

a sum of 5,000^l. has been set aside; of this at least 1,600^l.^{*} will be awarded to the plan classed as No. 1, and at least five of the final competitors will receive premiums; but the jury retain the right of distributing the total allotment among a greater number of competitors if they think fit.

In the final competition a general plan, section, and elevation are again required, accompanied by a general perspective view, all the three latter, as before, to be taken at any point the competitor prefers. What further drawings may be required will be decided by the jury after the preliminary competition; they may require the competitors to give drawings of one division or set of buildings; to a larger scale, we presume, than that of the general plan, though that is not stated in so many words. We observe also that no statement is made as to the scale to which the general drawings are to be made for the final competition; as far as appears, they are to be the same as in the first competition; but the fact that the scale is not defined appears to be an oversight. The point is of some importance as an indication of the amount of work a selected competitor will have to go through before his chance of ultimate success in the final competition. If the scale for the general plans is to be the same, there does not appear to be any reason why a competitor might not send in his general plans again for the final competition, if he is entirely satisfied with them. In connection with this point, however, it may be mentioned that a competitor selected in the preliminary competition has full liberty to modify his designs for the final one, and is not obliged to adhere to his first scheme. All descriptive writing on the plans is to be on the rooms described and not in the margin (a provision, obviously, against the possible waste of time of the jury in referring to schedules and reference letters), and it is all to be in English; no other language will be recognised. For a competition open to all the continental countries we should have thought French would have been more convenient.

The preliminary competition is to be decided by a jury of architects, viz: Mr. Norman Shaw, R.A. (London), M. Pascal (Paris), Professor Wallot (Dresden), Mr. Walter Cook (New York), and Mr. J. B. Reinstein (San Francisco). We are rather surprised that the committee did not apply to Mr. Waterhouse to be the English representative on the jury; in that particular function his name, we should imagine, would command more confidence with English competitors (if there are any) than that of any other English architect, more especially as this is a case in which plan is of the highest and most essential importance, and Mr. Waterhouse is a master of plan. For the final competition the jury will be composed of the five members of the preliminary jury, and of four architects who will be chosen by the Phebe Hearst Trustees, assisted by lists of names proposed by the competitors who are selected in the preliminary competition, each of whom will be invited to send five suggested names, the four who have most votes to be selected, subject, however, to proper provision for the international character of the jury.

The preliminary designs are to be delivered, not in San Francisco, but to the care of the United States Consul at Antwerp, by July 1 of this year. No date is yet fixed for the conclusion of the final competition, but it is stated that the selected architects will have not less than six months given them to mature their designs; and they will moreover, if they wish to study the site, receive, under certain conditions, first class transportation and expenses for the journey from their places of residence to San Francisco and return; a provision both liberal and sensible. There is to be no exhibition of the general collection of preliminary plans, but after the final competition the final and preliminary plans of all those who take part in it will be exhibited at the Mark Hopkins Institute of Art at San Francisco.

The programme has been deposited at various centres in different cities, that for London being the Institute of Architects.

Such is the outline of the arrangements for this very exceptional and perhaps unprecedented architectural competi-

^{*} In the programme the sums are given, naturally, in dollars; we give them here in English currency.

tion, concerning which it is difficult to predict whether it is likely to result in a grand success or a *fiasco*. The ultimate prize, for the man who comes out the winner in the final competition, is no doubt a grand one; but the work to be done for even the preliminary competition is so serious that it may be questioned whether many architects who are already in possession of a fair practice will care to go through it for the chance of selection to enter the final competition; for the premiums in the preliminary competition, though they may be thought liberal in comparison with ordinary competition standards, will by no means recompense the work to be undertaken. This will be realised at once when we say that the general plan includes no less than twenty-eight blocks of building, many of which must be extensive and elaborate in plan, and the plans of all of which must be given in as much detail as can be shown on the scale of 100 feet to an inch. The following is the list of these Departments, the requirements of which are in some cases drawn out at considerable length; we must content ourselves here with merely indicating the principal rooms required in some of the more important blocks:—

1. Administration: Including entrance to the University, offices of the president and secretaries, and for the meetings of regents and professors, reception-rooms, ante-rooms, committee-rooms, hall of records, etc.
2. University Library: For 750,000 volumes, with large reading-room, hall for papers and periodicals, study-rooms, etc.
3. University Museum: Provision for art, antiquities, ethnology, etc.
4. Auditoriums: Two, each adapted to lecture, concert, and theatre purposes, 5,000 and 3,100 respectively, and a garden arranged for celebrations and receptions.
5. Military Establishment: Four lecture-rooms, library, museum, gallery of models and drawings of military works, armoury, drill field, etc.
6. Gymnasiums: Two large halls for exercises, each with 200 dressing-rooms, and 100 shower baths; two swimming tanks, large field for athletic games, with stands and seats, "treated in a monumental and majestic style."
7. Printing and publishing Establishment.
8. Habitation: for 3,000 students, and for head of the Material Department and family, assistant doctor, superintendents—employees and workmen, etc., and two dining establishments for students.
9. Club Houses: Four, with all modern appointments.
10. Infirmary.
11. Approach and Communication: Porticos, galleries or corridors, interior staircases, elevators, etc.; covered communications between the various groups.
12. Buildings for the General Service: A central plant for production of power, heat, and light; workshops; telegraph and telephone stations; warehouses; fire department station, etc., etc.
13. The Departments of Instruction in general: Various adjuncts required in all the groups—cloak-rooms, lavatories, department libraries, study-rooms, etc.
14. Department of Philosophy and Pedagogy: Eleven lecture-rooms, twelve laboratories, etc.
15. Department of Jurisprudence: Eleven lecture-rooms, etc.
16. Department of History and Political Science: Fourteen lecture-rooms, gallery of geographical maps, etc.
17. Department of Ancient and Modern Languages: Fifty-four lecture-rooms.
18. Department of Mathematic: Fifteen lecture-rooms and model-room.
19. Department of Physics: Ten lecture-rooms, thirty-one laboratories, with necessary adjuncts, tower for vertical experiments, long gallery for optical experiments, machine-shop, etc., etc.
20. Department of Astronomy: Observatories for astronomy and meteorology, six lecture-rooms, dwellings for three astronomers and families.
21. Department of Chemistry: Three lecture-rooms, thirty-one laboratories, and a long list of accessory departments.
22. Department of Natural History: Ten lecture-rooms, various laboratories and their accessories, dissecting-rooms, vivisection-rooms, large museum of zoological collections in three sections, microscopical laboratories, herbarium, botanical garden, etc.
23. Department of Fine Arts: Providing everything for the teaching of the Fine Arts; painting, sculpture, architecture, music; etc.
24. Department of Agriculture: Seven lecture-rooms, many laboratories; museum for agricultural products, etc.
25. Department of Mechanical Engineering: This department includes electrical engineering. Eight lecture-rooms; eighteen laboratories; five drawing-rooms; three or four workshops, rooms for collections and models, etc.
26. Department of Civil Engineering: Accommodation similar to last department.
27. Department of Mining: Similar to No. 25; space and accommodations required for this department are about the same as

for the Department of Mechanical Engineering; power supplied from central station.

28. Department of Draughting and Graphical Analysis: Nine drawing-rooms, model-rooms, etc.

Bearing in mind that in the above statement of the requirements for the various blocks we have only given the principal items, and omitted a great quantity of minor detail, it will readily be seen, that this is a scheme which no man can adequately consider and sketch out plans for, even on the small scale demanded, between now and July 1, unless he put aside everything else that he was doing and devoted his whole time and thought to this one competition; and is it likely that any man who has a practice and has his living to make by it will abandon all his regular work for the sake of the chances offered to him here? The only people who are likely to go in for it are ambitious young men who have not got into practice, and who have enough to live on to support them while they are engaged in working out the California scheme; so, at least, the probability appears to us; and we do not suppose it was that class of architect which the promoters desired to attract. The promoters, in fact, seem to have been a little bitten with that disease of *megalomania* which is said by Nordau to be a special weakness of the present day; they have desired to have an architectural competition on such a scale as should throw all others into the shade; and they have gone beyond the limits of what it is possible to expect from competitors. They should have asked for a block plan of the site, with a sketch elevation and section, and detailed plans of perhaps two of the blocks, as an indication of the author's efficiency in the details of planning. With such a programme they might have attracted some of the most eminent architects from all countries. As it is, we very much doubt whether they will attract any such men. There may be still time to consider the matter and to announce such a modification of the conditions as we have suggested, through the Press, in such a manner that it should come under the eye of all actual or possible competitors; and the Trustees or their professional advisers would probably do well to take this point into consideration before it is too late, if they wish the competition to be a success. *The Builder, London.*

THE BEST FIREPROOF CONSTRUCTION FOR BUILDINGS OCCUPIED FOR MERCANTILE PURPOSES.

PAPER READ BY W. L. B. JENNEY BEFORE THE FIRE UNDERWRITERS' ASSOCIATION OF THE NORTHWEST.

CONTINUED FROM LAST ISSUE.



IN VIEW of these important developments, it is our opinion that important structures of this class should have a radically different method of fireproofing. The fireproofing should be in itself strong and able to resist severe shocks, and should if possible, be able to prevent the expansion of the steel work.

There seems to be but one material that is now known that could be utilized to accomplish these results and that is, first-class concrete. The fire resisting qualities of properly made concrete have been amply proven to be equal if not better than fire clay tile, as shown by the series of tests carried on by the Building Department of the City of New York.

The Engineering Record of September 16, 1897, states that in the Denver test a floor made of end construction porous terra cotta endured eleven alternate applications of

fierce flame and cold water, lasting 23 hours and finally endured a 24 hours continuous fire test and afterwards sustained a load of 12,500 lbs. which seems quite satisfactory still, personally, all things considered, I would give the preference to concrete.

From the experience gained in street railway construction in laying continuous rails, it is to a large degree possible to prevent the metal from expanding. In street railway work this has been accomplished merely by the adhesion of the pavement to the side of the rails. In building construction the same results could be obtained by encasing the columns and girders with concrete placed directly against the steel work. The adhesion of the concrete would to a large degree prevent unequal expansion of the concrete and steel. The floor arches should also be constructed of concrete but of sufficient depth to be able to resist lateral forces, except during a fire principally wind pressure. By the use of such floors with the prevention of injurious expansion and the protection of columns with materials that can stand severe shocks of any nature whatever the modern steel frame constructed building would be most thoroughly protected against any fire.

The construction herein suggested should not materially increase the cost of construction. The solid concrete about the columns would be added strength to same, and could no doubt be made self supporting. The same could be said of concrete surrounding beams and girders, as has been amply demonstrated by the strength developed by concrete iron constructions.

As so-called fireproof buildings are not equally and to the same degree, protected against fire, we would recommend to the insurance companies that they should vary the rate of insurance for this class of buildings, depending upon the character of the fireproofing used. The competition between fireproofing companies has been so severe as to reduce the price of their output, in very many instances at the expense of quality. The large fire loss in the Home building would still have been larger had the fireproofing been of poor quality, and we would further recommend that the insurance companies have prepared standard specifications governing the character of the fireproofing and the construction and putting up of same, and requiring owners of buildings to use fireproofing subject to these specifications, under careful inspection, or be subjected to higher insurance rates.

Before answering the question—"What is the best fireproof construction"—I will call your attention to another class of buildings known as "Mill Construction" much in vogue, particularly in St. Louis. The Chicago building ordinance permits building of this class to be 100 ft. in height as against 60 ft. for common construction. The underwriters give them an advantage of rate indicating a less hazardous risk. Are these advantages justified by the facts? I think not. Mill construction as understood by the Chicago Building Department is thus described in the city ordinances—"The term 'Mill Construction' shall apply to all buildings in which all the girders and joists supporting floors and roof have a sectional area of not less than 72 square inches, and above the joists of which there is laid a solid timber floor of thickness not less than 3 3/4 inches thick. Wooden posts used in buildings of this class shall not be of smaller sectional area than 100 sq. inches. Partitions and elevator enclosures in buildings of this class shall be made entirely of incombustible material. If iron pillars, girders or beams are used in building of this class, they shall be protected as provided for fireproof building; but the wooden posts, girders,

and joists, need not be protected by fireproof covering. The use of wood furring wood laths or steel partitions, shall not be permitted in buildings of this class."

On the 15th of March last there occurred a big fire in the heart of the wholesale district in St. Louis, a building occupied by the Ely-Walker Drygoods Co. Quoting from the St. Louis Democrat of the 16th of March, "the loss will be close on to \$1,500,000.00. One human life was lost and several people hurt. The fire was one of the worst the St. Louis fire department has had to cope with for a long time and for a time it looked as though there was to be a conflagration that would wipe out the Washington avenue wholesale district. The firm's enormous stock had been recently increased by large purchases of the finest lines of goods in the market, consequently every inch of available floor space was occupied by great piles of dry goods of every description for the spring trade." Desiring to obtain reliable information in regard to the character of the building burned I wrote to W. S. Eames, of Eames & Young, architects. Mr. Eames replied immediately as follows:

In regard to the recent destructive fire in our city, I beg to send you under separate cover two newspapers which contain very graphic and accurate descriptions of the fire, the amount of damage, the character of the contents of the building, etc. The fire began about half past seven on Monday night, and while I am dictating this letter I can see from my window the engines still attempting to quench it. Portions of all the walls remain, but the building is a total loss unless it be the foundation and the walls of the first and second stories. The building was not a fireproof building in any sense. It is what is known by the St. Louis Board of Fire Underwriters as "a standard slow combustion building." I enclose a printed specification for such buildings as issued by our Board of Underwriters. The building in question complied with all of the requirements of this specification except as to area and height. The building is about 120 ft. square and seven stories in height. It had three street fronts and a blind wall on the other enclosing side. The two principal street fronts were faced with Long Meadow brown sand stone. It was one of the last works of the late H. H. Richardson, and was of course Romanesque in style. Of course the stone work of the two street fronts was principally Ashlar backed with brick work. The building was constructed by Norcross Bros., of Boston. The basement, first and second stories, I think, had cast iron columns enveloped in fire clay casings plastered. The remaining columns were of southern yellow pine. The wooden girders, wooden floor beams and heavy planking were of Long Leaf Mississippi or Louisiana pine. The building was not equipped with automatic sprinklers and to this defect is attributed the loss of the building and its contents. The stairways and elevators were enclosed in brick shafts with standard metal covered doors to all openings.

The fire burned for about three hours apparently entirely within the building. Then came a collapse (which probably was caused by the fall of the burned wooden posts) whereupon the fifth, sixth, and seventh floors and the roof fell in and created an opportunity for a tremendous conflagration. The enormous mass of heavy dry seasoned beams and flooring made an irresistible fire with a heat of great intensity. The first, second and third floors are still in position but of course the intense heat has damaged what remains of the walls, and the contents of the building are a total and irreparable loss.

Most of the commercial mercantile building in this city have for the past seven or eight years been constructed upon

the slow combustion principle. The reason being that the Board of Underwriters gives a rate on such construction that makes it profitable to the owner of the building as well as the occupant. Nearly all of the buildings in the Cupples Block, of which we were the architects, are buildings of this type of construction. But special constructive features have been added to the requirements of the underwriters and the entire plant is thoroughly equipped with the very best system of automatic sprinklers."

The specifications of the St. Louis Board of Fire Underwriters for mill construction, although more in detail, do not differ materially from the Chicago city ordinances, which were quoted. In these buildings there is no lath and no plaster, hence, no covered passages, so that the fire is entirely exposed to the direct action of the fire department. This is certainly an advantage at the outset of a fire. It also enables the fire department, after the fire is well under control, to extinguish it entirely. There is no opportunity for the fire partially extinguished to be hidden under lath and plaster and to break out later. To this extent the system is advantageous but under the conditions under which the Horne building was placed—the raging fire across the street to windward, inflaming the goods in every store at the same instant—mill construction feeds the flame and causes total loss in an incredibly short time. Several Boston fires, the Jenkins building at Pittsburgh, as well as the St. Louis fire, have shown that no advantage as against loss can be expected from this class of construction. The timbers add so much fuel to the flames after the fire is once under way. In these buildings we meet another difficulty. The long heavy timbers required for that construction can be obtained cheapest and easiest in southern or pitch pine. Moreover, this material is usually considered to carry a heavier load than oak. For example, a 10 in. x 10 in. post in Georgia pine would require by formula in general use to be 11 in. x 11 in. if in oak. Oak is much safer from fire but unfortunately cannot be obtained of the requisite dimensions and moreover costs about 50 per cent more per thousand, than southern or pitch pine, which can be obtained free from knots direct from the mills smooth dressed to the sizes demanded, hence, this is the material usually employed for such buildings. This southern pine, often called pitch pine, is as its name implies full of pitch. It is the most inflammable of all the usual building materials. The pitch distills out by heat and rapidly catches and spreads the fire with rapidity, so that the usual so-called "Slow Burning Construction" often used as a synonym for "Mill Construction" is a misnomer and offers no protection against the burning of a stock of goods beyond the ordinary common construction and is not entitled to any reduction in rate. Indeed, when pitch pine is used, I should be inclined to place this construction as extra hazardous as the building could be set on fire by the burning of a newspaper or by a gas jet flaming against the wood. Such a fire once started usually feeds itself and spreads rapidly over the entire building. I also object to the use of southern pine for the floors and interior finish of apartment houses as unnecessarily hazardous, for there is no doubt but what pitch pine helps along a fire and greatly increases the loss above what it would have been had oak been used instead of the pitch pine.

The Jenkins building at Pittsburg is reported by the Insurance World as of mill construction. Also the store in St. Louis occupied by the Ely-Walker Co., and many of the Boston buildings.

To be Continued.

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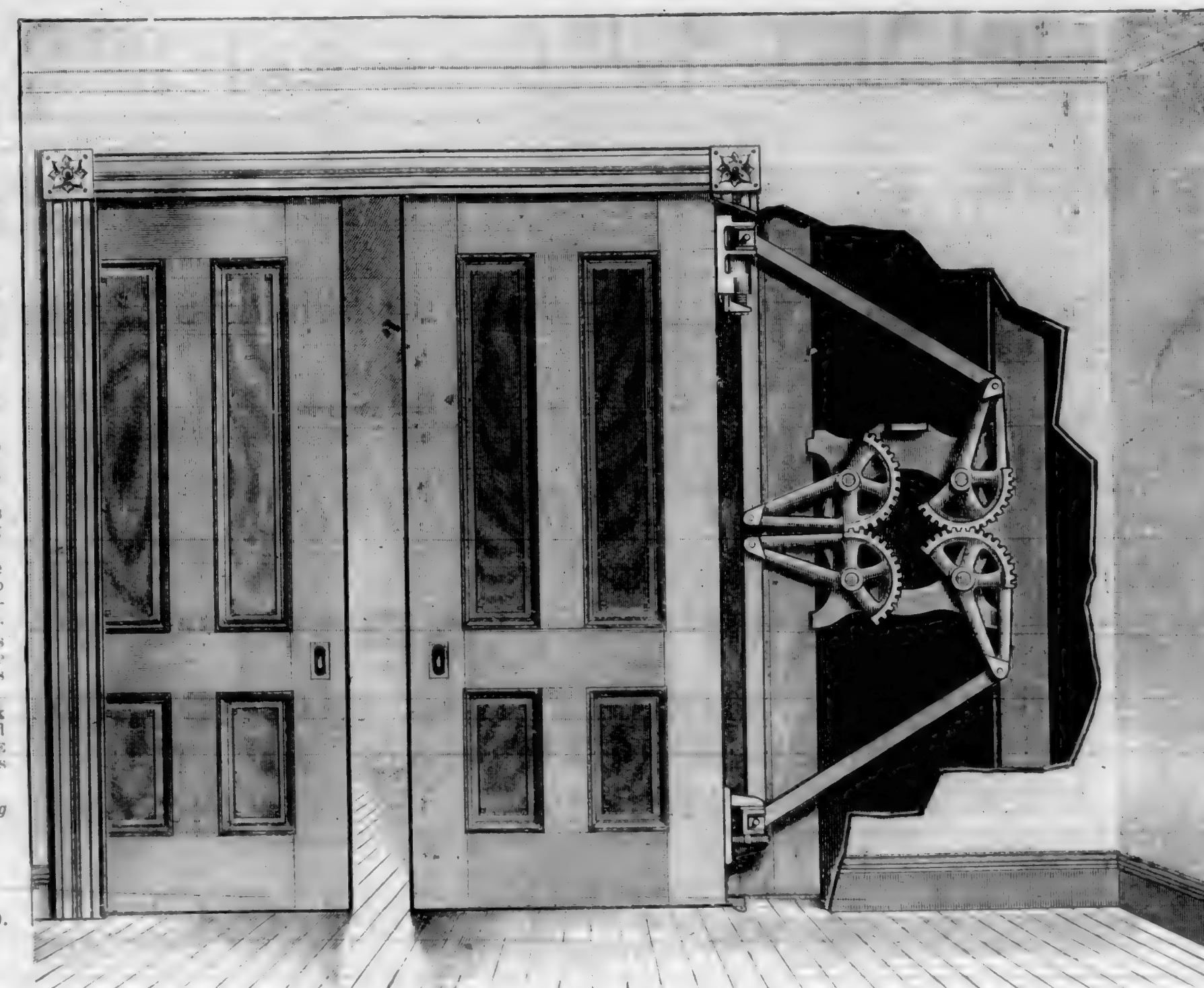
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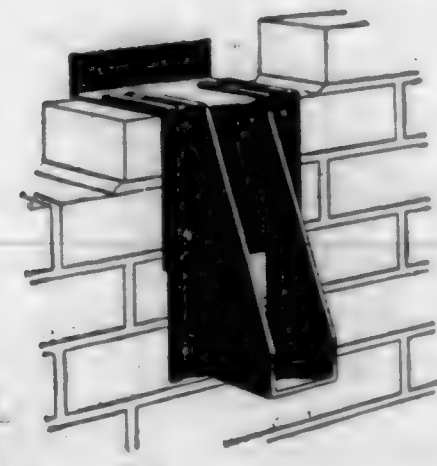
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Brennan-James, plasterers.	Brennan-James, plasterers.
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Brodie, R., iron works.	Brodie, R., iron works.
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Burnham, Stanford Co., planing mill.	Burnham, Stanford Co., planing mill.
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Burt, W. J., house mover.	Burt, W. J., house mover.
Butler, Wm. A., mason and builder.	Butler, Wm. A., mason and builder.
California Art Glass Works.	California Art Glass Works.
California Electrical Works.	California Electrical Works.
California Mills, planing mill.	California Mills, planing mill.
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Carey, J. B., brick manufacturer.	Carey, J. B., brick manufacturer.
Carle, Silas, contractor and builder.	Carle, Silas, contractor and builder.
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Depew, Chas. M., planing mill.	Depew, Chas. M., planing mill.
Dillon, David, teamster and contractor.	Dillon, David, teamster and contractor.
Donovan, M. J., painter.	Donovan, M. J., painter.
Dunbar, Wm., mason and builder.	Dunbar, Wm., mason and builder.
Dunham, Carrigan & Hayden Co., hardware.	Dunham, Carrigan & Hayden Co., hardware.
Dunlop, Chas., plasterer.	Dunlop, Chas., plasterer.
Dwyer, L. J., painter and decorator.	Dwyer, L. J., painter and decorator.
Dyer Bros., Golden West Iron Works.	Dyer Bros., Golden West Iron Works.
Elam, & Knowles, carpenters and builders.	Elam, & Knowles, carpenters and builders.
Excelsior Mill Co.	Excelsior Mill Co.
Feely, M. J., contractor and builder.	Feely, M. J., contractor and builder.
Fennell, M. & Son, masons and builders.	Fennell, M. & Son, masons and builders.
Field, Wm. J., contractor and builder.	Field, Wm. J., contractor and builder.
Field, Z. O.	Field, Z. O.
Flanagan, L. G., lime and cement.	Flanagan, L. G., lime and cement.
Foley, Michael, grading and teaming.	Foley, Michael, grading and teaming.
O'Brien, Jas. J., carpenter and builder.	O'Brien, Jas. J., carpenter and builder.
O'Brien, P. R. & Son, plumbers.	O'Brien, P. R. & Son, plumbers.
O'Connor, Thomas, mason and builder.	O'Connor, Thomas, mason and builder.
Forde, Cornice Works, patent sky lights, roof- ing, etc.	Forde, Cornice Works, patent sky lights, roof- ing, etc.
Forman Brick Co.	Forman Brick Co.
Frazer, J. P., painter and decorator.	Frazer, J. P., painter and decorator.
Fuller, W. P. & Co., paints, oils and glass.	Fuller, W. P. & Co., paints, oils and glass.
Furness, John, contractor and builder.	Furness, John, contractor and builder.
Geler, Frank A., Market Street Planing Mills.	Geler, Frank A., Market Street Planing Mills.
Giletti, Secondo, artificial stone.	Giletti, Secondo, artificial stone.
Gillogley, Geo., teaming.	Gillogley, Geo., teaming.
Girvin & Eyre, Importers.	Girvin & Eyre, Importers.
Gladding, McLean & Co., architectural terra cotta.	Gladding, McLean & Co., architectural terra cotta.
Golden West Iron Works, Dyer Bros.	Golden West Iron Works, Dyer Bros.
Goodman, Geo., artificial stone, etc.	Goodman, Geo., artificial stone, etc.
Granville, J. & Co., steam heating, etc.	Granville, J. & Co., steam heating, etc.
Grant, W. J., contractor and builder.	Grant, W. J., contractor and builder.
Gray Bros., artificial stone and concrete work.	Gray Bros., artificial stone and concrete work.
Griesse, Carl, artificial stone and concrete work.	Griesse, Carl, artificial stone and concrete work.
Hammond, Philip, metal roofers.	Hammond, Philip, metal roofers.
Hansen, A., planing mill.	Hansen, A., planing mill.
Hansen, F. L., contractor and builder.	Hansen, F. L., contractor and builder.
Hansen, N. & Co., planing mill.	Hansen, N. & Co., planing mill.
Harmann Lumber Co., lumber.	Harmann Lumber Co., lumber.
Harris & Jones, Lumber Dealers.	Harris & Jones, Lumber Dealers.
Hastings, H. L.	Hastings, H. L.
Heidt, W., cornice works.	Heidt, W., cornice works.
Henzel, Ed. F. & Co., electricians.	Henzel, Ed. F. & Co., electricians.
Herring, R., mill work.	Herring, R., mill work.
Hille, Wm., cornice works.	Hille, Wm., cornice works.
Hindes, Ed. B. & Co., patent blinds.	Hindes, Ed. B. & Co., patent blinds.
Hobson, B. Y., painter.	Hobson, B. Y., painter.
Hoffman, V., mason and builder.	Hoffman, V., mason and builder.
Holmes, H. T., Lime Co., lime, cement, etc.	Holmes, H. T., Lime Co., lime, cement, etc.
Hooper, C. A. & Co., lumber.	Hooper, C. A. & Co., lumber.
Hulst, Frank, sash, blinds and doors.	Hulst, Frank, sash, blinds and doors.
Hurlbut, R. P., builder.	Hurlbut, R. P., builder.
Ickelheimer, Samuel & Bro., plumbers.	Ickelheimer, Samuel & Bro., plumbers.
Ingersoll, G., contractors and builders.	Ingersoll, G., contractors and builders.
Jacks, Henry, contractor and builder.	Jacks, Henry, contractor and builder.
Jackson, P. H. & Co., illuminating tiles.	Jackson, P. H. & Co., illuminating tiles.
Jackson, W. E., curbing.	Jackson, W. E., curbing.
Jesse, Geo. R., sash, blinds and doors.	Jesse, Geo. R., sash, blinds and doors.
Jordan, D., & Son, masons and builders.	Jordan, D., & Son, masons and builders.
Joshua Hendy Machine Works.	Joshua Hendy Machine Works.
Judson Mill Co.	Judson Mill Co.
Keating, M., Artificial Stone.	Keating, M., Artificial Stone.
Keatinge, R., Artificial Stone.	Keatinge, R., Artificial Stone.
Kellener, M., house raiser and mover.	Kellener, M., house raiser and mover.
Kendall, A., Pacific Coast Lumber and Mill Co.	Kendall, A., Pacific Coast Lumber and Mill Co.
Keefe, J. H., painter and decorator.	Keefe, J. H., painter and decorator.
Kent, S. H., contractor and builder.	Kent, S. H., contractor and builder.
Kern, F. W., contractor and builder.	Kern, F. W., contractor and builder.
Kittredge, E. H. & Co., sash, doors and blinds.	Kittredge, E. H. & Co., sash, doors and blinds.
Knox & Cook, contractors and builders.	Knox & Cook, contractors and builders.
Kuss, P. N., painter, decorator and wood finisher.	Kuss, P. N., painter, decorator and wood finisher.
Lang, Geo., contractor and builder.	Lang, Geo., contractor and builder.
Larsen, H. H., mason and builder.	Larsen, H. H., mason and builder.
Leahy, D., plasterer.	Leahy, D., plasterer.
Leonard, J., Concrete and Artificial Stone.	Leonard, J., Concrete and Artificial Stone.
Leprohon, P., steam and hot water heating.	Leprohon, P., steam and hot water heating.
Logan, J. F., adjuster and builder.	Logan, J. F., adjuster and builder.
Lovett, A. E., roof repairing and painting.	Lovett, A. E., roof repairing and painting.
Lucas & Co., Gilded Gate Plaster Mills, caliche plaster.	Lucas & Co., Gilded Gate Plaster Mills, caliche plaster.
Lynch, M. C., contractor and builder.	Lynch, M. C., contractor and builder.
Macdonald & McKinnon, lumber.	Macdonald & McKinnon, lumber.
MacGure, A. B., lime, hills, plaster, cement, etc.	MacGure, A. B., lime, hills, plaster, cement, etc.
MacLure, James A., manufacturer's agent.	MacLure, James A., manufacturer's agent.
Mangiesdorf, M., Electrical Maintenance Co.	Mangiesdorf, M., Electrical Maintenance Co.
Manzrum & Otter, heating, ventilating, tiles, etc.	Manzrum & Otter, heating, ventilating, tiles, etc.
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McCarthy, John, mason and builder.	McCarthy, John, mason and builder.
McClure, H. N., teaming and grading.	McClure, H. N., teaming and grading.
McElroy, A., contractor and builder.	McElroy, A., contractor and builder.
McIlvray Stone Co., stone contractor.	McIlvray Stone Co., stone contractor.
McGowan, M., mason and builder.	McGowan, M., mason and builder.
McKee, John, stair builder.	McKee, John, stair builder.
McLachlan, T. M., contractor and builder.	McLachlan, T. M., contractor and builder.
McMahon, Henry, stair builder.	McMahon, Henry, stair builder.
McPhee & Co., stone contractors.	McPhee & Co., stone contractors.
Meenie, Alex., plasterer.	Meenie, Alex., plasterer.
Miller, J. W., mason and builder.	Miller, J. W., mason and builder.
Miller & Hamilton, planing mill.	Miller & Hamilton, planing mill.
Mitchell, R., mason and builder.	Mitchell, R., mason and builder.
Montague & Co., W. W., tiles, mantles, etc.	Montague & Co., W. W., tiles, mantles, etc.
Moore, C. Parker, contractor and builder.	Moore, C. Parker, contractor and builder.
Moore, G. Howard, contractor and builder.	Moore, G. Howard, contractor and builder.
Morehouse, C. O., plasterer.	Morehouse, C. O., plasterer.
Morehouse, J. J., plasterer.	Morehouse, J. J., plasterer.
Muleahy, J., mason and builder.	Muleahy, J., mason and builder.
Niehau, Edward F. & Co., hardwood lumber.	Niehau, Edward F. & Co., hardwood lumber.
Niehau Bros. & Co., planing mill.	Niehau Bros. & Co., planing mill.
Nutting, C.	Nutting, C.
Ogle, John, contractor and builder.	Ogle, John, contractor and builder.
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Pacific Bridge Co.	Pacific Bridge Co.
Pacific Kelling & Roofing Co.	Pacific Kelling & Roofing Co.
Pacific Lumber Co.	Pacific Lumber Co.
Pacific Rolling Mills.	Pacific Rolling Mills.
Pachitz, Gus. J., electrician, etc.	Pachitz, Gus. J., electrician, etc.
Palace Hardware Co., builders' hardware.	Palace Hardware Co., builders' hardware.
Paradine Paint Co., roofers, building paper.	Paradine Paint Co., roofers, building paper.
Patent Brick Co., brick.	Patent Brick Co., brick.
Peacock & Butler, masons and builders.	Peacock & Butler, masons and builders.
Petersen Brick Co., original red pressed brick.	Petersen Brick Co., original red pressed brick.
Petersen, H. M. & Co., concrete.	Petersen, H. M. & Co., concrete.
Phinney, F. L., hardwood.	Phinney, F. L., hardwood.
Pleasant, Henry, mason and builder.	Pleasant, Henry, mason and builder.
Pool, Jas. R., house mover and raiser.	Pool, Jas. R., house mover and raiser.
Rae, James, stone contractor.	Rae, James, stone contractor.
Rabson Iron Works.	Rabson Iron Works.
Raymond Granite Co., contractors for stone work.	Raymond Granite Co., contractors for stone work.
Reichley Geo., contractor and builder.	Reichley Geo., contractor and builder.
Reigle & Jamieson, machine white washing.	Reigle & Jamieson, machine white washing.
Reynold Brick Co., pressed stock and common brick.	Reynold Brick Co., pressed stock and common brick.
Rice, Richard, plumber.	Rice, Richard, plumber.
Richardson & Gale, masons and builders.	Richardson & Gale, masons and builders.
Richmiller, Geo., door opener.	Richmiller, Geo., door opener.
Riley John F., masons and builders.	Riley John F., masons and builders.
Ringrose, R., mason and builder.	Ringrose, R., mason and builder.
Robinson & Gillespie, contractors and builders.	Robinson & Gillespie, contractors and builders.
Rocklin Granite Co., granite work.	Rocklin Granite Co., granite work.
Rosenbaum, Fr. H., glass.	Rosenbaum, Fr. H., glass.
Ruffino & Bianchi, marble.	Ruffino & Bianchi, marble.
Sacramento Transportation Co., patent and stock brick.	Sacramento Transportation Co., patent and stock brick.
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San Francisco Novelty and Plating Works.	San Francisco Novelty and Plating Works.
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San Joaquin Brick Co., brick.	San Joaquin Brick Co., brick.
San Jose Brick Co., brick.	San Jose Brick Co., brick.
Saunders, J. S. W., contractor and builder.	Saunders, J. S. W., contractor and builder.
Schroeder, Wm., art glass.	Schroeder, Wm., art glass.
Scott & Van Arsdale Lumber Co.	Scott & Van Arsdale Lumber Co.
Sessions, M. P.	Sessions, M. P.
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Smith & Young, building supplies.	Smith & Young, building supplies.
Smith & Quinby, street contractors.	Smith & Quinby, street contractors.
Snell, E. L., lime and plaster.	Snell, E. L., lime and plaster.
Snook, W. S. & Son, plumbers.	Snook, W. S. & Son, plumbers.
Sonic Bros., carpenters.	Sonic Bros., carpenters.
Steiger, A., Sons, architectural terra cotta.	Steiger, A., Sons, architectural terra cotta.
Stevens, F. M., patent chimneys.	Stevens, F. M., patent chimneys.
Stockton Brick & Terra Cotta Co.	Stockton Brick & Terra Cotta Co.
Stratton, Jno. S., house mover.	Stratton, Jno. S., house mover.
Sullivan, J. F., painter and decorator.	Sullivan, J. F., painter and decorator.
Sullivan, Tim, carpenter.	Sullivan, Tim, carpenter.
Sullivan, M. F., grading and teaming.	Sullivan, M. F., grading and teaming.
Sweeney, Daniel, carpenter.	Sweeney, Daniel, carpenter.
Sweeney, G. C., plumber.	Sweeney, G. C., plumber.
Taroma and Broch, Lumber Co.	Taroma and Broch, Lumber Co.
Tay, Geo. H. Co., plumbers' supplies.	Tay, Geo. H. Co., plumbers' supplies.
Tobin, J. R., plasterer.	Tobin, J. R., plasterer.
Towle & Broadwell.	Towle & Broadwell.
Trotter, John, contractor and builder.	Trotter, John, contractor and builder.
Tupper, O. M., lime.	Tupper, O. M., lime.
Tuttle, John, teamster, plasterers' supplies.	Tuttle, John, teamster, plasterers' supplies.
Union Lumber Co., lumber.	Union Lumber Co., lumber.
Vermont Marble Co.	Vermont Marble Co.
Vulcan Iron Works.	Vulcan Iron Works.
Wagner, Henry F., painting and decorating.	Wagner, Henry F., painting and decorating.
Wagner, J. Ferd., mason and builder.	Wagner, J. Ferd., mason and builder.
Walker, George H., carpenter.	Walker, George H., carpenter.
Walker, J. W., plasterer.	Walker, J. W., plasterer.
Warren, C. A., grading.	Warren, C. A., grading.
Washington & Moon Mill Co.	Washington & Moon Mill Co.
Washington Street Planing Mill.	Washington Street Planing Mill.
Waterhouse, C. J.	Waterhouse, C. J.
Watson, W. C., plasterer.	Watson, W. C., plasterer.
Western Granite & Marble Co.	Western Granite & Marble Co.
Western Iron Works.	Western Iron Works.
White Bros., carpenters.	White Bros., carpenters.
White Bros., hardwood lumber.	White Bros., hardwood lumber.
Whittle, H., mason and builder.	Whittle, H., mason and builder.
Williams, F. A., contractor and builder.	Williams, F. A., contractor and builder.
Williamson, H., plumber.	Williamson, H., plumber.
Wilson, Bros. & Co., lumber.	Wilson, Bros. & Co., lumber.
Wilson, W. F., plumber.	Wilson, W. F., plumber.
Wilson, James A., mason and builder.	Wilson, James A., mason and builder.
Witkie, Andrew, planing mill.	Witkie, Andrew, planing mill.
Witkie, Andrew, Jr., & Co.	Witkie, Andrew, Jr., & Co.
Worrel, C. R., mason and builder.	Worrel, C. R., mason and builder.
West Coast Wire Works.	West Coast Wire Works.
Western Expanded Metal & Fire Proofing Co.	Western Expanded Metal & Fire Proofing Co.
Yates & Co., paints.	Yates & Co., paints.
Young, S. F., grading and teaming.	Young, S. F., grading and teaming.

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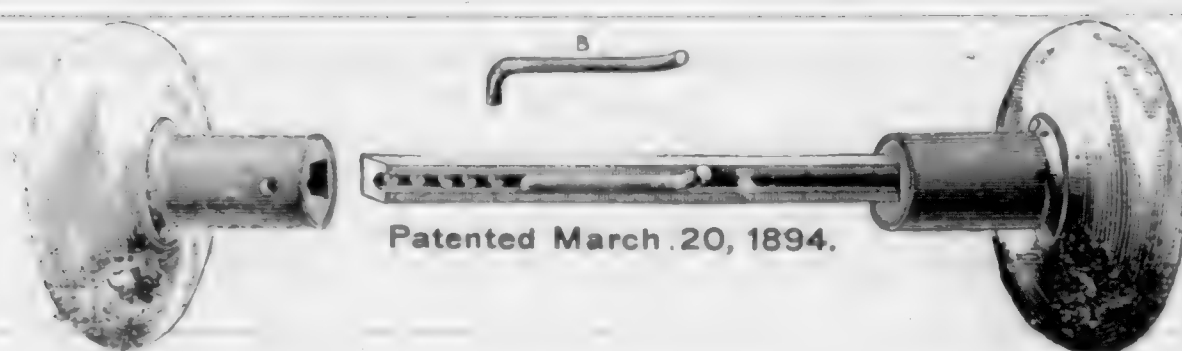
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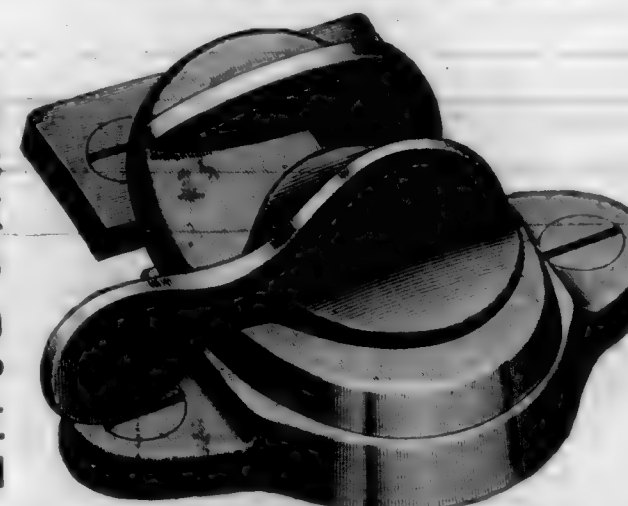
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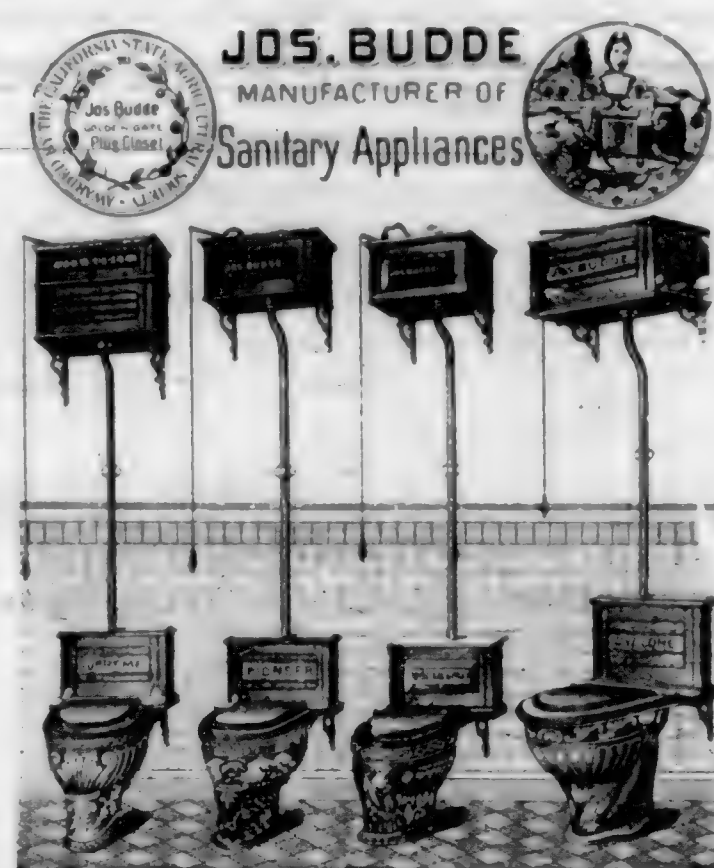
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\$3.00 PER YEAR

VOLUME XIX, No. 4.

APRIL, 1898.

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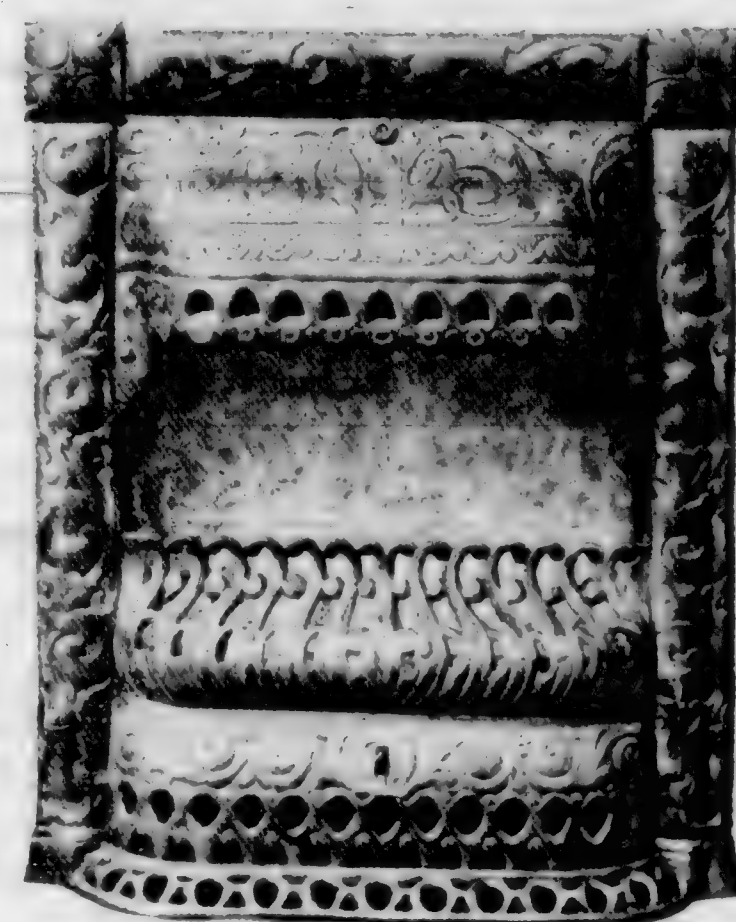
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SAN FRANCISCO, CAL.

BUILDING NEWS.

Broadway near Steiner. To build; o. Marie J. Radford; architect. G. K. Radford; c. Kidder & Cooper; signed, March 30; filed, March 31; cost \$1433.
Bush near Montgomery. All work except heating and ventilating for additions and alterations to six-story brick; owner, Pacific Telephone and Telegraph Co.; a. Albert, Sutton; c. Walker Bros. Co.; signed, March 28; filed, March 29; cost \$14,150. Iron and steel work; c. Walker Bros.; subc. Baisden Iron Works; signed, March 28; filed, March 30; cost \$948.
Bush near Fillmore. Alterations and additions; o. George E. Schulz; c. Henry Behrens; cost \$100.

Brvant near Boardman Place. Alteration and additions; owner, Louis Randolph; a. H. D. Mitchell; c. A. N. Nelson; signed, March 30; filed, March 30; cost \$1600.

Buchanan near Geary. To build; owner, George Roth; a. Safford & Kohlberg; c. H. Behrens; signed, April 2; filed, April 7; cost \$7485.

Central Ave. near Jackson. To build; owner, Albert B. McKee; a. Albert I. Fain; c. Reil & Ahlgren; signed, April 7; filed, April 9; cost \$4700.

Crescent Ave. near Roscoe. To build; o. Edward T. and Lou L. Miller; c. Erick Bros.; signed, March 24; filed, April 2; cost \$1235.

Dolores and 18th. Three-story frame; o. Martin Gosselk; a. H. Geiffuss; c. W. Hornmeyer & Co.; signed, April 2; filed, April 4; cost \$1890.

Dupont and Filbert. Three-story frame; o. Rosa Demuth; a. Mosser & Son; c. Garcia & Pearnich; signed, April 7; filed, April 9; cost \$3200.

Ellis and Pierce. To build; o. Margaret O'Brien; a. W. F. O'Brien; c. T. B. Smith; signed and filed, March 28; cost \$1120.

Eleventh Ave. near M. Cottage; o. J. A. Jacobs; cost \$1000.

Felt near Lott. Three-story frame; o. Mrs. Elizabeth A. McDuff; a. Edward R. Swain; c. George R. Lange; signed and filed April 11; cost \$6100.

Ferry Depot. Shed over boilers and heating plant; o. Board of Harbor Commissioners; c. G. W. Campbell; cost \$2067.

Geary and Jones. To build; o. Ruby A. Root; a. C. A. Mousstetter; c. Frank Steinman; signed, March 18; filed, March 21; cost \$10,674.

Gough and California. To build; o. Lewis Gierstle; a. Edgar A. Mathews; c. Edward Lietzer; signed, March 22; filed, March 24; cost \$28,075.

Grove and 32d. To build; o. John J. Hill; c. J. P. Beckett; signed, April 1; filed, April 2; cost \$1375.

Heron near 8th. To build; o. Margaret A. Mee; a. H. M. Woolley; c. D. W. Ross; signed, April 4; filed, April 6; cost \$200.

Hyde near Bay. Construction of a wharf; o. Equitable Gas Co.; c. Darby Laydon & Co.; signed, March 7; filed, March 19; cost \$880.

Hyde near Bay. Two gas holders and steel tanks; o. Equitable Gas Light Co.; a. Engineer of the Co.; c. H. Behrens; signed, April 9; filed, April 11; cost \$200.

Jackson near Polk. Excavations, etc.; o. Catherine Hoch; a. Jules Godard; c. Crawford Ferris; signed, March 18; filed, March 24; cost \$1050. Carpentry, mill and stair work, etc.; c. W. J. Field; signed, March 22; filed, March 24; cost \$1700.

Jessie near 14th. To build; o. Patrick Long; c. W. H. Hagger; cost \$200.

Jones near Filbert. Three-story frame; o. Mrs. Josephine V. Yest; c. E. W. Hyde; cost \$4400.

Kearny near Pine. Alterations and additions; o. Charlotte L. Gashwiler; a. J. T. Kidd; c. C. F. Shelby; signed and filed, March 24; cost \$1154.

Laguna and O'Farrell. Plumbing for three flats; o. L. Kutter; a. W. J. Cuthbertson; c. Eckelheimer; cost \$800. Painting; c. W. Shafer; cost \$400.

Market street, Nos. 937-943. Alterations; o. Claus Spreckels; c. T. T. Pottinger; cost \$1500.

Market near Sacramento. Grading, etc. for brick building; o. Emily F. Pope; a. Pissis & Moore; c. Jas. A. McMahon; signed, March 23; filed, March 24; cost \$11,085.

Market near 4th. Electric plant in Parrott building; o. Central Light and Power Co.; c. Union Iron Works; signed, April 5; filed, April 8; cost \$30,000.

Main and Folsom. All work for frame and iron building; o. Keystone Boiler Works; a. Percy & Hamilton; c. Anderson & Greig; signed, March 19; filed, March 21; cost \$7500.

BUILDING NEWS.

Mission near 18th. Repairs; o. Walter F. Foster; a. McDougall & Bros.; c. P. J. Brennan; signed, March 29; filed, March 30; cost \$1470.

Mission near 2d. Iron, steel work, etc.; o. Wells, Fargo & Co.; a. Percy & Hamilton; c. Joseph F. Forderer; signed, March 28; filed, March 28; cost \$12,624.

Oak near Laguna. To build; o. George J. Anderson; a. D. V. Dunt; c. Petersen & Persson; signed, April 2; filed, April 4; cost \$3190.

Railroad Ave. near Oak. Two-story frame; o. B. Vergez and A. Methebat; c. C. A. Henderlong; signed, April 4; filed, April 5; cost \$3800.

Second and Mission. Ornamental cast and wrought iron work; o. Wells, Fargo & Co.; a. Percy & Hamilton; c. Winslow Bros. & Co.; signed, March 19; filed, April 4; cost \$28,000.

Second near California. To build; o. Miss Mary McQuaid; c. John Keneally; signed, April 6; filed, April 7; cost \$2575.

Scott near Broadway. Two-story frame; o. W. F. Herrin; a. Julius E. Kraft; c. Anderson & Greig; signed, March 17; filed, March 29; cost \$673.

Stockton near Vallejo. Two-story frame; o. Hirsch Bros.; c. H. P. Conrady; signed and filed, April 6; cost \$4500.

Sutter near Taylor. Alterations and additions; o. Mrs. Mary A. Gaffney; a. Kenitzer & Barbi; c. Hannah Bros.; signed and filed, April 4; cost \$2,330.

OAKLAND

Sixth and Allee. To build; o. Henry Hennings; a. McNally & Slattery; c. A. H. Denke, Sr.; signed, March 23; filed, March 24; cost \$4350.

Adeline and 10th. Additions and alterations; o. M. Jones; a. Chas. Mau; c. McCracken & Lee; signed, and filed, March 8; cost \$210.

Tenth and Broadway. To build; o. John Lancaster; a. J. Conant; c. J. M. Shay; signed, March 30; filed, March 31; cost \$4157.

Butler Ave. near Idaho. To build; o. Wm. J. Elfert; a. John J. and T. D. Newsum; c. J. House; signed, April 7; filed, April 8; cost \$1800.

April, 1898.]

THE CALIFORNIA ARCHITECT AND BUILDING NEWS.

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BUILDING NEWS.

Forty near Grove. Two-story frame; o. Arch-Bishop of S. F. by Rev. Father L. Seda; a. Etienne A. Garin; c. P. G. McIntyre; signed, April 6; filed, April 7; cost \$255.

Fourteenth and Clay. Alterations and additions; o. First Methodist Episcopal Church; a. Samuel Newson; c. M. S. Libbey; cost \$500.

Ro El Valle de San Jose. To build Engine house; o. Pliebe A. Hearst; a. F. S. Van Trees; c. Charles and Walter Williams; signed and filed, April 12; cost \$4187.

Thirty-fifth near Telegraph Ave. To build; c. C. D. and Bessie Lither; c. Todd & Cornell; signed, April 7; filed, April 11; cost \$1520.

Union near 12th. Cottage; o. D. Knabbe; a. Chas. Mau; c. J. W. Baughman; signed, April 4; filed, April 12; cost \$1940.

Webster near Durant. To build; o. I. M. Condit; a. Geo. A. Bordwell; c. B. C. Allen; signed and filed, March 23; cost \$2500.

PIEDMONT

Club House. Piedmont Development Co.; a. D. F. Oliver; c. H. C. Canfield; signed and filed, March 21; cost \$2885.

ALAMEDA

Pacific Ave. near Chestnut. Brick and carpenter work; o. Thos. H. Kelly; c. Theo. Vectors; signed, April 2; filed, April 3; cost \$184670.

BOLINAS

To build. O. Bell C. and Grace Nichols; a. Oliver Everett; c. Edward Blotch; signed and filed, April 6; cost \$1344.

ROSS STATION

Dibble Tract, lot 10. Cottage and bath; o. Edward G. Seimdtell; a. Geo. H. Howard; c. Thos. O'Connor; signed and filed, April 7; cost \$3900.

SAN RAFAEL

B street. Cottage; o. C. A. Burkhardt; a. B. A. Brown; c. Thos. O'Connor; signed, April 4; filed, April 6; cost \$1550.

By a decisive vote at a recent election here, it was decided to issue bonds to the extent of \$150,000 for the purpose of erecting a High School building.

SAUSALITO

On grounds of El Monte Hotel. To build one-story frame dancing pavilion; o. Excelsior Loan Association; a. B. A. Brown; c. J. Strittmatter; signed, April 5; filed, April 6; cost \$1550.

BERKELEY

Bancroft Way near College Ave. Two-story frame; o. Lloyd Tevis; a. A. S. Smith; c. Anderson & Stockholm; signed, March 28; filed, March 31; cost \$242550.

Humboldt Ave. and Prince street. To build; o. Walter Deakin; c. C. M. McGregor; signed, April 11; filed, April 12; cost \$104.

Telegraph Ave. near Durant Ave. Two-story frame; o. C. L. Tilden, T. H. Bishop; a. Edward B. Seely; c. Kiddier & Copper; signed, April 6; filed, April 7; cost \$7727.

BUILDING NEWS.

LOS ANGELES

Henry D. Thompson has purchased the southeast corner of Sixth and Bonnie Brae streets, and is having a plan prepared for a suitable residence.

H. B. Hubbard has purchased a lot on Alvarado street, between Tenth and Eleventh streets, upon which he intends erecting a two-story residence.

Architects Ferris & Kromnick are preparing plans for James Christie, of a six-room cottage, to be built at Pico Heights.

Architects Bradbeer and Russell have prepared plans for Morris Klein of a six-room cottage, to be erected on Tenth and Union avenues.

Architect R. B. Young has prepared plans and taken bids for a two-story frame building 36x36 feet, for the Pacific School of Osteopathy. The location may possibly be the corner of Tenth and Figueroa streets.

Architect F. L. Roebig has prepared plans for the Southern California Savings Bank for extensive alterations to the southeast corner of Court and Spring streets, by which they will occupy when completed the entire ground floor of their bank building.

Architect John P. Krumpholtz is working on the detail drawings for the sugar house of the Oxnard beet sugar factory at Oxnard. Its dimensions are 400x120 feet; steel frame, expanded metal and fire-proof floor construction. The window frames, 30 in number, will be constructed of galvanized iron, and galvanized corrugated iron will be used for roofing. The steel frame work is well advanced, and work on the brick walls will commence shortly.

Architect A. M. Edelman has prepared plans for the estate of C. H. Heilman of a two-story business building 32x80 feet, to be built on the west side of Main street near Third street.

Architect Edward Neisser has let the contract for the erection of four flats, located on the east side of Olive street, between Tenth and Eleventh streets, to E. C. Shipley.

Architects Bradbeer and Russell have prepared plans for Mrs. E. Woolcott, for a five-room cottage to be built on Central avenue, between Seventh and Eighth streets.

Architect H. F. Starbuck is calling for bids for a church building to be erected on Third street by the congregation of the Knox Presbyterian church.

Architect C. L. Strange has prepared plans for a two-story 10-room residence, cobblestone foundation, natural wood inside finish; to be built on Burlington avenue.

Architects Bradbeer and Russell have prepared plans for a two-story frame for Dr. Jones, to be built on Olive between Second and Third. The same architects have plans for cottage to be built on West Ninth street.

Architect Frank D. Hudson has let the contract for the foundation work of a four-story and basement brick business building to be built on the east side of Broadway between Third and Fourth streets.

BUILDING NEWS.

Architects Reid Bros. 401-402 Stinson block have plans and specifications of the new Douglass building all ready for bidders. The building will be 5-stories and basement; the elevation will be either stone or pressed brick and terra cotta; steel columns and girders throughout; wood floor joists, forming a semi-fire-proof structure. Inside finish may possibly be oak.

Martin Bekins, the proprietor of the Van and Storage Co. is about to erect an addition to his brick warehouse at Fourth and Alameda streets, it will be 50x150 feet, and two-stories in height.

Architect Krause and Jenkins are preparing plans for Willard Sheldon of a two-story frame; concrete foundation, plastered outside, Spanish tile roof inside finish of oak redwood and yellow pine; to be built on the corner of Twenty-ninth and Menlo avenues.

Architect A. Benton has prepared plans for a new church for the St. John's Church, Episcopal of San Bernardino; it is to be of the perpendicular style with corner tower, side cloister; seating capacity 250; frame building; open timber roof; pine and redwood finish.

A Turkish hotel will be built on Grand avenue between 1st and 2d streets; cost \$10,000; architect, A. J. Kosby he is now preparing plans.

BAKERSFIELD

After taking off 30 feet from the proposed plans to this building, Mr. Offer has awarded the contract of Geo. Robinson for \$110.

CATALINA ISLANDS

Architect C. H. Brown is preparing plans for the Catalina Yacht club, of a club house, to be built near the pavilion at Terminal Island, it will be 60x100, two stories, and surrounded by a porch 12 feet wide; the first floor will contain a ball room 35x58 feet.

SAN DIEGO

Building permits have been granted to W. R. Rogers for a residence at Seventh and Stevenson streets, to cost \$3500.

S. E. Cofes has been granted a permit to build a cottage at Third and Olive streets, to cost \$1800.

The contract was awarded yesterday for the construction of M. V. Carroll's residence at Fifth street and Robinson avenue.

POMONA

Architect R. B. Young is preparing plans for the Sisters of the Holy Name, of a two-story frame academy building 65x100 feet, to be erected on the corner of Holt and Illinois avenues, Pomona.

RIVERSIDE

Frank A. Miller who intends erecting the new building which will be used jointly as a hotel and court-house, has asked for an extension of time to October 1st, pending the arrival of Walter Raymond from the east.

AUBURN

J. Ford has commenced a five-room cottage. J. Thott will build a three-room cottage on the Huntley tract.

Mrs. Champman is building a small cottage.

John Chisholm will build a five room cottage on Linden Heights.

Mrs. L. M. Power will build a small cottage for rent.

Contracts not let and no architects plans accepted for any of these.

GENERAL INDEX OF ADVERTISEMENTS.

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Chimneys Patent. Clawson. xii	Paint. G. Orsi. vii Joseph Dixon Crucible Co. vi Paraffine Paint Co. ii Fuller & Co., W. P. & Co. xvi	Sliding Door Hanger. Dunham, Carrigan & Hayden. ix
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Hard Wood. Pangst, Fred L. iii		Water Closets. Biddle, Joseph. vii John Douglas Company. iii
Heating and Ventilating. W. Morgan & Co. xii		Window Cord. Samson Cordage Works. xvi
		Wood Preservative. Cabot's. xiii Pacific Refining and Roofing Co. iii

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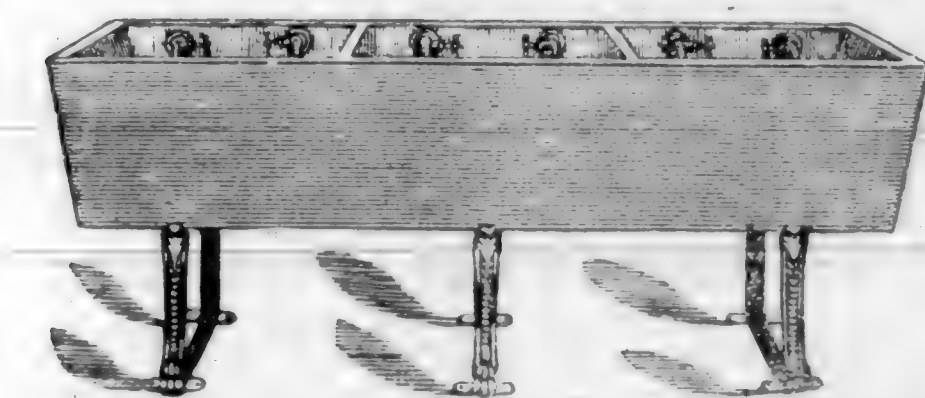
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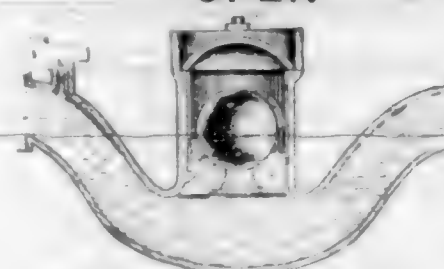
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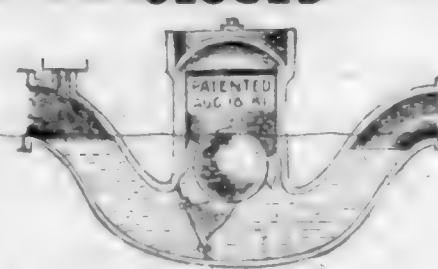
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NUMBER 4.

A MONTHLY JOURNAL DEVOTED TO THE ARCHITECTURAL INTERESTS OF THE PACIFIC COAST.



IN THE Architects Code of Ethics is an article of very general adoption by the various chapters of America.

It reads about as follows:

Although employed and paid by the owner to protect his interests, the architect should remember that exact justice must be maintained between both parties to a contract. He should so conduct his practice as to maintain and foster a higher and better standard of construction; and to encourage the employment of a better class of skilled contractors and workmen in every department.

Another article of equal strength and general adoption in the Code says:

A number of the architectural profession is found to maintain its honor, and to labor earnestly to extend its sphere of usefulness.

These articles are perfectly right and proper but we feel it clearly within our province to point out the fact that in the matter of plumbing inspection a goodly number of the profession in this City have become sadly forgetful of the existence of the foregoing precepts in their Code of Ethics.

It has become almost a uniform practice to specify the grade of bathtubs, the quality of closet and brand of kitchen

sink, etc., etc., then finish the specifications by inserting this clause: "all other plumbing and drainage must comply with the rules and regulations of the Board of Health"—while we have no particular objection to offer to this mode of getting the plumbing contracts into municipal shape—we do most strenuously object, to the practice of requiring from the contracting plumber a Board of Health certificate of inspection as a condition to a contract. And our objection to this mode of procedure is fully sustained by the Ethics of the Code, wherein it says: "Exact justice must be maintained between both parties to a contract."

How can exact justice be maintained for the owner when an architect delegates to a plumbing inspector a duty that is clearly and specifically within the lines of his responsibility.

These inspectors are but human, and it is human to err, and we, who know their little peculiarities well, know that they were never known to err on the side of the owner.

These specifications, which read according to the rules, etc., etc., with the certificate of inspection clause as a condition to the contract, are to the plumber—who knows a thing or two about politics, and who has a friend at court—a source of considerable profit, as they are also to the inspector detailed on the building. But to the plumber who

figures on just what the rules and regulations call for, who is without a close political connection—as he is without the “useful friend at court”—that “certificate of inspection,” as a condition to the contract, becomes a bugaboo of insurmountable proportions.

Mark the result, the political plumber banking on his financial and political affiliations with the inspector—more particularly the former—and knowing the exact cost to his competitors for the work as specified, complacently sends in a bid below the actual cost of the work, which when completed is as complacently accepted by his friend the inspector.

Who suffers? The non-political plumber—an honest man as plumbers go—loses caste and business and the architects' confidence in his ability, through no fault of his own. The architect should suffer through loss to his self respect; the owner becomes a sufferer because of the trust he has reposed in the honor and Ethics of the profession supposed to be embodied in his particular architect, to whom he has also entrusted his property and his money.

It is to the architect and to the architect only, that the owner looks for protection; as an employer, the owner expects, and has every right to expect, that exact justice shall be maintained between himself and all parties to contracts entered into for him, by his architect. But this practice of deliberately delegating to an open-handed free-lance inspector, a duty which the Ethics of his profession and his honor as an architect demands shall be performed by himself, certainly cannot be construed by any stretch of the imagination, as obtaining exact justice for any one, nor of maintaining the honor of a profession that should be beyond all else honorable.

THE STEEL SKELETON IN HIGH OFFICE BUILDING CONSTRUCTION GIVEN ITS INITIAL EARTHQUAKE TEST.

THE Earthquake which arrived at 11:42:44 on the night of March 31, last, according to all authorities was by far the severest experienced in this city since 1868. Prof. Lenschner, Director of the Observatory at Berkeley, in reporting of its intensity says: “It must have vastly exceeded all prior shocks in a horizontal direction.” So of its severity there can be no doubt.

To be able to furnish to the world at large, and the building world in particular, the initial earthquake test of stability for the steel skeleton constructed high office buildings is now the proud lot of San Francisco.

It is, of course, only meet and just that where a condition of such vast importance as this arises, detailed reports of the effect of the shock upon the high buildings of the City, should be given to the world at large by the men who are responsible for their stability. Therefore the Editor of this Journal submits with much pleasure the following letters upon the subject:

To the Editor of the California Architect and Building News.

SAN FRANCISCO, April 22, 1898.

DEAR SIR—Your favor inquiring as to the noticeable effect of the recent earthquake on tall buildings of steel skeleton construction, is received.

In reply would say that the Claus Spreckels Building,

having a base of 70'0" x 75'0" and a height of 315 feet, i. e., having a height of four and one half times its base, has shown no signs of damage.

The closest inspection reveals no cracks, either in stone, mortar joints or plastering. No glass has been broken although some were bent plates of large size (72" x 132").

The elevator guides are perfectly true, showing complete recovery from any movement the building may have been subject to.

We have mentioned this building particularly, believing it offers the best proof of the complete immunity of well constructed buildings from damage, from our occasional seismic disturbances.

Other buildings, above the usual height, in relation to their bases, coming under our observation, show no evidence of harm.

Very sincerely yours,

REID BROS.

To the Editor of the California Architect and Building News.

SAN FRANCISCO, April 15, 1898.

DEAR SIR:—In regard to the last serious earth-quake and its results on high buildings which have been erected under my supervision, I beg leave to state, that having never been in favor of high buildings and never having constructed any buildings on the so-called steel or iron skeleton construction, I cannot give you any absolute information in regard to the effects of same. Have found no damage in any of the buildings which have been put up under my supervision further than slight cracks, especially where the wood partitions and brick walls are joined together, which condition of things have also found has occurred in all steel buildings.

In one building only, a ware-house having a front composed of a series of arches which were tied together by very rigid concrete and iron woven panels was there any effect which amounted to anything like a damage, and there so slight, as to be of no consequence. In this case it is very evident that the main building had undergone a decided movement from east to west, during this movement, where unquestionably the piers and walls were out of plumb, the rigid panels caused the brick work to crack on the face, but on cessation of the shock, all these walls and piers regained their original position, now being perfectly true and plumb, and the building as strong as ever, as far as can be seen by very close examination.

Having examined personally fifteen or twenty large brick buildings, including the Telephone Building, the Otis Building, the Grosvenor Hotel, and the building opposite the Grosvenor Hotel, I found no traces of any damage done.

Yours very truly,

WM. F. SMITH, Architect.

To the Editor of the California Architect and Building News.

SAN FRANCISCO, CAL., April 15, 1898.

DEAR SIR:—In response to your favor of the 9th inst. requesting my opinion as to the effects of the recent earthquake on steel-frame construction in this city, I am gratified to state that they have stood the test very satisfactorily. While none of us could have desired such an experience we

have naturally been curious to know how a severe shock would treat the buildings in question, and it is comforting as well as interesting to observe that while the vibration must have been very marked the buildings show no damage from this cause. The hour of disturbance precluded any concerted opinion as to personal experiences during the shake, as the offices of the buildings were empty, but from the reports of the few people who happened to be on the upper floors of two of the taller structures I judge that force of the oscillation must have been in proportion to the height from the ground and possibly by reason of the rigidity of the steel-frame the shock may have been intensified.

One of the three office buildings in which I have had a professional interest rests on piles averaging twenty-eight feet, driven to hardpan, in which the estimated load is very much within the limit of subsidence for each pile. The occupants of the top story of this building had an uncomfortable shake up, but the building shows no damage.

As the several members of steel-frames are either cased in terra cotta or imbedded in the masonry, we have no ready means of observing the lateral or shearing strains, which are the especial points of interest to the architect, but the fact is demonstrated that in properly constructed steel-frame buildings an earth quake will leave fewer marks of its force than in the cases where the walls have been anchored to wooden beams in the ordinary method of construction.

Very truly yours,

CLINTON DAY, ARCHITECT.

Editor California Architect and Building News.

SAN FRANCISCO, April 22, 1898.

DEAR SIR:—Referring to your favor of April 9th, asking my general observations, together with the result of my examinations, upon buildings which I have built lately in San Francisco, of the effect of the recent earth-quake, I beg to state as follows:—

On the morning following the shock I visited several of the buildings in question, the first one being Mr. W. F. Whittier's residence on the NE. cor. Jackson and Laguna streets, and as far as the exterior of the building was concerned noticed no effect whatever. I did not go inside, but afterwards saw Mr. Whittier at his office and, upon inquiring as to any damage done, he said there was none except the shaking down of a few flakes of loose plaster. The only place that this occurred was on the wall side of the rear stairway where the plastering ran continuously from the first story floor passed and above second story floor. At the junction of the second story floor there are joists usually placed running horizontally and parallel with studing. These joists had shrunk and buckled the plaster off slightly, producing cracks, and it was the loose plaster from the cracks which was shaken down in a fine dust on the floor below. Otherwise no damage throughout the entire building.

In the W. S. Clark Building, NE. cor. Bush and Battery streets, I examined same carefully from top to bottom inside as well as outside, and was unable to detect the slightest damage, there being no cracks visible except such as could be accounted for by natural causes and which existed before the earthquake occurred. This building is one denominated in the Fire Ordinances as Class B. It was built upon made ground, the foundation being piled. The piling

of this building was rather peculiar, inasmuch as the original shore line of the bay of San Francisco ran diagonally from the NW. corner of the building to the SE. corner, thus cutting the lot in half, the Western triangle being upon firm ground and the Easterly triangle on mud. This I ascertained when piling, the piles in outer triangle being 60'0" long at the extreme NE. corner of the building and from thence running to SW. corner of building down to 14 or 15 feet in length. The building was originally calculated, however, very carefully, as far as weights were concerned and the same amount of load per square foot imposed upon the foundation in all cases. Whether this had anything to do with its stability I am unable to state positively, but I believe that it had a good effect in keeping the building free from damage. In other words, when the shock came, one part of the foundation being as strong as the other, the building moved as a whole and was not shaken in parts as would probably be the case were one part of the foundation less strong than another.

In the Hobart Building on Market street which I built twelve or thirteen years ago, and which was the first building in San Francisco to use partial steel construction, I noticed no evidence of disturbance on the exterior. I only looked at front however and did not examine the interior, as the building has since been altered and made into offices. Throughout the entire front, which is a very complicated piece of construction I did not notice any cracks whatever.

The Union Depot and Ferry House I examined very thoroughly and carefully throughout, and the only cracks I could find were at the junction of the tile partitions with the overhead beams, and in one or two cases the walls themselves had cracked and some of the plastering fallen off. The cracks at the junction of the beam and top of partition were caused, in my opinion, by there not being placed on the underside of the beams any means of fastening or steadying the tile wall. The original specifications did not provide anything and no steps were ever taken subsequently to fasten them. Had there been a 4" channel placed flat side upwards into which the partition could have been wedged, there would probably been no cracking.

The only other evidences of disturbance I found around the building was in the upper stories of the tower in SE. corner thereof, where a small crack, probably a sixteenth of an inch in thickness, made its appearance in second and third stories.

I examined very thoroughly the junction of the tower with the main building and found no cracks, which was rather remarkable considering the fact that this tower is 245 ft. high and must have vibrated considerably at the top. This would produce a crushing and grinding effect on its junction with the main building, but so far as I could see not the slightest effect was produced.

I examined particularly the grand nave, which is an open space 45'0" wide and 660'0" long running about north and south, from which direction the shocks came principally. This nave is covered throughout its entire length and width with marble wainscoting in large slabs, there being a base about 2'0" high, then a plain space about 9'0" high, capped with a complicated marble cornice. I looked principally for evidences of disturbance in the vertical joints of the long slabs, which were, as I said before, 9'0" high and about an average of 4'0" wide. I was very much surprised to find that there was not even the slightest crack visible, the original pointing being all in place and no spawling of edges having taken place. This is more remarkable when it is

considered that the wall on Easterly side of nave between the piers is composed of heavy wooden studding diagonally boarded. It would seem that if any damage were to be done it would occur at these points, but, as I said before, nothing was visible.

In the Crocker Building where I have my office, I examined only the rooms which I occupy and found no cracks whatever. I do not think that any cracking was done or any damage on either the exterior or interior of this building, otherwise if there had been I would have heard of it.

Yours very truly,

EDWARD R. SWAIN.

Ca Architect and Building News.

SAN FRANCISCO, CAL., April 16, 1898.

DEAR SIR:—Your letter is at hand relative to the recent seismic disturbance in this City, and to general observations and results of examinations made upon high buildings, so that through the opinion of the architects in this city, your valued journal may be able to compare the relative value of the two systems of construction followed in our midst, viz., the old or solid masonry unfortified by metal skeleton, and the new, viz., combination of masonry and steel frame.

In answer I have simply and briefly to say that if you desire to investigate properly the true merit of a certain system of construction it would, I feel, be wisdom to take for example the structures, which because of their excessive height and limited ground area, will be most subject to oscillation from the effect of wind force and earth-quake shock, and should such structure be found to resist the greatest forces, lower buildings, such as the Mills, Crocker, etc., of same construction, with greater ground area, will certainly be proof against the same acting elements and need not become a part of your investigations.

We have in our city two tall structures of comparatively equal height and ground area.

One, The Claus Spreckles' building, square in plan and complete in every detail, with a rigid steel frame, the perpendicular wall surfaces subdivided into panels of minimum height by heavy steel masonry floors and said wall panels again subdivided to the greatest degree by solid partition walls from ground line to uppermost point. It is a splendid example of our modern system of construction as applied to an office building.

The architect was afforded the opportunity, was provided with ample material, took advantage of the situation, proved equal to the occasion, and in a masterly manner gave to the city a building more limited in ground area when compared to its perpendicular than any other building perhaps in the world; beautiful in design and irresistible as far as known forces are concerned in its perfect stability as has been proved beyond question by the recent disturbance.

If The Claus Spreckles' building, therefore, has not been found wanting, the system of construction employed is certainly ideal, no matter what might have developed in other buildings of similar construction, of lesser elevation, for the fault could not be laid at the door of the system but the manner of its employment.

The second structure is the New City Hall Dome, for which I am responsible. It is circular in plan, of equal height, almost same ground area, and after similar system of construction as The Claus Spreckles' building, but incomplete as a perfect building in being destitute up to this date of many essential members, such as its solid floors and partition walls at every story height, all of which were pro-

vided for by me in original design, but not placed because of the lack of funds in the public treasury.

And while it is unfortunate and to be regretted that it has been impossible so far to find the way to supply these most necessary re-enforcing members in the Dome, that it might have become as rigid as was originally intended, and be able, thoroughly, to the very last degree to resist all such horizontal and upward forces, as of recent occurrence, or of increased intensity, without slightest indications of effect, still the lack of same has now demonstrated the absolute necessity of these things being placed, and also produced ample evidence of the severity and tendency of the shock, which would otherwise be unknown, upon masonry not as yet perfectly re-enforced by steel, as above mentioned, and it also afforded evidence of the imperceptibility of the shock upon the frame itself and all masonry brought in proper relation with said frame from foundation to crown line, and emphasizing, therefore, in this case more than any other the crowning virtue of the steel frame in building.

The Dome, though circular in plan, has been designed originally from an interior point of view as a model office building, with steel frame so arranged that great solid floors may be placed every fifteen feet from base of first order up to the very summit, and each of said floors subdivided by partitions, and as The Claus Spreckles' building for example, without a single floor or partition from foundation up, (one great open shaft) would be robbed of a mighty and indispensable element of its present rigidity, just so is the Dome, at this date, (deprived of these vital members of re-enforcement) possessed of only two-thirds of the strength, rigidity and utility originally contemplated, and was, therefore, as is evident with such existing conditions, subjected during the late tremor to a many fold more serious trial than any other structure in this city or elsewhere.

My examination of the Dome developed these facts, that in every particular the steel frame was rigid, and that all materials in contact with same in perfect condition, but at the very centre of the Dome, because of the nature of the movement or forces, being deprived of the essential weight and horizontal or lateral bracing which would be afforded, as above mentioned floors and partitions, I found one of the terra-cotta wall panels somewhat cracked, which was the sum total of the injury done, and which could never have occurred were the Dome entirely complete, as I have above described.

The Dome, therefore, was the only structure, of the many buildings of steel construction in this city, which, though severe as the trial was, bore the slightest evidence that the earth-quake had occurred, and the strong reasons in this one particular case, why it could not be otherwise expected, and how it could have been and may yet be easily avoided, I have, I trust, clearly presented.

All other buildings throughout the City and State damaged in any way belong to the system of construction, viz., solid masonry. Hence it is evident to the general public, (for it could never be discussed in the profession), that in a city like ours, subject to periodical tremors like the recent one and perhaps two fold greater, that the only character of building to be erected, if we aim to possess the most perfect type is that of steel frame complete, supporting enclosing walls, if possible, at every floor line, and through which steel frame all weights are transmitted directly to foundation, and by which metal skeleton all parts throughout are perfectly united.

Respectfully,

FRANK T. SHEA.

HOW TWO WEALTHY CITIZENS BECAME EXPERTS IN TIMBER PHYSICS.

THE WORLD'S ELECTRICAL ENGINEERING EXPERTS GIVEN A LESSON IN ECONOMICS, AND INCIDENTALLY IN CONDUIT CONSTRUCTION

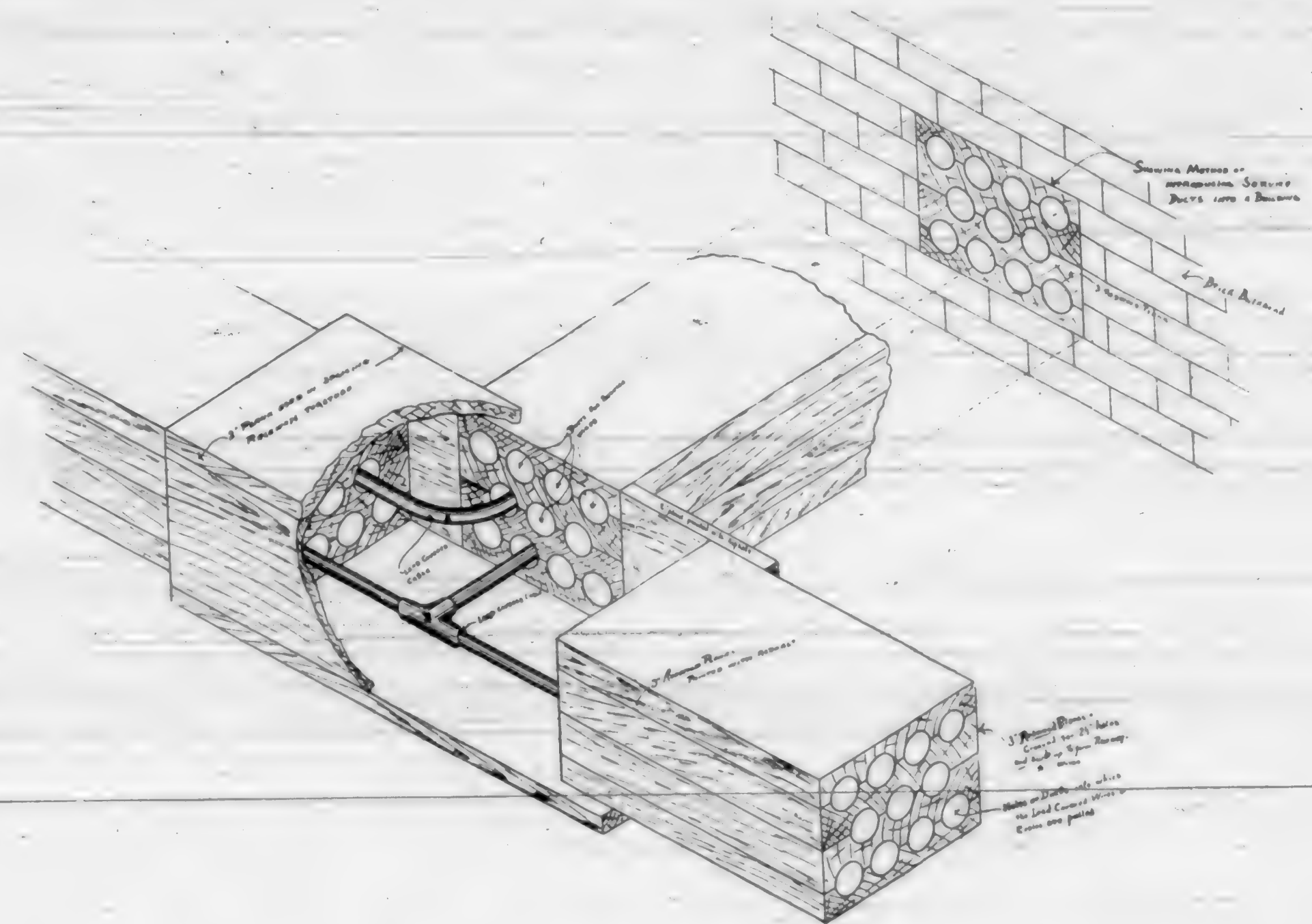
The business of selling electric current and telephone communications in large cities has acquired, as every reader of this Journal knows, enormous proportions. The tendencies of municipal legislation, growing more exacting each year, in opposition to the use of poles and all other known supports for overhead wiring, brought the companies who are in the business to

and property, minimum of danger to the consumer and to the companies' employees, and lastly, utility for the active service for which it is produced.

These surely are all the considerations that trustworthy men, acting collectively or singly, should allow to enter in judging of what constitutes the better conduit.

This leads to a short Wood digression, made necessary in order that the reader's mind may receive the right amount of preparation for the coming disclosures regarding the great discovery, recently made by two wealthy experts, long residents of this city, and neither of them heretofore suspected of expert knowledge in Timber Physics.

Until very recently no company in any city of the world us-



stay strictly for the revenue there is in it, face to face with a problem, the solution of which was the underground conduit system. The placing of wires underground becoming compulsory within the limits of traffic congested districts, the question of doing so in the most effective manner conducive with safety to the life and property of others, together with the necessity for obtaining satisfactory results where space was very limited, access to conduits difficult, and where large consumption from many consumers made arrangement of construction very intricate, was a mathematical and mechanical problem that taxed severely the brains of many of the best electrical engineering experts that the world has as yet produced.

One of the greatest difficulties that continues to confront the companies engaged in the business for a legitimate profit, is that of discovering a material from which an ideal conduit may be constructed. The cost is of little consequence to such companies. Expense as an obstacle to the adoption of a conduit should never be considered.

Consideration should be given to, maximum of safety to life

ing conduits for underground wiring service had utilized wood for underground conduits or raceways, as a means of distributing electric currents. This great discovery of wood as a suitable material for such conduits may open up a vast vista of wealth for the owners of redwood forests, and then again it may not.

However that may be, it is a substantiated fact that this great discovery was a simultaneous one on the part of the wealthy investigators. By the expenditure of two cents in postage, jointly contributed, they obtained from the Forestry Division U. S. Dept. of Agriculture the much wanted information, that the most important consideration had heretofore been given to Wood as a material of construction; they also found that the use of Wood as a substance which may be altered physically and chemically is far more important than is generally admitted. Immediately after carefully digesting—mentally—this wonderful piece of intelligence, the wealthy investment producers became imbued with a sudden and consuming joint desire to alter the physical and chemical properties of redwood as a substance

for underground conduits at the very least cost to themselves; but utterly regardless of the cost to the people at large or to fire underwriters in particular.

Among the enumerated physical properties of wood is "color" and "behavior after seasoning." These two physical properties these old sinners—experts, rather—very deftly altered by a burning process of their own, and a graphic description of this process is given in the accompanying description and diagram of the Alma Keith fire, a tenant of his honor, the Mayor.

This fire process through underground redwood conduits brought out some properties of the wood—asphaltum treated—which should attract the attention of the city authorities, as well as the fire underwriting experts. These are its intense propensity to produce dense and penetrating volumes of gases and smoke, under easy provocation. This property of the redwood of course interests the wealthy experts but little; it is just as well, however, to call their attention to it, otherwise something might be lost to them. Perhaps, another great discovery will be the outcome, whereby these penetrating dense volumes of gases and smoke may be turned to some account. The resources of the aforesaid wealthy experts being almost inexhaustive.

And in this Wood digression, with the aid of the accompanying diagram, showing graphically the method employed and the easy access through the open ducts, leading into the premises of patrons, for either fire, smoke, or accumulated gases, will be found the true story of the great discovery and of how it was that these streets underground of poor old San Francisco, became filled with redwood planks, grooved with ducts, piled one on top of the other, spiked together and made to do duty as underground conduits for distributing electrical currents by means of lead covered cables drawn into the raceways. The planks are generally about 3 inches by 12 inches, with 2½ inch grooves cut therein. This set of ducts or raceways is laid in the streets from the powerhouse along the various thoroughfares where it is intended to supply electric current for light and power. (Wherever a consumer along the line is secured, a service is introduced into his basement in a manner similar to the method shown by diagram.)

Every two hundred feet or so a brick manhole is located, having a cast iron top set flush with the paving. This manhole or junction box is installed to facilitate the drawing in and out of the various cables.

It is the custom when installing this system to install extra ducts—i. e., more than present needs demand—in order to have room for additional cables as business increases.

The matter of drawing in these cables is a safe enough proposition from an electrical standpoint, before the conduit has been cut or chopped into to make service connections.

The timber which composes this conduit system not having been laid on a concrete or other stable foundation, soon settles at these service points, and when the additional wires are drawn in the lead and insulation is torn or abraded by the sharp corners, thereby laying bare the conductor. The conductors may be conveying any voltage from 100 to 7,000 volts. It will be readily understood that with a potential anywhere near the latter figure a break in the continuity of the insulating covering will soon cause trouble. This was demonstrated recently in this city. Employees of the Mutual Company while drawing in the cables or in working in the opening in the ducts

abraded the lead covering and injured the insulation to such an extent that the leak of current, permitted thereby set fire to the asphaltum soaked ducts and soon had the lead melted and insulation burned off adjacent wires, and a general mix-up in the conduit was the result. From this point the smoke and gases traversed the raceways of a nearby service which terminated in the basement of Alma Keith's millinery establishment in the Phelan Building, and causing a loss to the fire underwriters of \$1,200.

This same trouble is liable to happen at any time where conduits and raceways are installed in this manner.

Any conduit system employing open ducts is, in addition to being capable of conducting smoke and gases from a fire originating therein, a collector of other gases which have escaped from neighboring pipes conveying illuminating gas which permeates the ground, and if the joints in the conduits are not carefully installed, these may in a short time collect enough gas to become a source of great danger from explosions and fires.

It is from this fact that any company which connects such a system to the basement of a customer, with similar ducts, and does not seal up the ends of the raceways, should be held liable for any damage resulting from this criminal negligence. It might be further stated that the ducts which convey the cables from the main conduit to a basement should be of a fireproof material, certainly never of wood, made more inflammable by a coating of asphaltum. An iron tube with an insulated lining should be insisted upon by the fire underwriters' association.

While the street work may be without the pale of the insurance companies, it comes within their jurisdiction, and strictly within that of the fire marshal, when the wires are brought to the sidewalk line and enter the building basement.

In several prominent places high tension electrical apparatus is installed by Mutual Outfit, where it is within reach of anybody and where not even a sign is placed notifying the public that the potential being carried by the wires and bare parts is up in the thousands and "Hands Off."

Installed in the basement of Lucke's Shoe Store on Market Street, for instance, are several arc cutout switches; these have had, for some reason not known to the writer, their covers removed, thereby exposing the metal current carrying parts for the inspection of the buzz-saw boy. These switches, carrying as they are, a current of several thousand volts, would without a doubt electrocute anyone touching same.

The same condition of affairs, or worse, exists at Summerfield & Roman's, clothiers, Fifth and Market Streets; Johnson's Restaurant, History Building, basement, gore corner of Geary and Market Streets, and several other places. This condition of affairs should be looked into as it is criminal to allow them to exist.

Consumers of electrical current looking for cheap service can find it readily enough, if they assume all risks to life and property that the methods of these experts in Timber physics, and in other things legislative, municipal and judicial, will give them, free of extra compensation. Applications for this kind of cheap service may be made to philanthropist Alvinza Haywood, Esq., care of the People's Anti-Monopoly Low-Price Waterworks Company, Oakland, or to his fellow-discoverer, also a pure philanthropist in his own right, Mr. Barry Cornwall, care of the Coal Combine, U. S. Appraisers Building, or to James

YOUTH'S DIRECTORY:
C. J. DEVLIN, Architect.

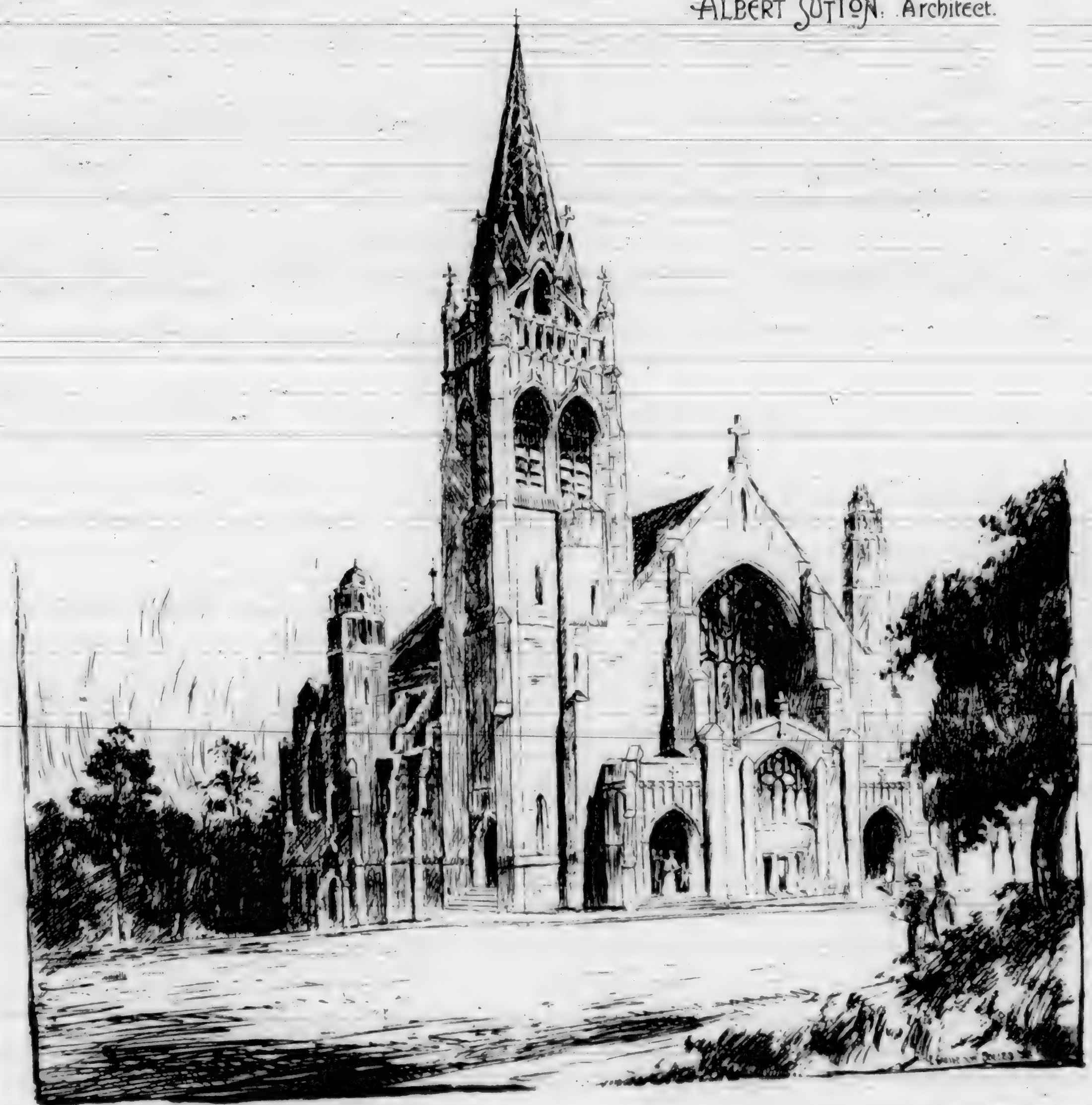


CALIFORNIA ARCHITECT & BUILDING NEWS
SAN FRANCISCO

BRITTON & REY PHOTO LITH

VOL. XIX No 4 APRIL 1898

DESIGN FOR A CHURCH.
 ALBERT SUTTON, Architect.

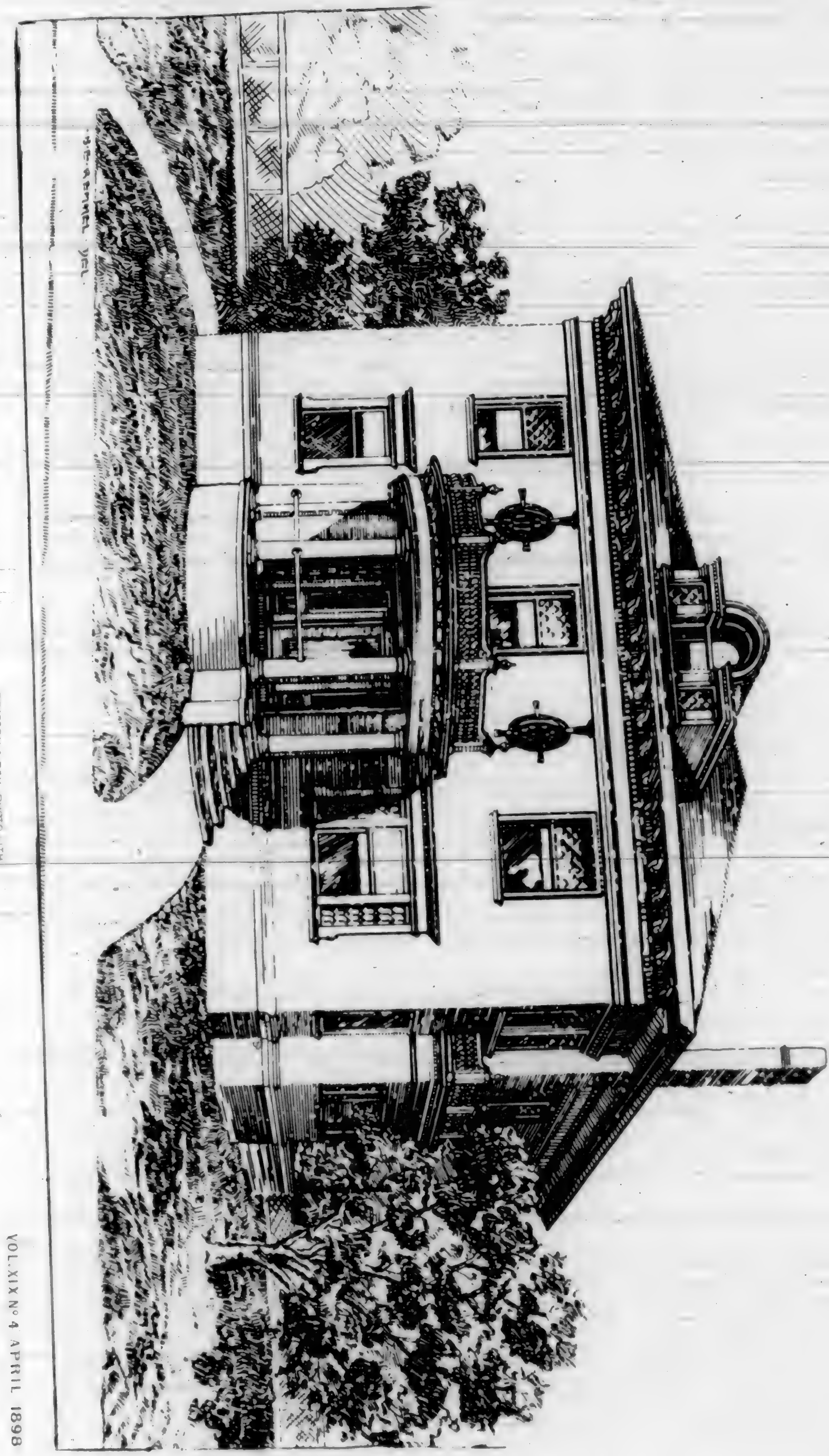


CALIFORNIA ARCHITECT & BUILDING NEWS
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VOL. XIX No 4 APRIL 1898

... RESIDENCE - FOR - MR. F. W. WOOD...
 .. ALAMEDA - CAL. ..
 B. E. REYNOLDS, ARCHT.
 208 - BAYVIEW - ST. S. F.



CALIFORNIA ARCHITECT & BUILDING NEWS
 SAN FRANCISCO

BRITTON & REY, PHOTO LITH.

VOL. XIX No 4 APRIL 1898

DESIGN FOR STONE BUILDING.
ALBERT SUTTON, Architect.



CALIFORNIA ARCHITECT & BUILDING NEWS
SAN FRANCISCO.

BRITTON & REY, PHOTO LITH.

VOL. XIX No. 4 APRIL 1898

Fisher, Esq., Secretary of the Mutual Electric Light Company, limited—only as to time of existence.



The management of this journal desires to extend a cordial invitation to all architects on this coast and elsewhere to contribute designs for publication.

Drawings should be made with perfectly black lines on a smooth white surface. Good tracings, if made with black ink, answer the purpose.

The designs selected will be published without charge. All drawings, whether accepted or not, will be returned to their authors, who must bear express charges both ways.

RESIDENCE for Mr. F. W. Voogt, Alameda, Cal., B. E. Remmel, Architect.

YOUTH'S DIRECTORY, C. J. I. Devlin, Architect.

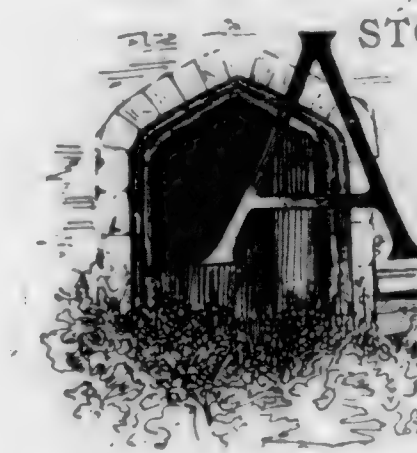
DESIGN for a Church, Albert Sutton, Architect.

DESIGN for a stone Building, Albert Sutton, Architect.



THE USE OF STONE IN SKELETON CONSTRUCTION.

E. MCL. LONG, C. E., IN STONE.



STONE wall is a rigid mass of solid stone and cement from face to back, and is as durable as the foundation on which it rests. Through all ages it has been a symbol of strength, and represents stability and solidity.

All massive structures, and those designed to stand through centuries have been built of stone, or stone and cement, with no other material entering into their con-

struction; and in viewing an edifice of this character, whatever may be its architectural rendering, one cannot be impressed with its appearance of strength. The walls sustain the weight of the building, and are thick, with small openings for doors and windows, thus showing to all observers their ability to do the work for which they are designed.

We have become so accustomed to looking upon stone, when used in the walls of buildings, as the strength-giving material of the structure, that it is rather hard for us to consider it otherwise. It is, therefore, that the architect in applying a covering of stone to a structural steel frame endeavors to create the impression that the building owes its stability to this covering. This hallucination has been partly produced by constructing heavy basement walls and reducing the size of windows to a minimum and giving them deep reveals. While this form of construction may be pleasing to the eye, as we are now trained to look at stone work, it is a fraud and is certainly very undesirable, from an economic standpoint, for stone work is expensive and every extra pound causes an increase in size of beams and columns, and from a practical standpoint since the most desirable thing in an office or store room is to have a maximum amount of light. In most instances, however, where light rooms and economy are the prime objects of the designer, the stone is applied so as to produce very queer results. Where the ground floor of a high building is used as a store, the windows and doors occupy nearly all the wall space and we see twenty stories of masonry supported by stone piers scarcely sufficient in size to support their own weight, and stone beams or flat arches three feet deep carrying a superimposed load of hundreds of tons over a span of twenty feet. We can hardly, however, class this as an architectural fraud, for it is self-evident that the stone is not doing the work as represented.

However applied, stone has become very popular, at least, as a covering for the fronts of steel constructed buildings, and while it plays no part in the structural strength of the building, it still has its own duties to perform in affording a protection against the weather both for the interior of the building and for the steel work. So, from the top of the beam at one floor level to the bottom of the one above, it is a stone wall, and as such acts an honest part, and it is an error to say that a steel skeleton is covered with a veneering of stone, for the stone is a necessary part of the structure, and the completed wall is a combination of stone and steel in which each material has its duty to perform.

During the period when the steel skeleton constructed building was first being brought into use, the question was often asked whether two materials, of such different physical natures as stone and steel, could be joined together to form a solid whole. The question has been well answered by the number of examples we have, in none of which have the different rates of expansion and contraction damaged a building. This difference is not as great as most people would suppose. For a rise of 100° in temperature, steel expands one-eighth of an inch in sixteen feet. For the same rise in temperature, granite expands one-eighth of an inch in twenty feet, and marble one-eighth of an inch in eighteen feet. According to these figures, since the stone is exposed to the extremes of temperature and the steel is protected, we might infer that the stone expands or contracts more than the steel. However this may be, since no practical inconvenience is produced, we will let the question drop, and confine our attention to methods of building the masonry to the steel.

The typical steel skeleton building is one in which the frame of steel is designed to carry all permanent and temporary loads and convey such loads through its columns to

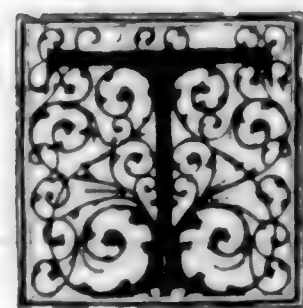
the column foundations, and among the permanent loads is included the weight of the walls. The walls rest on beams, commonly called spandrel beams, at each floor level, and thus each wall is the height of one story and has only its own weight to sustain, whether it incloses the first or twentieth floor rooms.

The problem that presents itself to the architect is to construct a wall to fill up a rectangular opening in the side of a building. As a foundation for this wall he has a steel beam, or a combination of beams, to limit its height; he again has beams similar to the foundation beams, and to limit its extent laterally he has steel columns. The foundation beams are designed to carry the weight of the superimposed wall with a minimum amount of deflection and the wall must be designed to be as light as is consistent with strength and its efficiency as a protector against the weather. It is better that this wall should be entirely of stone than of brick with a stone facing.

As steel buildings are at present constructed, another condition to be fulfilled is that all beams and columns must be protected against the weather. This will necessitate the outside of the beams and columns being at least 8" within the building line.

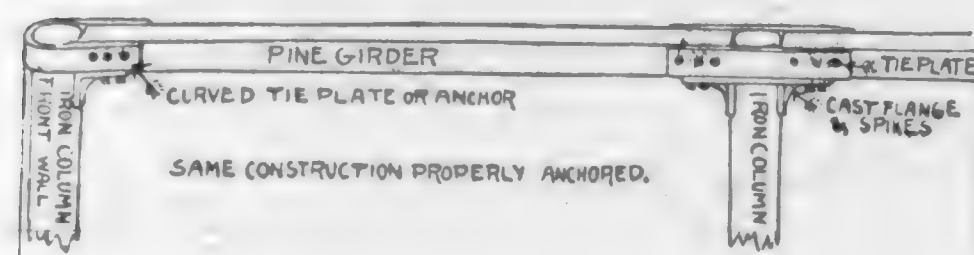
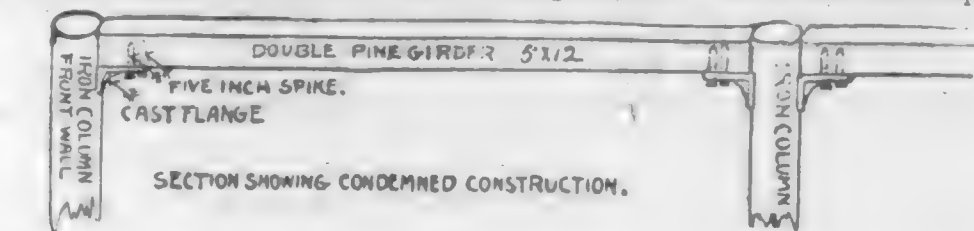
To be Continued.

SLOW-BURNING CONSTRUCTION.



THE AYER building in Wabash avenue in this city which, on the 16th inst., collapsed in less than ten minutes after the fire started was a so-called "mill-construction" building. The awful catastrophe demonstrated it to have been nothing but a fire and death trap of the most dangerous description.

It was a large area building, seven stories high, 80 feet wide and 160 feet deep. The front was entirely constructed of iron and glass. It was built in 1890 at a cost of \$112,000. The original owner says he gave the architect carte blanche for a substantial mill-constructed building, and that when it was finished it was so well liked by the insurance people that he secured a "very advantageous rate for it." If that is true then the architect has a terrible responsibility hanging over his head. Ten persons lost their lives and a score or more were severely injured, say, nothing of the loss of \$750,000 worth of property. One of the city building inspectors made an examination of the ruins after the fire and he is reported as saying: "This was not a cheap building. Plenty of first-class materials appear to have been used, but the work was 'scamped' in vital points. It is an example of



pure carelessness on somebody's part, as the cost of doing properly what was neglected in this case would not have exceeded \$200 for the whole building."

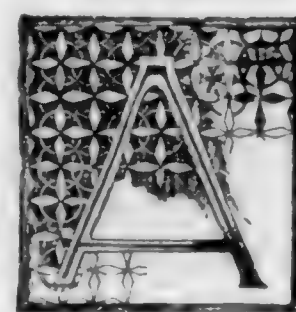
As to the construction of the building Deputy Commissioner Shea of the building department in his testimony said: "I found the columns with a 1 1/4 in. cast iron flange to receive the wooden girders, and said girders were fastened with two five inch by one-half inch wrought iron spikes (see first diagram). No iron straps around the columns connected with the girders, as there should have been (see second diagram.) I also found the interior girders fastened to columns in the same manner, with an iron strap twenty-four inches long and two inches wide by one-half inch thick, with nail holes in the end of each strap. These straps were fastened to the side of each girder by three-inch by one-quarter-inch spikes. The iron anchors of the north and south walls project about six inches outside of the walls, with two nail holes in the ends. The building was of mill construction. The joists were about nine and a half feet long, four feet apart. Joists were six by twelve inches. The length of girders about sixteen feet, made of two pieces bolted together.

In the same City on the Tuesday following the collapse of the Ayer building, the Shoeman, another "mill construction" affair, became a total loss by fire, the immediate cause being the explosion of a gasoline can. This building was seven stories in height and the whole inside fell to the cellar in a remarkably short space of time.

If these buildings had in fact been mill-construction they would not have burned as they did. Everybody who knows anything about mill-constructed buildings knows that they are so built to be slow burning. That is what they are built for, and that is why the insurance companies make a lower rate on them than they do on buildings of ordinary construction. But from the frequent and disastrous fires in the last year in so-called fire-proof and mill-constructed buildings, it begins to look as if they were the worst kind of fire-traps, and built solely to deceive the insurance companies. It is about time for the companies to look into the matter. They owe it to themselves and to the public. It will not do to depend upon the city building departments. They cannot be depended on. That has been demonstrated in the Ayer building.—*The Investigator of March 26.*

[Note.—The Shoeman stood between the old Colony building, seventeen stories high, on one side, and the Manhattan building, sixteen stories high on the other. Both of these sky-scrapers were of the steel skeleton construction and neither one of these buildings was much endangered by the fierce heat.—EDITOR.]

SOUTHERN UNION STATION AT BOSTON.



RAILWAY passenger station that in size and equipment will be without equal in the United States, perhaps unequaled anywhere in the world, is now in the course of construction at Cove and Summer streets and Dorchester avenue, Boston. The total investment of the Boston Terminal company, which has conceived this project, will amount to nearly \$12,000,000. Four million dollars will be expended in construction, the contract price of the main station building alone being \$1,100,000. As a whole, the station was designed by George B. Francis, engineer of the Boston Terminal com-

pany, assisted by the chief engineers of the roads that will ultimately use the station.

The design involves a unique feature in station construction. In the first attempt to introduce into one terminal an electric suburban service, and the regular through passenger traffic of a steam railway. The difference in character of the suburban or commutation passenger traffic and the passenger traffic which goes beyond the commutation points

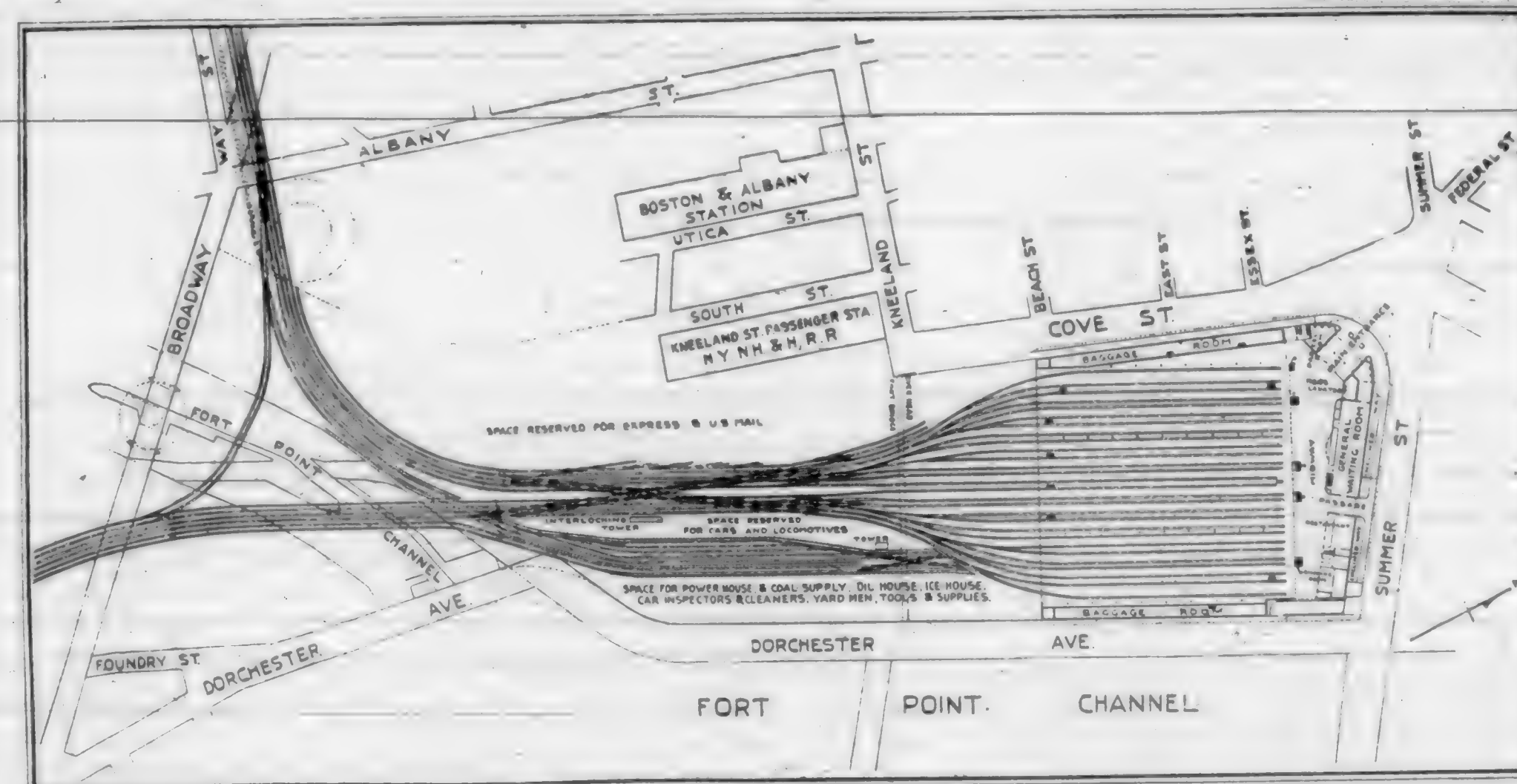
from the fact that the main and connected buildings have a roof area of 700x650 feet, the largest railway roof in the world. The structures will require about 15,000 tons of steel and will rest upon 40,000 spruce piles. The architects for the building are Messrs. Shepley, Rutan & Coolidge.

The first story and basement are devoted entirely to railroad purposes, the second story to offices of the terminal company and general offices, with restaurant rooms in ad-



dition to those provided on the first story. The third, fourth and fifth stories will be occupied by the offices of the several railroad corporations forming the terminal company. The suburban station in the subway, accessible by either inclines or steps, is below the level of the ocean, which is but one hundred feet away. This necessitates the use of about eight acres of waterproofing material to shut out the water effectually. Above this is placed an average of 3 1/2 feet of concrete to resist the water pressure.

The main entrance to the station will be at the corner of



Sumner and Cove streets, where it is built on the arc of a circle for a distance of 228 feet. On either side of the curved portion the main building extends 320 feet on Sumner street and the same distance on Cove street, with a further extension of 350 feet on the latter thoroughfare for baggage-rooms. The general waiting-room on the first floor will extend through two stories, and has an area of 65x225 feet.

A general idea of the size of the station may be obtained

At this time seven-eighths of the work on the new station is under contract, and about one third of the construction has been accomplished. Norcross Brothers of Worcester Mass., are the contractors for the foundations and buildings, excepting the steel work for the train shed and the bridging over the suburban tracts, which is let to the Pennsylvania Steel company. About \$250,000 is being spent on construction monthly.—*Construction News.*

ELECTRICITY IN MODERN BUILDINGS.



IN THE construction of a certain class of building a steel framework, filled in with stone or other material, is being very largely used, and as electricity is rapidly becoming the means of distributing light and power, and to some extent, even heat, throughout the halls, corridors, offices, etc., of any building which proposes to offer all the best modern conveniences, it may be worth while to consider whether there will take place any interaction between the steel frame work, considered as a conducting network of comparatively low resistance, and the electric circuits which distribute the lighting and power current. It is, of course, evident that such a steel framework will offer a path of comparatively low resistance to any current that may be set up in it, and it is the purpose of this article to formulate those conditions which will tend to the setting up of such currents, and their fiscal effect on the building materials.

Suppose, says a clever writer on matters electric, we have a steel frame building with a complete system of electric distribution—for lighting, elevators, heaters, etc., etc.—it can easily be imagined that there may be set up inductively a most complicated and interlined system of active currents in the various uprights and horizontals forming the frame, and that they may be of quite considerable magnitude. This can occur not only in the steel frame itself, but in the piping for the heating or auxiliary gas lighting services. With a direct current distribution for lighting only, these induced currents would probably have a negligible effect, as it is only at the moment of make and break that inductive action would take place, although even in such a case a direct current, though continuous in direction, will have sufficiently small fluctuations in strength (owing to the fact that the number of coils in the armature is not infinity) to keep up a continual alternating current in all the pipes and beams parallel to it and within the sphere of its influence. But in very many cases current is distributed for elevator and motor purposes, and here we find not only the small fluctuations due (as mentioned above) to the armature construction, but also that fluctuation due to the varying demands of the elevator and motor services, which, while not so rapid, will have an enormously greater amplitude, and so a much greater inductive influence. There are very many buildings, moreover, that employ an alternating current for lighting, the influence of which requires no pointing out. So that it appears that there will always be some circuits induced in such buildings, whether in the frame or the piping.

It is well known that an electric current flowing in a circuit must produce one effect and may produce more. It must heat the conductor and may decompose it. The heat generated in the conductor depends on the amount of current flowing, and on the resistance offered to it, and in a circuit of varying conductivity the greatest heat will be generated at the point of greatest resistance. In a circuit—again taking from the supposable case of the same writer—composed of beams and points of function will be those of highest resistance, and will therefore be the heating points.

Just how far the expansion and contraction due to heating and cooling may be expected to work with the natural vibration to loosen the joints, is a matter that affords a very interesting field for discussion and experiment. But if it be

granted that it does have the effect of so loosening them, then such loosening will tend to promote the decomposing action of the current flowing, with the assistance of whatever slight amount of moisture has condensed out of the atmosphere (or elsewhere) on the opposing faces of the loose joint. This latter action of the current is probably of greater importance than the former, as its tendency is to loosen by decomposition, and just where the utmost rigidity and permanence is desired, viz., in the foundations. The electrolytic injury would take place just at the base of a steel pillar, where the current was able to escape to earth, and the effect would be to eat away the metal, as the iron of water pipes is eaten away by the passage of railway currents. The electrolysis of gas and water pipes might be even a serious matter unless precautions be taken to minimize its effect.

While it seems impossible to so arrange as that there shall be no induced currents in framework or piping, still it is possible, and in most cases would be well, to adopt such precautions as will confine them within such small limits that they may become negligible. It would be well to thoroughly ground the entire steel structure by copper wires of large section leading from various points to the earth, and making good contact there with permanently moist soil. It would also be advisable in laying out circuits to so arrange that all those wires carrying the main current shall be as far removed as possible from any part of the structure, and as close together as insurance regulations will permit. If it be necessary for the main wires to be close to a pipe or pillar, and to run parallel to it, then they should be placed one on each side of it so as to neutralize each other's effect.



THE BROCHURE prints each year over one hundred half-tone engravings from photographs of European architecture, the subjects being carefully chosen, is those likely to be of most value and interest to architects and draughtsmen. Each issue deals with some particular building or class of subjects; the October issue for instance, illustrated in detail the Great Staircase of the Chateau of Blois; the December issue contained photographs of beautiful Italian holy-water fountains; the January number illustrated Sicilian churches.

It will be evident that such pictures are of great value, not alone to architects and draughtsmen and students of art, for whom they are primarily intended, but also to all those to whom the best of the world's architecture appeals. An article of detailed description and comment accompanies each set of illustrations.

Although these photographs and the description of them form the chief features of the magazine they by no means constitute its entire contents. Articles of various kinds are constantly published which interest all who in any way have to deal with architecture. It is a marvel that the magazine can be sold for the subscription price—50 cents a year.

CARRICK'S FIRE-PROOF CONSTRUCTION.

THIS fire-proof system is the invention of a practical plasterer and will remedy many defects and difficulties from which other systems suffer. The object of this invention is to provide for the construction of complete floors, ceilings, partitions, columns, etc., in which a space is provided for ventilation, making the introduction of pipes and electric light and bell wires a very easy matter. The air space is accessible and wires may be easily run through or removed for repairs.

Partitions constructed of channel iron studding, set at every sixteen centers, bolted and fastened at top and bottom, and with transverse stiffening braces and sheet steel lath fastened thereto columns incased in the same way, ceilings formed with sheet steel lathing secured to angle iron bars, extending beneath the floor beams, and knees or brackets to which they are fastened, said knees being bolted to iron bands, which extend around the I beam, at every sixteen centers.

The concrete flooring to be supported by angle irons and knees or brackets as above, extensions of sheet steel upwards from the angle irons every thirty-two inches, said extensions riveted to the angle irons and having 2x2 inch wooden strips, nailed to the upper edge transversely for the wood floor to rest upon and from a space between floors and concrete for ventilation, piping and wiring purposes.

The sheet steel extensions also divide the concrete at their upper edges into panels, to prevent cracking in case of vibration, contraction and expansion. The lathing is made in sections or sheets, which are preferably made of galvanized sheet steel and by means of dies properly formed, these sheets are stamped with slots or channels, the portion which forms the slot is so cut that it turns inwardly and forms a key or lock to hold the plastering in place on the interior of the lath and also a ledge or support to prevent the plaster which protrudes inwardly, from falling down as is generally the case.

Carrick's lath construction is especially valuable for plastering on brick walls, as it does away with the necessity for plugging and furring, thus saving time and expense.

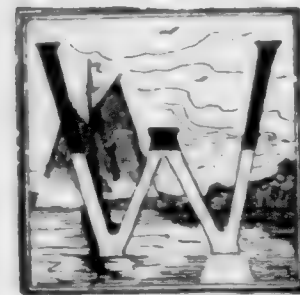
The sections are attached to the wall by means of large nails driven into the brick joints, while the supporting V shape rib, acts as a furring strip. It should be understood that the system takes in the plastering work as well as the fire-proofing.

The inventor claims the following points of superiority: 1—Simplicity and rapidity in construction. 2—Absolute prevention of cracking or bulging. 3—Easily and quickly repaired. 4—A splendid sound deadener. 5—Fire, water and vermin proof. 6—Gives perfect ventilation, making it especially valuable for use in large buildings.

THE BEST FIREPROOF CONSTRUCTION FOR BUILDINGS OCCUPIED FOR MERCANTILE PURPOSES.

PAPER READ BY W. L. B. JENNEY BEFORE THE FIRE UNDERWRITERS' ASSOCIATION OF THE NORTHWEST.

CONTINUED FROM LAST ISSUE.



Now reach the question under discussion: "What is the best fireproof construction for buildings occupied for Mercantile Purposes." As recommended in the Appraisers' Report (Insurance World, July 1, 1897), "the first requisite is a good foundation," which in Chicago means that the loads shall be uniformly distributed, that is to say, the load upon each footing shall be carefully calculated taking into account the weight of the building and the load within, that is, all the load that will come upon said footing. Then make the size of the footings so that the load per sq. ft. shall be the same in every instance throughout the building. This load should not exceed

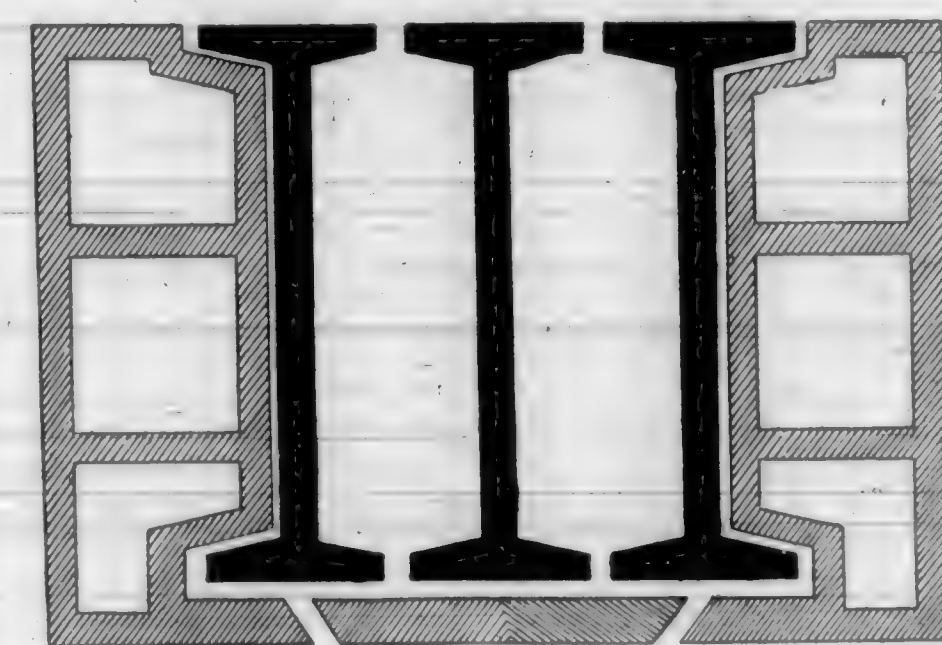


Fig. 2.

3,500 lbs. per sq. ft., for should this load be much in excess the settlement will be so great as to be inconvenient, and moreover continue too long, besides it increases the difficulty of obtaining an absolutely uniform settlement. With the load designated the total settlement should not exceed three inches, and should cease entirely by the end of the first year after the building is fully occupied. Any unequal settlement is not only a disfigurement to the building, but it causes a movement in the fireproofing that may be equal to a disarrangement, loosening the flange protection of the beams and girders so that they will fly off as soon as touched by a stream of water.

Second, fireproofing. This should be much more substantial than what is at present in general use. The recent fires have demonstrated that it is not difficult to protect the steel from injury. The fireproofing as usually constructed protects the steel, but is itself usually destroyed, causing serious loss. The material should be carefully tested by heating to redness and plunging into water, repeating this test five or six times. If it flies to pieces it is worthless. What is known as soft porous terra cotta, if the clay is good, usually stands well. This is manufactured by adding six parts of saw dust to four parts of fire clay. On burning, the saw dust is consumed, and furnishes a tile full of air holes or little cells, rendering it impossible for any hurtful heat to penetrate to the metal. The weakest part in the usual fireproofing is the protection of the soffits of the beams and girders. As usually constructed they are like Fig. 2, a long, weak flange on either side holding in a dove-tailed manner the soffit tile. The tile are also too thin and too close to the flanges of the metal beam. This is a serious fault, because the soffit is the very surface which has to resist the intense heat and action of the fire from the burning goods below, and is exposed to the direct force of the water.

In the *Clay Worker* of April 18, 1897, I find in the report of the proceedings of the last convention of the brick manufacturers at Buffalo, N. Y., a discussion of this subject. Mr. Gates, president of the American Terra Cotta Co. of Chicago, condemns the arrangement of Fig. 2, where the soffit tile

only 1 inch thick is placed close to the flanges of the beams, and only supported by the long weak flanges of the side tile. Mr. James Taylor, Fig. 3, made a diagram of a method he suggested which would overcome the dangerous method of Fig. 2—so justly condemned by Mr. Gates. He proposes a porous terra cotta flange 2 inches thick, Fig. 3, supported



by short strong flanges on either side. By this method the whole surface of the metal girder is covered with a non-conducting material which has entirely no liability to crack or break under the most severe difference of temperature. The short flanges on either side reduce the liability of cracking or breaking to a minimum, and the additional thickness affords additional solidity without much increase of weight, and greater ability to resist the action of heat and water. In Fig. 4, Mr. Gates showed how the terra cotta could be

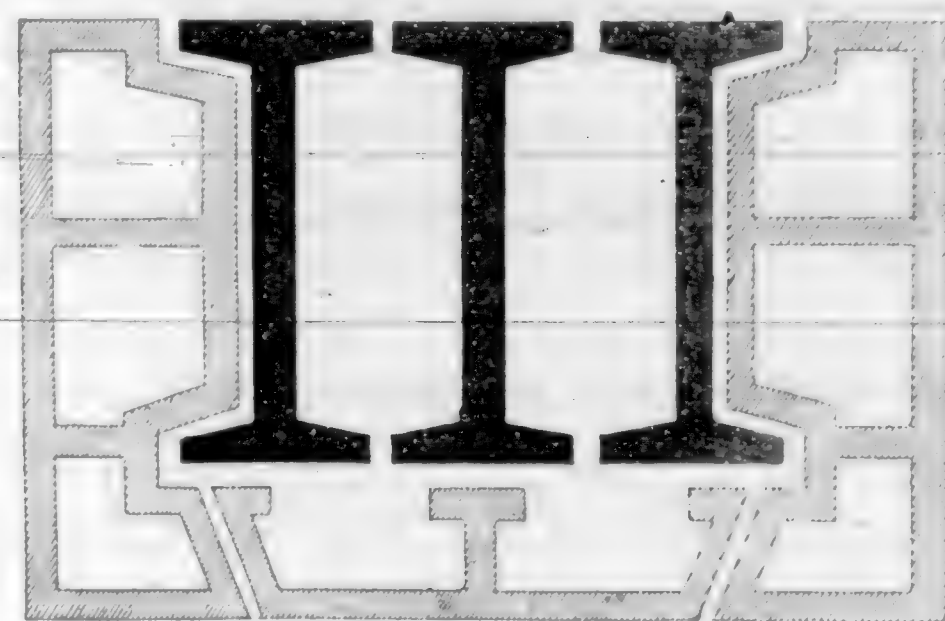


Fig. 4.

used in a double capacity, as a fireproofing protection and as an exterior finish when such girders are used projecting from exterior walls—mouldings can be added at pleasure. Care must be taken in dimensions and shapes in order that the side flanges shall securely hold the soffit tile so that it cannot escape or be knocked out by a stream of water. The floor arches should be very substantial, and what is known as "porous and end construction" is recommended. The laying of the terra cotta is very essential. Common lime mortar should be discarded as unfit for the purpose and Portland cement mortar should be used, adding only sufficient lime mortar to make it work freely under the trowel. Every joint should be filled with mortar over the entire surface and the tile crowded close together. In putting in the key, unless it fits closely, slabs of tile covered by cement mortar should be forced into the joints. It is very essential that these tile floors should be very rigid, as by so doing they prevent the lateral movement of the building not only in case of fire but as against high winds. If this work is well done they will take up a material portion of the wind

pressure even in a building of moderate dimensions. In most of the fires that have occurred in fireproof buildings very serious damage has been done to the floor arches by sealing off of the lower web, necessitating the replacing of the floors at an expense even greater than first cost. Concrete on top of the floor arches should be of good quality. Soft coal cinders should not be used. Crushed slag of the blast furnace is far better; it is full of air cells, and being produced at very high temperature is not affected by any heat likely to obtain. This concrete should not be inferior to that used in sidewalks, and when practicable should form the floor so as to avoid wood floors. The column protection, is another detail that should receive the most careful attention, for the columns are the main supports of all that are above, and if a single one should fall it brings down all there is directly above it, and the loss is necessarily very serious.

At the Fair building the columns are doubly protected, see Fig. 5, so that should the outer layer of terra cotta be

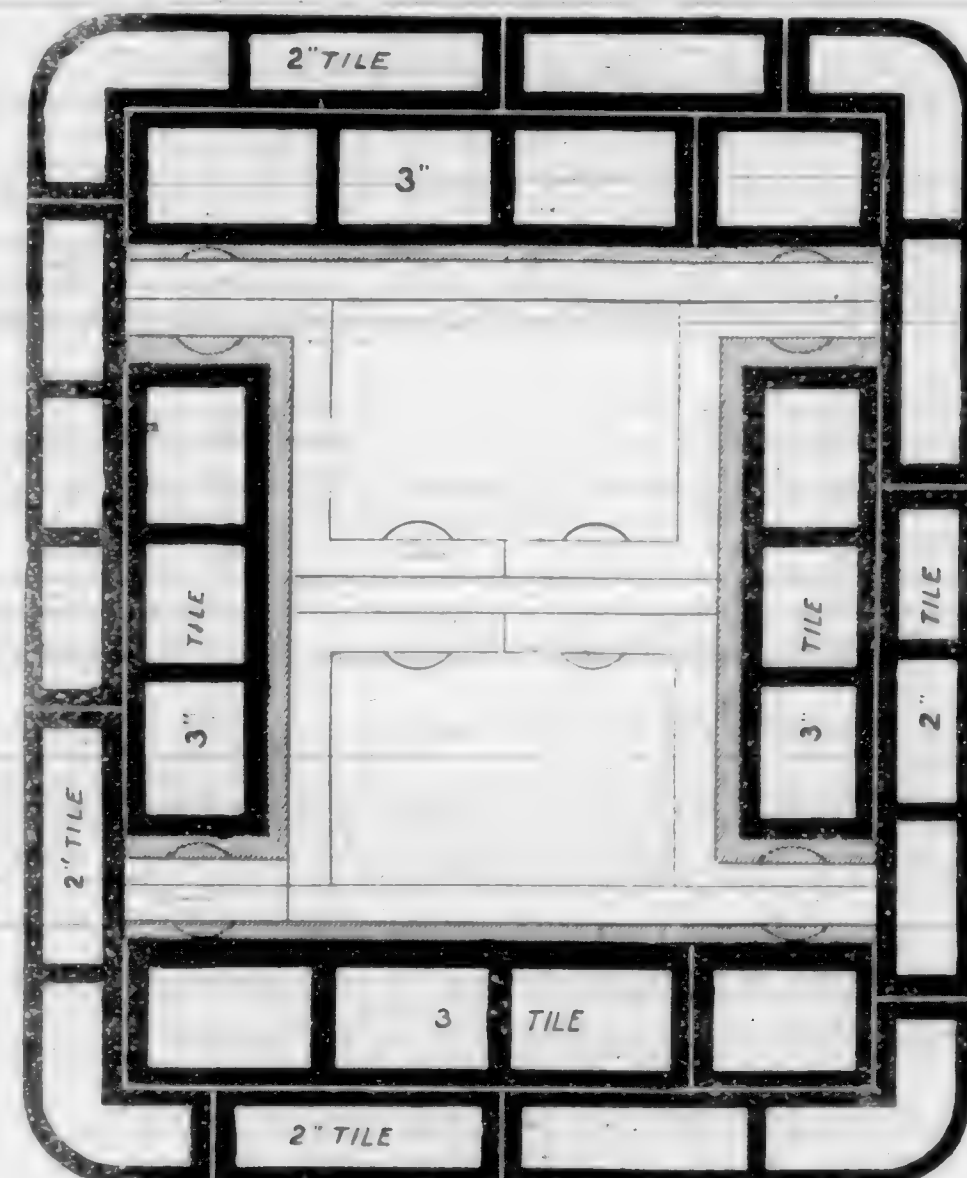


Fig. 5.

knocked off the column would be sufficiently protected by the second layer, which would be sufficient to resist the heat and prevent any serious injury to the column. For round columns there can easily be two layers; the inner one should be bound on firmly by wires or wire netting, which, lying close against the terra cotta, is itself protected. That this is the case can easily be shown by tying a piece of sewing cotton tight around a lead bullet and holding it in the flame of a candle; the lead will melt before the string burns off. The Chicago city ordinances demand in case of buildings devoted to the sale, storage or manufacture of merchandise, the covering of columns shall be of brick not less than 8 inches thick; if of hollow tile these coverings shall be in two consecutive layers each not less than 2 1/2 inches thick; if of porous terra cotta it shall consist of at least two layers, each not less than two inches thick, each course breaking joints and to be so anchored and bonded in itself as to form an independent and staple structure. If this is carried out in a proper manner the protection is all that is necessary.

To be continued.

DUNHAM, CARRIGAN & HAYDEN CO.

17 and 19 BEALE ST., San Francisco Cal.

WE show here an illustration of our AMERICAN SLIDING DOOR HANGER for which we claim unusual advantages, great saving in time and expense, and superior excellence in operation, together with the following features not obtained or claimed in other hangers.

TRACKLESS—We obviate the use of a track above or below, and the special framing necessary where a track is used.

NO WHEELS—There are no wheels to bind by reason of warped or sagging track. The movement is perfectly PARALLEL and insures against binding.

NOISELESS—The operation is noiseless and extremely easy.

DOORS EASILY ADJUSTED—The door can be readily adjusted plumb, raised or lowered by drawing them into the opening which gives easy access to the adjusting screws.

QUICKLY PUT UP—The hangers can be put up in one-third the time required for overhead hangers.

SUBSTANTIAL—The parts are made to carry three times the weight of doors of the size given.

ONE PACKAGE—We pack the hangers fully assembled and ready to attach in one package, including all bolts and screws necessary.

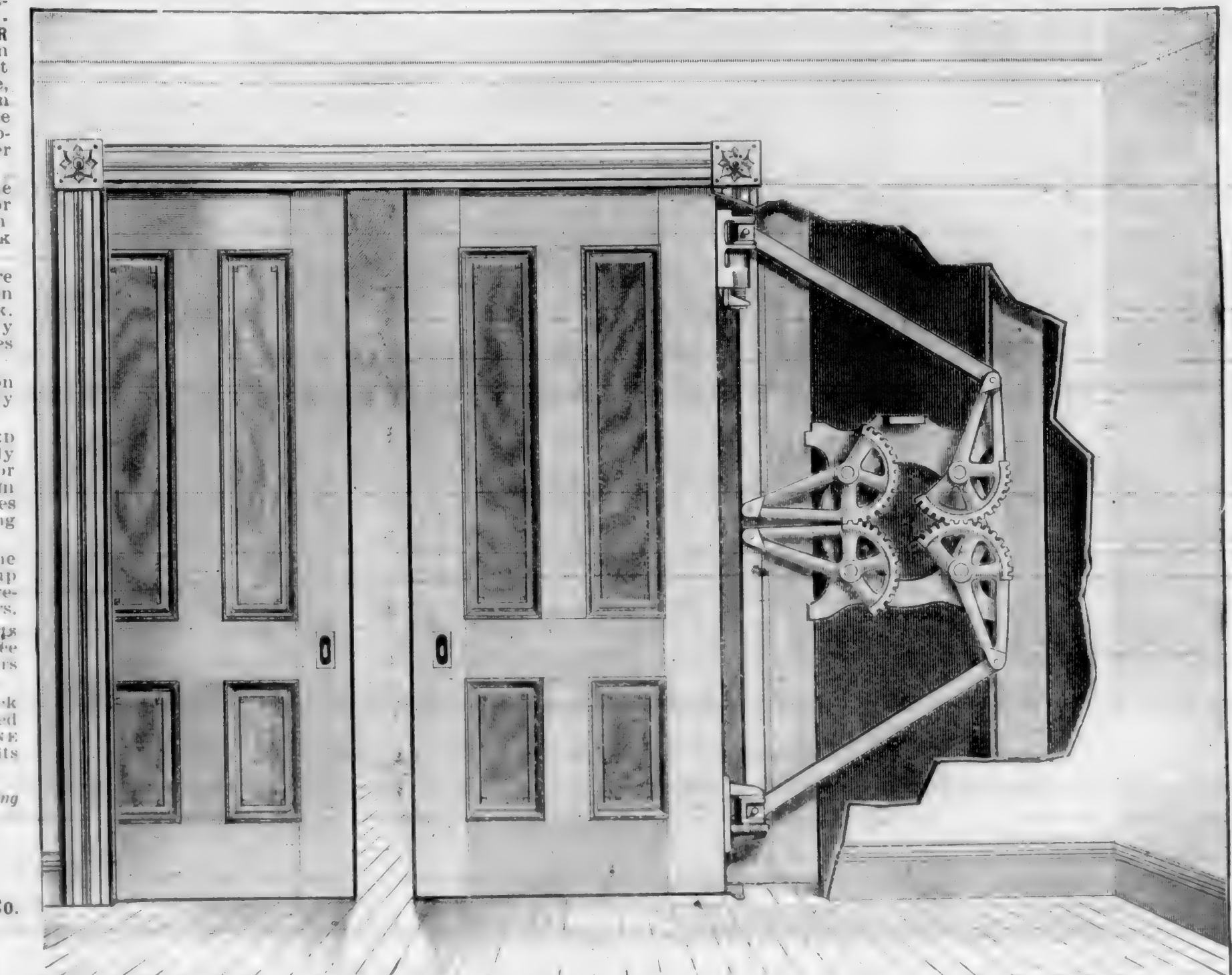
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Acts as a stop and prevents window

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For brown and white coat

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AND BOLTED

Mineral Wool

For fire-proofing and deadening

only 1 inch thick is placed close to the flanges of the beams, and only supported by the long weak flanges of the side tile. Mr. James Taylor, Fig. 3, made a diagram of a method he suggested which would overcome the dangerous method of Fig. 2—so justly condemned by Mr. Gates. He proposes a porous terra cotta flange 2 inches thick, Fig. 3, supported

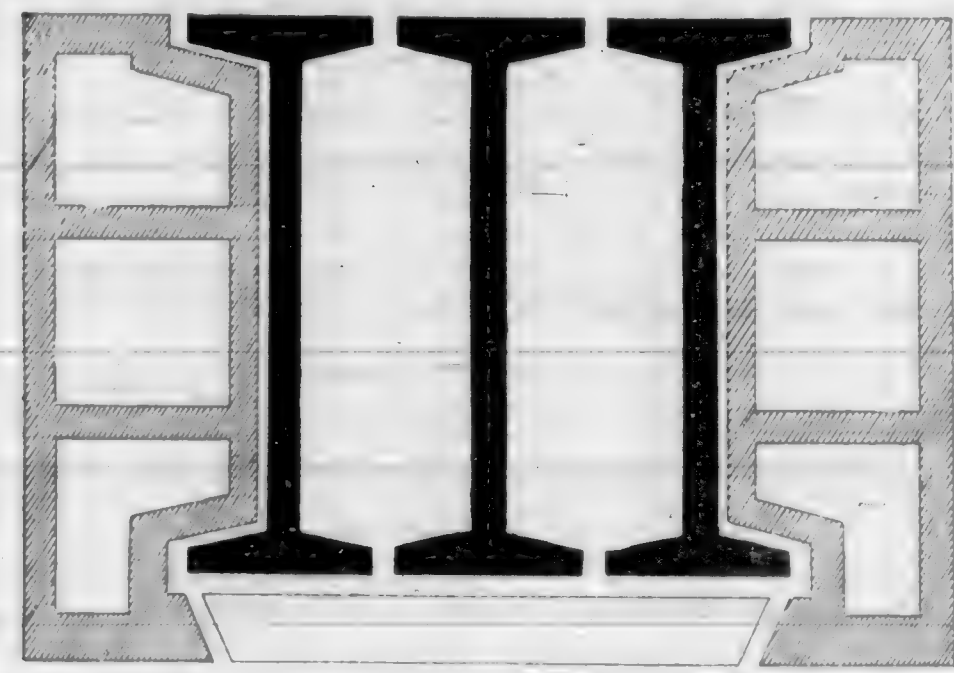


Fig. 3.

by short strong flanges on either side. By this method the whole surface of the metal girder is covered with a non-conducting material which has absolutely no liability to crack or break under the most severe differences of temperature. The short flanges on either side reduce the liability of cracking or breaking to a minimum, and the additional thickness affords additional solidity without much increase of weight, and greater ability to resist the action of heat and water. In Fig. 4, Mr. Gates showed how the terra cotta could be



Fig. 4.

used in a double capacity, as a fireproofing protection and as an exterior finish when such girders are used projecting from exterior walls—mouldings can be added at pleasure. Care must be taken in dimensions and shapes in order that the side flanges shall securely hold the soffit tile so that it cannot escape or be knocked out by a stream of water. The floor arches should be very substantial, and what is known as "porous and end construction" is recommended. The laying of the terra cotta is very essential. Common lime mortar should be discarded as unfit for the purpose and Portland cement mortar should be used, adding only sufficient lime mortar to make it work freely under the trowel. Every joint should be filled with mortar over the entire surface and the tile crowded close together. In putting in the key, unless it fits closely, slabs of tile covered by cement mortar should be forced into the joints. It is very essential that these tile floors should be very rigid, as by so doing they prevent the lateral movement of the building not only in case of fire but as against high winds. If this work is well done they will take up a material portion of the wind

pressure even in a building of moderate dimensions. In most of the fires that have occurred in fireproof buildings very serious damage has been done to the floor arches by scaling off of the lower web, necessitating the replacing of the floors at an expense even greater than first cost. Concrete on top of the floor arches should be of good quality. Soft coal cinders should not be used. Crushed slag of the blast furnace is far better; it is full of air cells, and being produced at very high temperature is not affected by any heat likely to obtain. This concrete should not be inferior to that used in sidewalks, and when practicable should form the floor so as to avoid wood floors. The column protection is another detail that should receive the most careful attention, for the columns are the main supports of all that are above, and if a single one should fall it brings down all there is directly above it, and the loss is necessarily very serious.

At the Fair building the columns are doubly protected, see Fig. 5, so that should the outer layer of terra cotta be

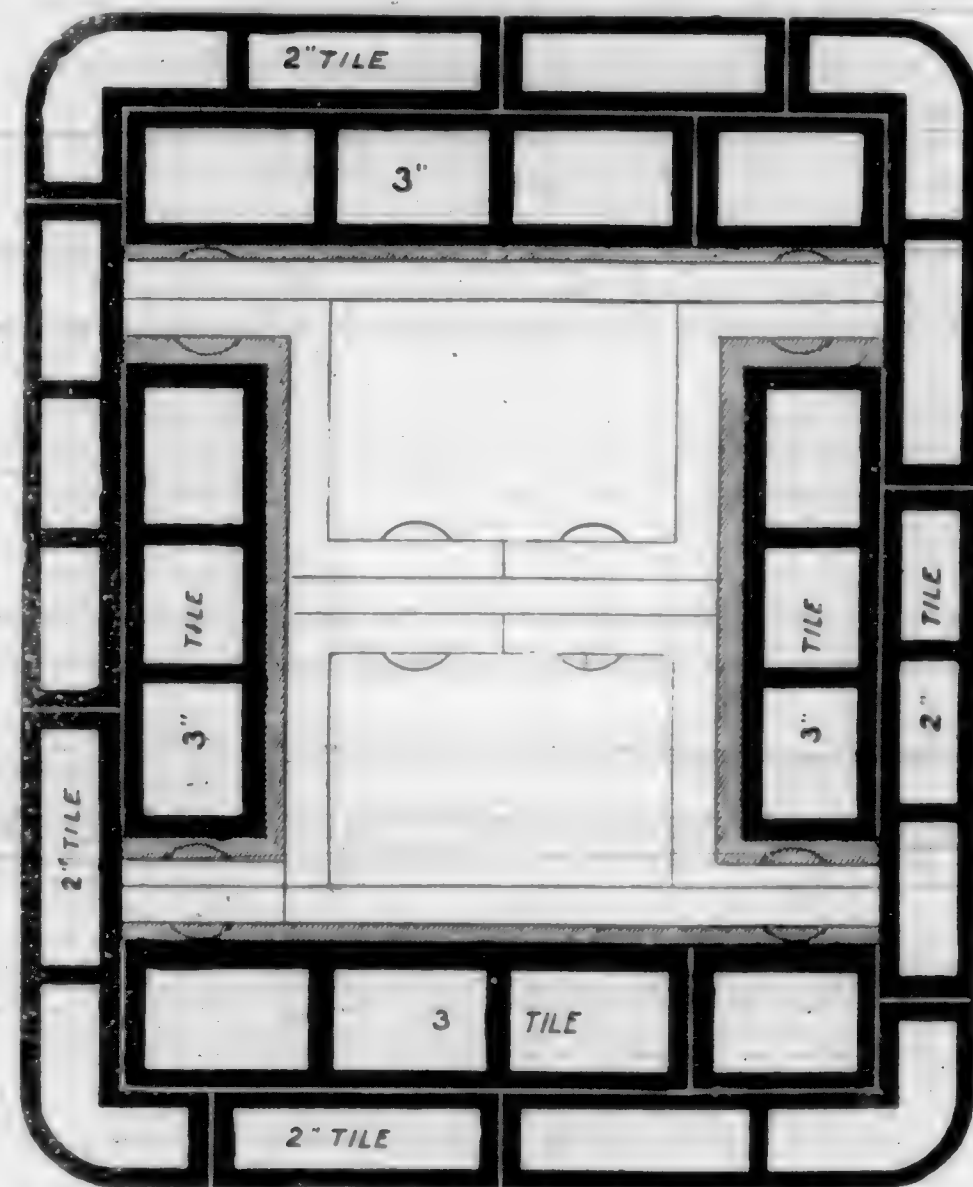


Fig. 5.

knocked off the column would be sufficiently protected by the second layer, which would be sufficient to resist the heat and prevent any serious injury to the column. For round columns there can easily be two layers; the inner one should be bound on firmly by wires or wire netting, which, lying close against the terra cotta, is itself protected. That this is the case can easily be shown by tying a piece of sewing cotton tight around a lead bullet and holding it in the flame of a candle; the lead will melt before the string burns off. The Chicago city ordinances demand in case of buildings devoted to the sale, storage or manufacture of merchandise, the covering of columns shall be of brick not less than 8 inches thick; if of hollow tile these coverings shall be in two consecutive layers each not less than 2½ inches thick; if of porous terra cotta it shall consist of at least two layers, each not less than two inches thick, each course breaking joints and to be so anchored and bonded in itself as to form an independent and staple structure. If this is carried out in a proper manner the protection is all that is necessary.

To be continued.

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NOISELESS.—The operation is noiseless and extremely easy.

DOORS EASILY ADJUSTED.—The door can be readily adjusted plumb, raised or lowered by drawing them into the opening which gives easy access to the adjusting screws.

QUICKLY PUT UP.—The Hangers—can be put up in one-third the time required for overhead hangers.

SUBSTANTIAL.—The parts are made to carry three times the weight of doors of the sizes given.

ONE PACKAGE.—We pack the Hangers fully assembled and ready to attach in one package, including all bolts and screws necessary.

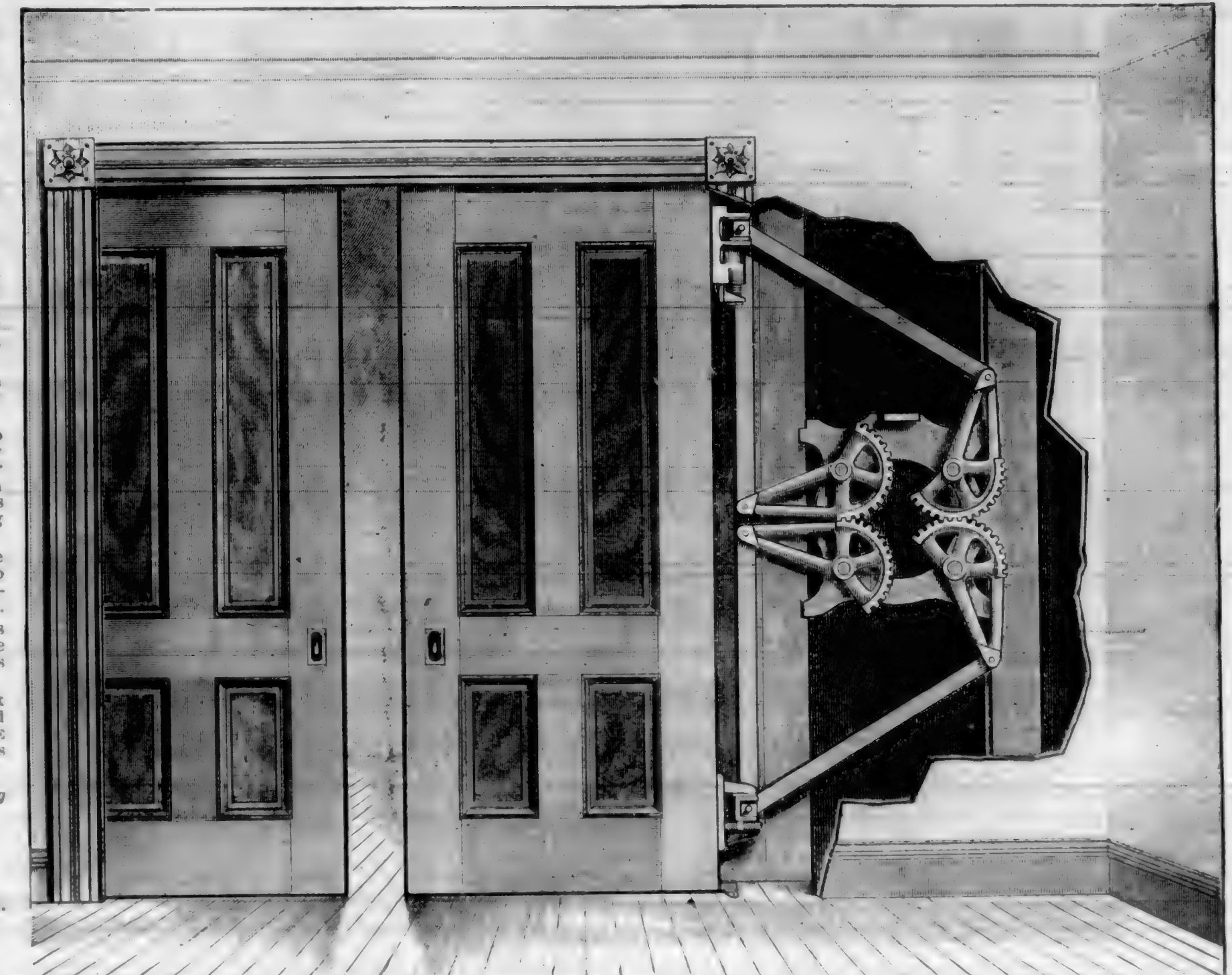
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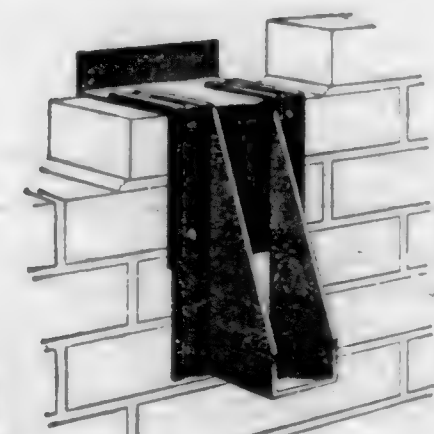
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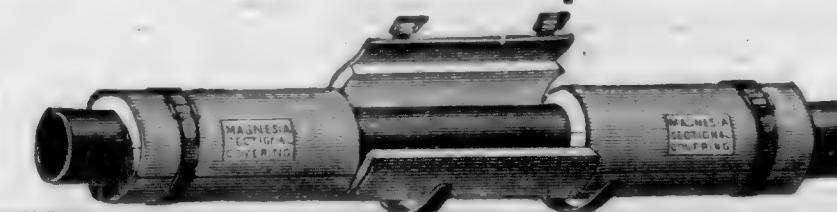
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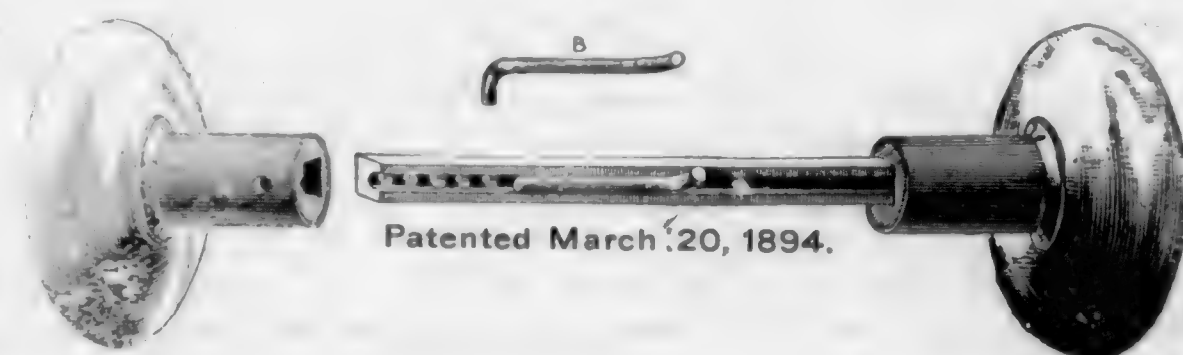
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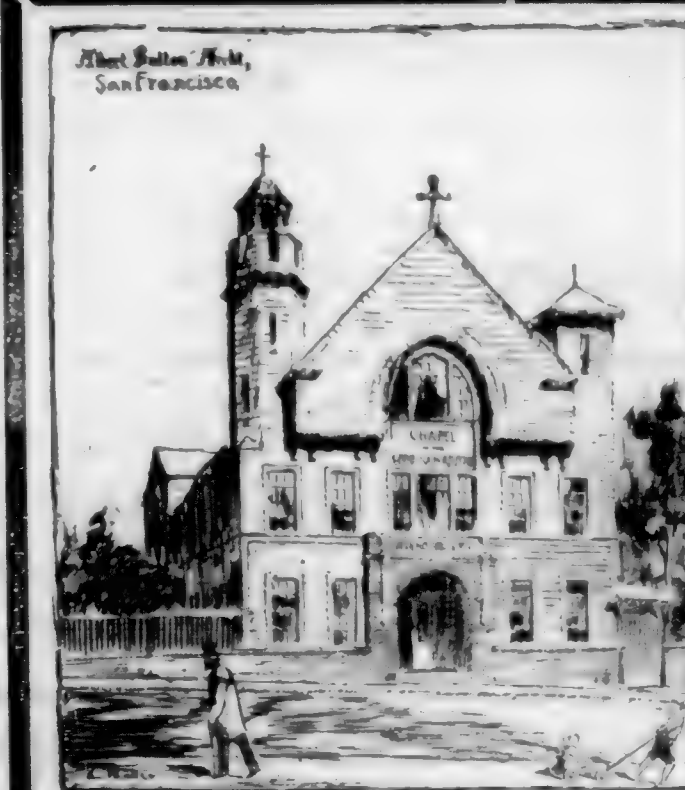
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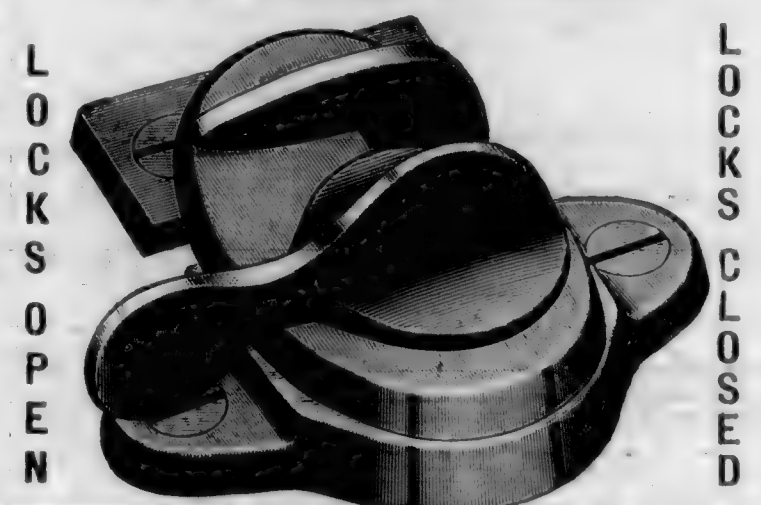
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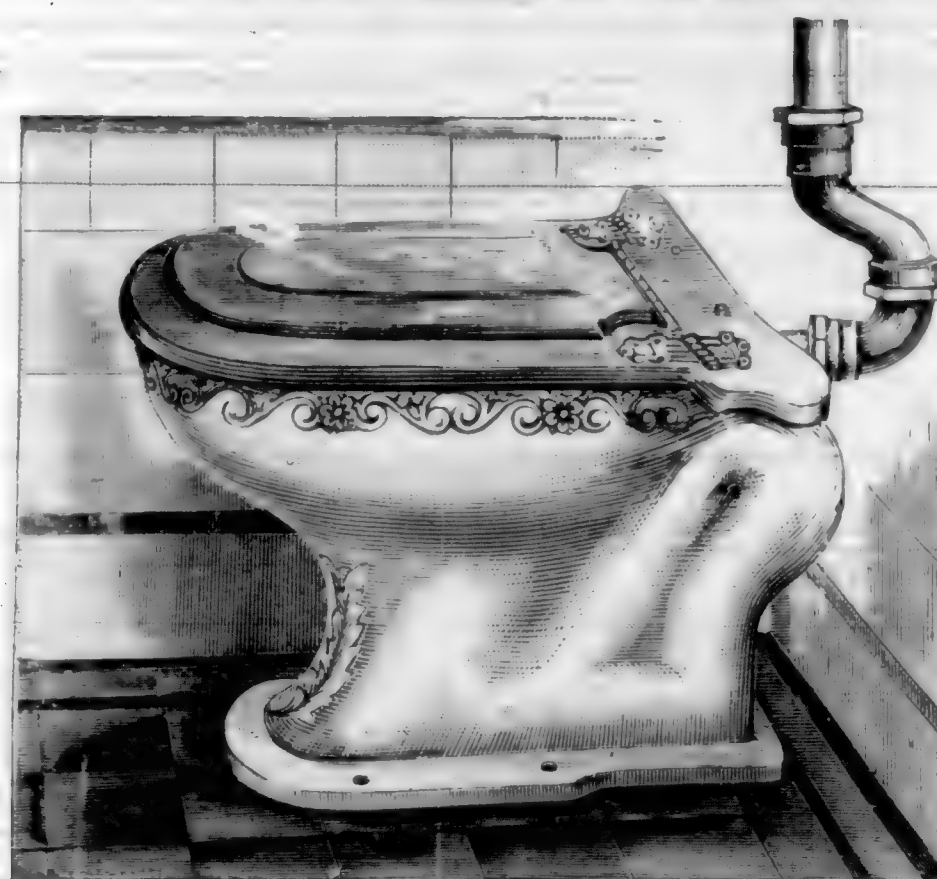
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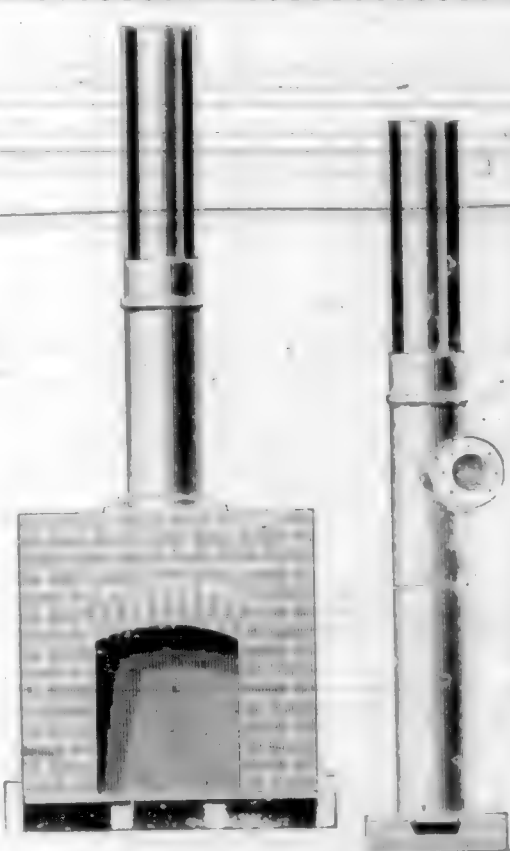
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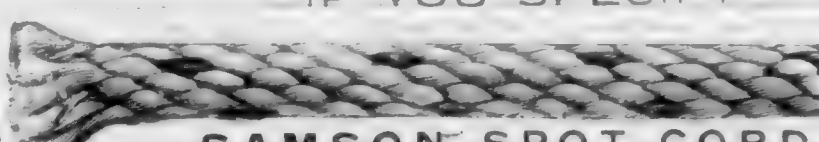
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THE CALIFORNIA ARCHITECT AND BUILDING NEWS

\$3.00 PER YEAR

VOLUME XIX, No. 5.

MAY, 1898.

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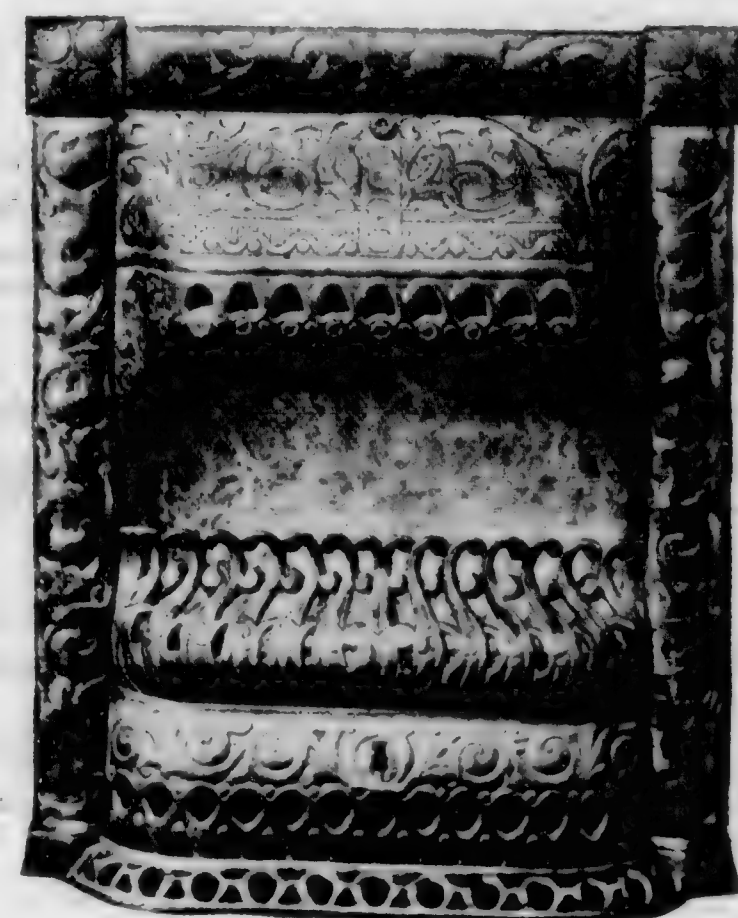
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THE CALIFORNIA ARCHITECT AND BUILDING NEWS.

BUILDING NEWS.

Bartlett near 23d. To build; owner, Marie C. Kratz; c. H. R. Schmuckert; cost \$9750.

Bernice near 12th. Two-story frame, 4 flats; o. Charles Fleischer and wife Kate; n. W. H. Wharf; c. Carl A. Holm; signed, April 27; filed, April 28; cost \$9925.

Beulah near Shrader. Cottage; o. Martin Schmitt; c. W. W. Rednall; signed and filed, 12; cost \$2308.

Bush and Jones. To build; o. Frederick Tillman, Jr., trustee estate of Claus Mangels; a. Hermann & Swain; c. Peterson & Persen; signed, May 10; filed, May 11; cost \$1708.

May 12; cost \$2915. Sewerage, plumbing and gas fitting; c. Ickelheimer Bros; signed, May 10; filed, May 12; cost \$1782. Painting, etc; c. W. T. Beck; cost \$1400.

Bush near Kearny. Alteration; o. S. H. Seymour; J. W. Murphy; c. William Little; signed, May 2; filed, May 3; cost \$2300.

Bush near Sansome. Cast iron work; o. Murphy, Grant & Co's building; o. Murphy, Grant & Co; a. F. S. Van Trees; c. Mahoney Bros; sub-c. Judson Mfg. Co; signed, April 28; filed, April 29; cost \$322. Painting, varnishing, papering, etc; c. F. A. Jennings; cost \$1708.

BUILDING NEWS.

Central Ave. near Clay. Alterations and additions; o. The Homeopathic Sanitarium; a. Havens & Toepke; c. Z. O. Field; signed and filed, April 29; cost \$3480.

Clara near 5th. To build; o. May L. Blake; a. W. Koenig; c. I. W. Coburn; signed, April 14; filed, April 18; cost \$2327.

Cole near Frederick. Cottage; o. S. Z. Dolliver; c. John Stierlein; cost \$6000.

Davis and Jackson. Partitions, etc; owner, John G. Gibson; a. James E. Wolfe; cost \$750. Plumbing, etc; c. J. P. Groom; cost \$500.

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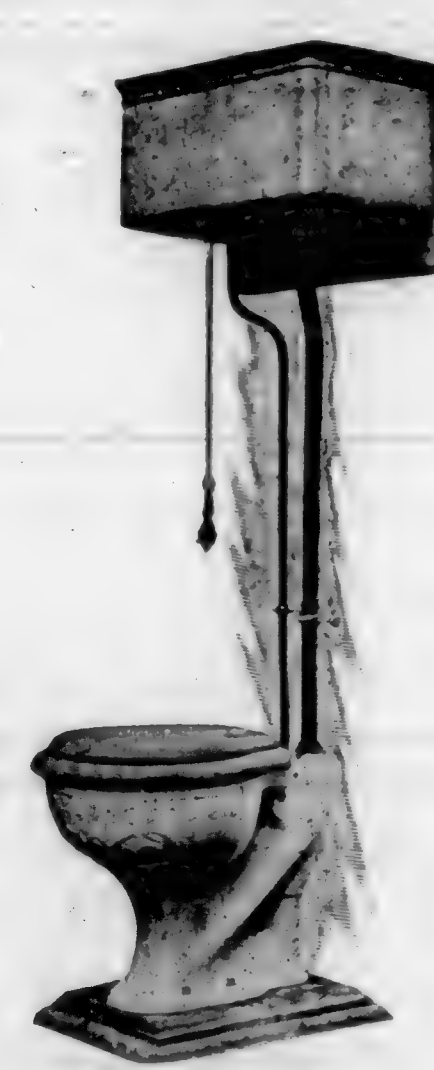
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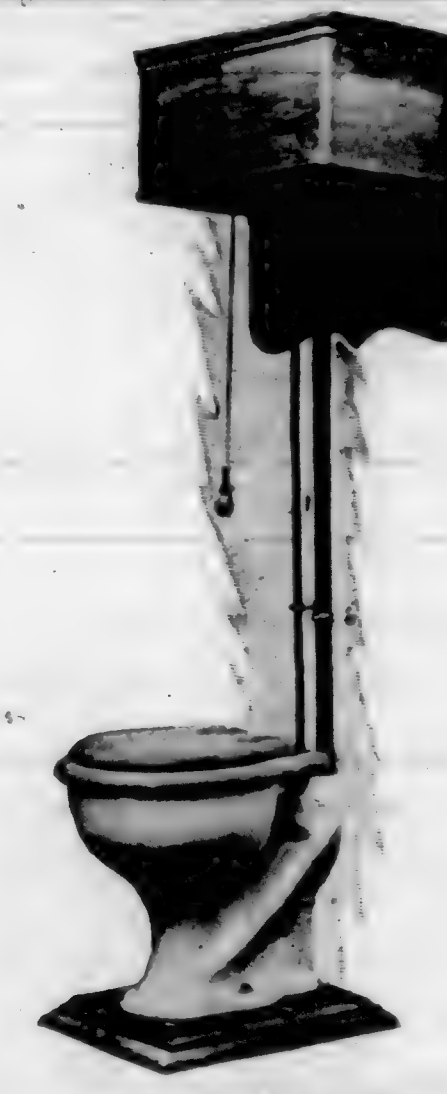
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BUILDING NEWS.

Devisadero near Eddy. To build; o. J. F. Dunn; a. Havens & Toopke; c. D. B. Munroe; signed and filed, April 14; cost \$540.

Devisadero near Fulton. Plumbing, etc.; o. Ellen A. Fife; a. N. Blaisdell; c. Peter Crichton; signed and filed, April 30; cost \$16,791.

Devisadero near Fulton. Painting, graining, etc.; a. N. Blaisdell; c. Kuss & Storz; signed, May 5; filed, May 9; cost \$1500.

Eddy and Moson. Alterations to build; o. A. W. Wilson; a. Shea & Shea; c. I. W. Coburn; signed, April 12; filed, April 19; cost \$1946.

Eddy and Jones. Alterations and additions; signed April 23; filed, April 25; cost \$8156.

Eddy and Powell. Lathing, plastering, etc.; o. William Rogen; a. Havens & Toopke; c. J. J. Morehouse; signed, April 26; filed, April 28; cost \$1491.

Ellis and Cohen. Three-story frame; o. John Blaney; a. F. B. Wood; c. C. E. Sheibley; signed, April 12; filed, April 21; cost \$8400.

Front and Broadway. Repairs, etc.; o. American Biscuit Co.; mason work; c. T. Butler; carpentry; Campbell & Pettus; a. Wright & Sanders; cost \$5000.

Fell near Lott. Plumbing, gas fitting, etc.; o. Mrs. Elizabeth A. McCord; a. E. R. Swain; c. Duffey Bros; signed, April 14; filed, April 16; cost \$1065.

Geary and Jones. Plumbing, etc.; o. Ruby A. Root; a. C. A. Neussdorfer; c. T. K. Reimer Bros; signed, April 20; filed, April 21; cost \$1923.

Guerrero near 10th. To build; o. John and Nellie Donnelly; a. C. N. Jones; c. J. A. Cotter; signed, April 15; filed, March 18; cost \$3240.

Jackson near Pierce. Carpentry work, etc.; o. Mrs. Camilla Sansone; a. Safford & Kohlberg; signed, April 16; filed, April 30; cost \$9455.

Jackson and Lyon. To build; o. David Dangers; a. Newson & Meyers; c. Campbell & Pettus; signed, April 8; filed, April 16; cost \$5945.

Jackson near Pierce. Plumbing, etc.; o. Mrs. Camilla Sanson; a. Safford & Kohlberg; c. W. F. Wilson; signed, April 12; filed, April 18; cost \$1511. Excavations, brick work, etc.; c. F. Wagner; cost \$1148.

BUILDING NEWS.

Kearny and Washington. Suspension floors for Hall of Justice and morgue; a. Shea & Shea; c. Western Expanded Metal and Fire Proofing Company; signed, Feb. 3; filed, April 28; cost \$19,650.

Kearny and Morton. Wrought and cast iron work, etc.; o. M. A. Guist & Co.; a. Hermann & Swain; c. J. A. Wilson; signed, May 4; filed, May 4; cost \$4740.

Lombard near Gough. Cottage; o. Henry L. Brice; a. H. Hess; c. Hilmyer & Upham; signed, April 19; filed, April 22; cost \$1759.

Lombard near Gough. Cottage; o. Anton Johnson; a. T. P. Ross; c. Chas. Lundberg; signed and filed, April 23; cost \$1300.

Market and Powell. Elevators for hotel; o. E. J. Baldwin; c. W. L. Holman; signed, April 16; filed, April 20; cost \$8673.

Morton near Stockton. Trenches, artificial stone, etc., for 6-story brick; o. V. Menesini; a. C. R. Wilson; c. H. M. Peterson & Co; signed, April 20; filed, April 21; cost \$2100. Lathing, plastering, etc.; c. Frank Cochran; cost \$914. Painting, graining, varnishing, etc.; c. J. A. Mohr; cost \$650.

North Point street near Larkin. To build; o. George McLennan; c. Vaughn & Chadwick; signed and filed, April 27; cost \$2205.

Nineteenth and Mission. Excavation, brick work, etc., for 4-story brick; o. Youth's Directory; a. Chas. J. I. Devlin; c. Thomas Butler; signed, April 6; filed, April 14; cost \$20,991. Carpentry, mill work, etc.; c. J. W. Smith; c. \$17,380. Plumbing, gas fitting and drainage; c. G. C. Sweeney; cost \$577. Lathing, plastering and cementing; c. Martin Carriek; cost \$286. Painting, graining, etc.; c. J. F. Sullivan; cost \$1875.

Page near Laguna. To build; o. Louis Friedlander; a. C. H. Hasty; c. Wilson & Long; signed, May 9; filed, May 10; cost \$3400.

Paraguay near St. Johns. Cottage; o. Henry Pfeiffer and Marion Pfeiffer; a. J. W. Johnson; c. Marcuse & Rummel; signed, April 29; filed, April 22; cost \$1300.

Powell and Eddy. Brick work, etc.; o. Wm. Rogen; a. Havens & Toopke; c. John Furness; signed, April 4; filed, April 16; cost \$10,650. Gas fitting, plumbing, etc.; c. Duffey Bros; cost \$1800. Decorative plaster work; c. J. P. McMurry; cost \$2400. Concrete flooring, etc.; c. Mangrum & Otter; cost \$6650.

BUILDING NEWS.

Sacramento and Larkin. Brick work, carpentry etc., for five flats and two stores; o. Mrs. F. de Lariere per J. S. Perini, attorney; signed, May 11; filed, May 3; cost \$7200. Plumbing, gas fitting, sewerage, etc.; c. E. Kraus; cost \$1200. Painting, graining, etc.; c. G. A. Petterson; cost \$625.

Scott near Geary. Repairs to Girl's High School; o. Board of Education of S. F.; a. T. J. Weis; c. Daniel Sherrin & sons; cost \$1600.

Second and Mission. Plumbing work, etc.; o. Wells Fargo & Co.; a. Percy & Hamilton; c. W. F. Wilson; signed, April 13; filed, April 18; cost \$16,856. Elevator work; c. Fraser Electric Elevator Co; signed, April 13; filed, April 18; cost \$15,500.

Second and Mission. Marble work, etc.; o. Wells Fargo & Co.; a. Percy & Hamilton; c. Duffey Bros; signed, April 9; filed, April 18; cost \$23,000.

Shipley near 6th. Alterations and additions; o. Gus Harshill; a. Safford & Kohlberg; c. J. V. Hull; signed and filed, May 12; cost \$3153.

Sixth Ave. near California. To build; o. Felix Marcuse; c. Marcuse & Rummel; signed and filed, April 29; cost \$9000.

Steuart near Mission. Excavations, etc., for 3-story brick; o. John F. Boyd; a. McDougall Bros; c. H. Stettin; signed and filed, May 6; cost \$7680.

Sutter near Mason. Electric elevator; o. Maude L. Bertschman and Blanch B. Morton; a. Oscar Haupt; c. W. L. Holman; cost \$1525.

Turk near Taylor. Alterations and additions; o. James D. Phelan; a. Curlett & McLaw; c. A. H. Wilhelm; signed, April 18; filed, April 19; cost \$6173.

Twelfth Ave. near Clement. To build; owner and contractor, D. Taylor; cost \$2000.

Washington near Mason. Demolitions, and all work except mantels and gas fixtures; o. L. Brizzolara; a. E. Deplorre; c. P. A. Antonelli; signed, April 18; filed, April 19; cost \$5900.

Washington near Spruce. Two-story frame; o. Dr. J. Mora Moss; a. Sam'l Newson and F. H. Myer; c. Depew & Brooks; signed, May 14; filed, May 15; cost \$2750.

Webster near Post. To build; o. Mrs. Dora Deekler; a. W. J. Culbertson; c. D. Currie; signed, April 22; filed, May 4; cost \$1480.

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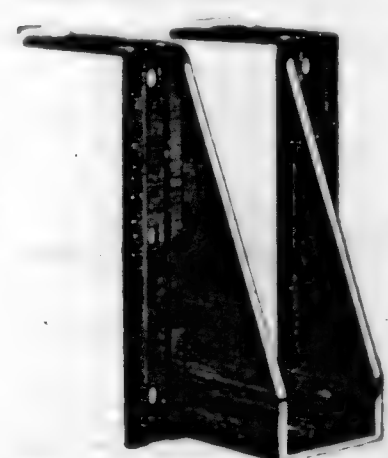
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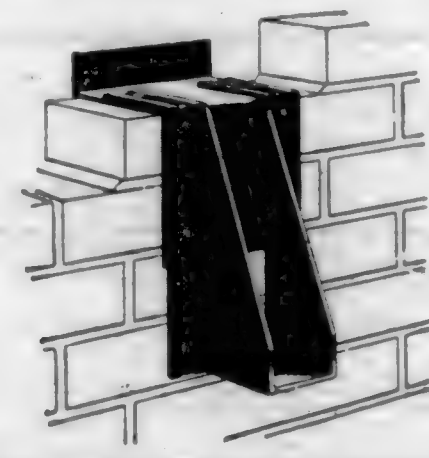


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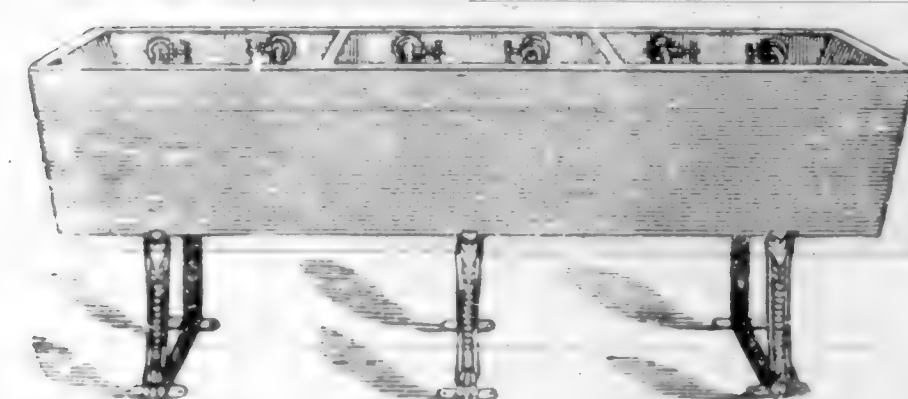
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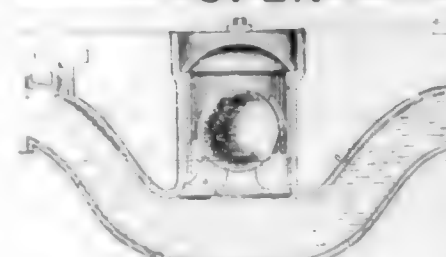
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BUILDING NEWS.

ALAMEDA

Santa Clara Ave. near Lafayette. To build: O. Callen Bryant; a. A. Sutton; c. Z. O. Field; signed, April 25; filed, April 26; cost \$6250. Plumbing and heating apparatus; c. Datzel & Moller; signed, April 25; filed, April 27; cost \$904.

ARIZONA

John Ivancovich contemplates erecting a brick building with stone foundation, adjoining the A. O. C. W. hall, at Tucson. It will be 75x85 feet, with iron and plate-glass front.

ANAHEIM

N. B. Mitchell of Pasadena is reported as having plans for a hotel building which he is contemplating building upon his property here.

A high school will be the next enterprise to be started in Anaheim. The people have grown tired of sending their boys and girls to Santa Ana and Fullerton.

AZUSA

Six buildings were burned here last week, involving a loss of \$10,000.

BANNING

Mr. M. L. Bridge is expected soon from Los Angeles to build the foundations for the new residence of Charles M. Morris, and to complete the work of plastering, etc., on the new cottage being built for Dr. King.

FRUITVALE

Spring Tract. Cottage; a. Elizabeth L. Murison; a. W. G. Bugbee; c. A. C. Soule; signed May 5; filed, May 5; cost \$1580.

BUILDING NEWS.

EL MONTE

Architects Smith & Elder have prepared plans for a frame store building 30x70 feet, for E. L. Dobson, to be built at El Monte. The same architect has plans for a cottage, for George Slack, to be built at the same place, by day's work.

OAKLAND

Eleventh and 6th Ave. Alterations and additions; a. C. H. King; a. W. J. Mathews; c. C. Christensen; signed, May 5; filed, May 6; cost \$1800.

Webster street, No. 1376. Alterations and additions; a. Ann M. Laidlaw; a. W. M. Campbell; c. F. Eskilson; signed, April 2; filed, April 26; cost \$1255.

Hillside Ave. To build; a. J. H. and Julia L. Borraugh; a. D. F. Oliver; c. H. E. Wharton; signed and filed, April 6; cost \$9257.

Myrtle near 12th. To build; a. Adolph Phil; a. A. W. Smith; c. W. E. and J. C. S. Whelan; signed, April 1; filed, April 19; cost \$9299.

Eleventh and 6th Ave. Alterations and additions; a. Harriet A. Braun; a. M. G. Bugbee; c. A. C. Soule; signed, May 5; filed, May 7; cost \$890.

CLAREMONT

As a result of raising \$92,000, since January, Dr. Piersons of Chicago gives \$20,000 for a science hall for Pomona college. The hall is to be 60x90 feet, will face Holmes hall on Warren avenue. There will be three floors: the lower floor given to mathematics, the second to biology and the third to chemistry and physics. Steps are being taken which will result also in the erection and equipment of a gymnasium.

RIVERSIDE

The supervisors of Riverside county have decided to erect the hospital building, to take the place of the

one burned, on the old site at San Jacinto, and will call for bids as soon as plans can be adjusted. The building is to be completed by July 1.

The county clerk has been instructed to advertise for bids for supplying the county with suitable lands and buildings for county hospital purposes, to take the place of the building destroyed by fire.

Work on the new passenger depot is progressing. The outer walls are of pressed brick and present a very pleasing effect. The building will cost when completed \$10,000.

PASADENA

It is reported that a Mr. Neumeister, formerly of Chicago, will erect an ice plant here. Work on Hotel Green annex goes steadily on. The decorative architecture begins to show up splendidly.

Ellis Hakes, of Illinois, has purchased a fine building site near the La Pintoresca. He contemplates erecting a home on the property shortly.

Architects Locke & Munsel are preparing plans for the remodeling of the Raymond residence, on Columbia street, Pasadena, which has been purchased by C. W. Smith, president of the Los Angeles and Pasadena Electric Company. The same architects have been instructed by E. S. Chamberlain of Des Moines, Iowa, who is charmed with the Southern California style of architecture, to prepare plans for a handsome brick and stone residence to be erected in that city.

Architect C. W. Buchanan is preparing plans for a nine-room modern residence for D. A. Davis, to be erected on North Moline avenue.

Continued on page 4.



THE CALIFORNIA ARCHITECT AND BUILDING NEWS

\$3.00 PER YEAR

PUBLISHED ABOUT THE 20th OF EACH MONTH

BY E. H. BYRRELL LESSEE, PUBLISHER.

OFFICE 408 CALIFORNIA ST. SAN FRANCISCO CAL.

ESTABLISHED IN 1879 NOW IN THE NINETEENTH YEAR. INCORPORATED 1889

VOLUME XIX.

MAY 20th, 1898.

NUMBER 5.

A MONTHLY JOURNAL DEVOTED TO THE ARCHITECTURAL INTERESTS OF THE PACIFIC COAST.



ARCHITECTS will examine with interest the illustrations of tile arch construction in the highest office building in the world, which are shown on another page of this issue.

The *Engineering News*, to whom we are indebted for the article, has further information that similar defects can be seen in the tile floor construction of several buildings now going up in New York City.

That paper in its editorial comments on existing methods of building inspection, emphasizes the fact that competent authority has assured the Editor that these are merely ordinary examples of tile floor construction, such as can be found in odd corners around any first-class fire-proof building in that city.

As to tests and the extravagant claims which have characterized tile floor manufacturers' statements, the *News*

pays its respects very neatly in the following paragraph:

"Suppose we accept this view of the case, that tile construction of this sort is common, or at least frequent in fire-proof buildings. If this be true, then it follows that our knowledge of the strength of such floors is to say the least very imperfect; for all the tests which have been made of the strength of such floors have been made on arches carefully constructed with sound and symmetrical blocks, properly bonded with mortar. That such construction as is shown in our photographs is far weaker than floors built like the test arches, no one would think of denying. Perhaps it is still strong enough for safety; that is a matter which we shall not attempt to decide; the point of importance is that tile floor arches are just as capable of being built in a careless and defective manner, not contemplated by their design, as any other sort of engineering construction; and in view of some of the extravagant claims which have been made for tile floors, we believe, is well worth establishing."

FIRE-PROOF BUILDINGS AND LOW INSURANCE RATES.

800 BUILDINGS OF THIS CHARACTER IN NEW YORK
CITY VALUED IN THE AGGREGATE AT NEARLY
\$200,000,000.



HAT is termed a fire-proof structure is very different from the so-called fire-proof building of twenty years ago. While it is still true that the absolutely fire-proof building scarcely exists, the modern steel-framed building constructed throughout of incombustible materials is practically fire-proof.

This statement is supported by the test of several fires, and by remarkable concessions in rates by fire underwriters.

Salvage on the fire-proof buildings themselves has always been exceedingly large, the walls and steel framework being only slightly damaged in the fiercest fire, and scarcely entitled to a claim for loss as the result of any ordinary blaze. This can not always be said, however, of the combustible contents; for a degree of heat and amount of water not seriously affecting the building may destroy goods and furniture.

Fire underwriters have carefully studied the risk of the modern fire-proof building. They have employed experts and have accumulated statistics to determine the character of the new risk from their point of view; and they are now satisfied it is a safe risk.

Competition for fire-proof risks has recently been very keen among New York underwriters. This is partly due, it is true, to the recent suspension of rates in the Metropolitan district; but it is mainly due to the fact that the underwriters believe that large losses need not be feared among so-called fire-proof buildings. Rates have been amazingly low. We submit a few examples:

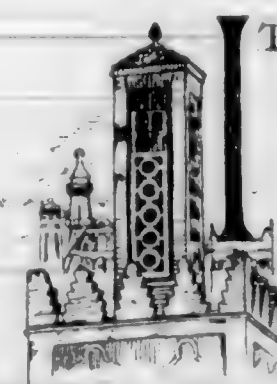
Lord's Court was written at five cents for three years. The Central National Bank building and the fire-proof Arnold Constable building were written at ten cents for five years. Large lines are carried. On one thirty-two storied steel skeleton building classed as one of the several hundred New York fire-proofs, nine companies wrote \$675,000 in sums ranging from \$50,000 to \$200,000. The total premium for five years was only \$675, and it is understood that the broker who placed the risk got twenty-five per cent of this small sum.

The underwriters are not gambling. There are about 800 fire-proof buildings in New York City, valued in the aggregate at nearly \$200,000,000. At an average rate of fifteen cents for five years this fire-proof business would produce \$300,000 in premiums. As the total destruction of any of these buildings is impossible, the damages to a large number of them could hardly be severe enough to wipe out all profit even at this low premium rate. We may therefore assume as a fact that low rates will continue to be the rule on these superior risks, even after a new rating by a tariff association.

This low rate experience in New York supports one of the strongest arguments urged by architects and builders in behalf of first-class buildings. The difference in insurance rates justifies the construction of first-class buildings of the modern fire-proof type.

AN EXPLANATION THAT EXPLAINS.

OR HOW TO EFFECT PROGRESS EITHER FORWARD OR
BACKWARD.



IT IS NOW an open question in building circles as to which building will be first completed and opened for the use of a patient and long suffering public. The Hall of Justice or the new Post-Office. With the former the contractors have been somewhat given to experiments in vast fields of enterprising development of new industries—such as opening up stone quarries and establishing brick yards, in out of the way nooks only known to themselves. These enterprises while laudable and in every way worthy of commendation, take much time and money. Of the former, the now famous firm of brothers, possess or at least act as if they were possessed, of unlimited quantities; of the latter, if dame rumor is to be believed, the Harbor Commissioners have awarded them liberal portions for their now practically completed work on the Ferry Depot.

It is just possible, however, that their supply of the former will be curtailed. More certain things than their grip on continuous extensions have "gang'd aft aglee." The term of office of indulgent supervisors, for instance, will expire one of these days. Then what?

The stone quarry riddle has been eliminated from the case by the firm position taken by the architects—Messrs. Shea & Shea—in standing by their specifications and Colusa stone—now all in place.

The expanded metal people too are about out of the way, having completed the first three stories and are now well on with the fourth.

The brick—just plain ordinary pressed brick, ah! there's the rub—can the contractors plead successfully to the powers that be that they are up against a pressed brick combine, then by working up the old, old story, of self preservation being the first law of nature, gain time enough from this board and the next, to bring to a conclusion this last new enterprise of theirs, viz.:—The pressed brick works they are said to have established at Stockton.

This about disposes of the Hall of Justice, and it gives much "the best of it" to the New Post Office building's chances, now under pretty fair headway. The daily papers may retard progress somewhat, in their efforts to assist the marble quarry men for the revenue there is in it. But this is doubtful; and the money could be far better expended at some of the unopened marble quarries in the State. In that quarter there would be a possibility of seeing the color of it again. As things stand now, a lobby at Washington with log rolling tendencies; many small but beautiful exhibits of speculative marble possibilities; with the purchased support of the said daily newspapers, constituted about all the stock in trade that has been thus far brought forward to induce the Treasury Department officials, to seriously consider California marble as a structural possibility.

The Supervising Architects office at Washington has kept the local superintendent, Mr. Roberts, quite busy, for some time back, visiting stone quarries, marble quarries and marble locations. This is all right and should be quite satisfactory to all concerned; but, and what a large but that is, there will be no delay from this time forth, and what is

more, the department ruled a long time ago, that "the opening up and development of quarries, had no part in the functions of Government.



THE USE OF STONE IN SKELETON CONSTRUCTION.

E. MCL. LONG IN STONE.

CONTINUED FROM APRIL NUMBER.



SINCE the architectural lines of every building are somewhat different the spandrel beams must be designed, or rather modified, to meet the special cases, and in order to arrive at the most substantial results the architect and the designer of the structural steel should work in unison. Generally the architectural lines of a building, and its adornment, are designed first, and then the structural steel frame is designed to carry a wall of known shape and weight. This is practical, for before an engineer can design a girder to carry a load he must know its weight and how it is to be applied. But still if this method of procedure is carried too far, and the lines of the building as first laid down, before the structural part has been considered, are strictly adhered to, almost impossible problems may be presented to the designer of the frame, and unnecessary expense incurred. Therefore, the structural engineer, when he finds he is being led into too complicated and expensive construction, should consult the architect, and where possible, without injuring the appearance of the building, the original lines should be changed. This architectural change for the most part would consist of a slight change in design or position of pilasters and cornices and some unimportant angles on the exterior of the building.

As in all masonry, the foundation for the curtain wall is of greatest importance. It seems strange at first sight that no standard construction has been agreed upon for this part of the skeleton construction; but when we consider the short time in which this form of architecture has had to develop, and the fact that most of these frames have been constructed by different engineers, each having his individual ideas in regard to a new form of construction, and the variation in decorated front to be supported, the variety we meet with in this detail is not to be wondered at. A long list of details could be shown of combinations of I beams, channels, Z bars, and angles that are now in use, but since these would be uninteresting to the general reader, and those particularly interested in this form of construction can procure them from books and articles on individual buildings, we will confine ourselves for the present to generalized methods and principles.

Besides carrying the wall, this beam serves as a floor

girder to receive the ends of the floor beams, or as a floor beam, and as such receives its part of the floor load, therefore its position must be at a floor level. Its position is also limited between the top of one window and the bottom of the one above. In the horizontal plane its position is very much limited, owing to the fact that its ends are to be connected with the columns.

In regard to the manner of loading this spandrel beam we have first the cornice, or horizontal band of stone ornamentation, which in architectural design is between the windows and on about the same elevation as the spandrel beam, so we can assume that this work will be fastened directly on the outside of the spandrel beam. From this band to the next band above we have the wall, or rather since the wall is mostly windows, the mullions between the windows. Thus we have two kinds of loading, a uniform loading and a loading at intervals along the beam corresponding to the window spaces. Now neither of these loads are over the center of the web of the beam, but are applied externally by means of supports built to the outside of the beam, and tend to produce a twisting moment in the beam which carried to the columns produce the effect of an eccentric loading there.

Where the outside wall is of stone and extends out well from the steel frame this twisting moment is quite an item, and must be balanced by having the floor beams at right angles to the spandrel and attached to it, in this way the structural problem becomes one of the cantilever, the supports for the stone work being a continuation of the floor beams with the spandrel acting as a fulcrum and receiving its load centrally and vertically. For causes of economy, the spandrel beam is generally a deep girder (a plate girder). Now the floor beams instead of ending at this girder can project beyond it, and thus form a shelf on the outside of the structural frame, on which can be built a stone wall of any design. If the spandrel beam can be placed so as to receive the floor beams on its top flange the construction is very simple, otherwise it receives the floor beams somewhere on its web and the continuation of the beams are formed by riveting on the outside of the spandrel. It would give a better form of construction if all supports for walls were built as above, but generally if floor beams are perpendicular to the front wall they are parallel to the side walls, and to have the floor beams making right angle connections with all four walls would cause a little complication in construction at the corners of the building. By so doing, however, we are following correct principles of construction and obviating the undesirable twisting that is produced by loading a detached beam on one side. In all structural steel work, except the skeleton of a steel building, all parts of the construction are in view and the steel can be easily examined to see how it is standing usage, and can be constantly repainted as a protection against rust, and when different members show weakness they can be replaced. But when once the steel of a building is covered with masonry it will never see the light of day again, except in the case of fire or the destruction of the edifice. It is, therefore, very important to be sure that all connections are well made and the steel well coated with paint, and that the stone covering is so constructed as not to allow moisture to attack the steel. It is one of the great faults in this form of construction that the structural material and details cannot be inspected, and considering this fact it is surprising to see with what carelessness these frames are often put together.

After the steel work has been erected and the architect is absolutely certain he has a structure that will stand rigidly