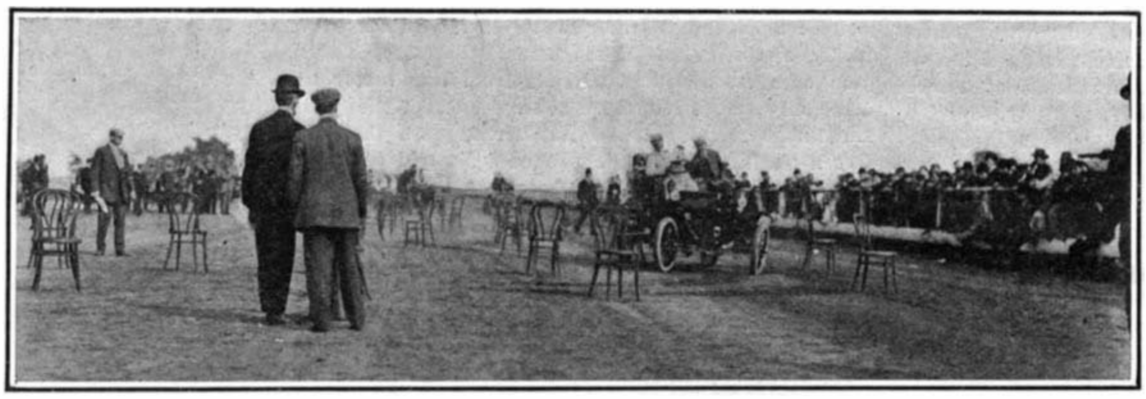
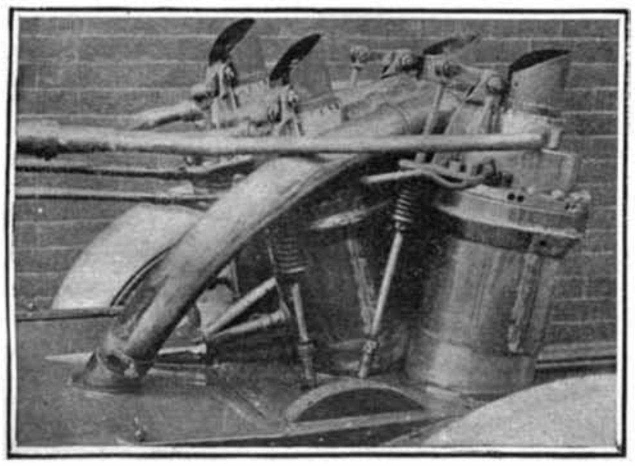
THE RECONSTRUCTED CHRISTIE RACER AND ITS RECORD AT THE AUTOMOBILE CARNIVAL.

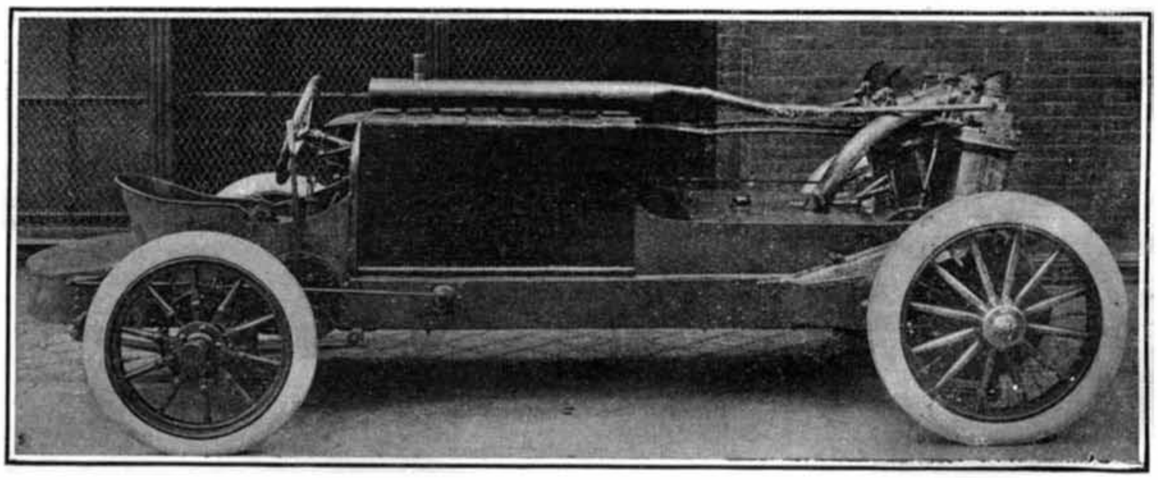
On the last day of the auto carnival and open-air show at the Empire City track, Walter Christie ran his reconstructed 135-horse-power direct-drive racer twice around the mile track in 54 1-5 and 53 seconds respectively. The second figure ties the track record made by Oldfield in a Peerless racer on a specially prepared track at Los Angeles, Cal., two years ago. It is equivalent to a speed rate of 67.92 miles an hour.

Our illustrations show the appearance of the Christie racer and its motor at the present time. The machine holds the world's record for the mile for a 4-cylinder car, it having covered that distance in 35 1-5 seconds on a soft beach at Atlantic City last April, as against 39 seconds scored the same day by an 8-cylinder Darracq. It has therefore run at the rate of 102 miles an hour, as against 122 miles an hour made at Ormond in January by the latter French car. In rebuilding his racer, Mr. Christie aimed at getting as powerful a motor as possible between the two front wheels. In order to accomplish this he placed the cylinders at a slight angle, as this enabled him to set the cylinders close together at their bases and still have room for the greater diameter of the water jackets and the heads. Electrolytic copper water jackets were first used, but these developed leaks and were subsequently replaced by clamped sheet-metal jackets. The exhaust valves (which are very large, being 3⅛ inches in diameter) are in the center of the cylinder heads and are water-jacketed. Eight 1½-inch automatic, flat-seated inlet valves occupy the remainder of each flat cylinder head. Thus both the incoming and outgoing gases have a direct passage into and out of the cylinders. The spark plugs screw into inclined holes at the edge of the cylinder heads. The pistons have four plain compression rings with square ends. They are also inlaid with three wide bronze rings which form the bearing surface. The cylinders are of steel having a 7⅝-inch bore and stroke. A 2¾-inch crankshaft of chrome steel is used. The engine weighs complete only 470 pounds. In making the record at Florida, it turned up 1,125 R. P. M. The weight of the complete machine is only 1,800 pounds. The original Christie car was illustrated in the 1905 Automobile issue of the Scientific American.

Besides the record made by the Christie racer, several interesting tests were carried out. Among these were included a vibration test, a traction test, and an obstacle race. One of our illustrations shows a car making a quick turn while threading its way through a line of chairs in the last-named test. This test was won by a Maxwell runabout in 16 seconds, while a Wayne car was second in 16 1-5 seconds, and an Autocar third in 16 3-5. In the traction test each car was obliged to haul 500 pounds dead weight placed in a stone boat a distance of 200 yards. This was done by a 24-horse-power Autocar in 25 2-5 seconds, by a 24-horse-power Frayer-Miller in 28 4-5 seconds, and by a White steamer in 44 4-5 seconds. The vibration test consisted in carrying a pail filled with water a distance of 200 yards. The car was obliged to start from a standstill, and to cross the finishing line on high gear. The test was won by a 26-horse-power Oldsmobile with a loss of ⅜ inch of water. A 35-horse-power Gobron-Brillié was second with a loss of 6-8 inch, and a 40-horse-power Wayne third with a loss of ⅞ inch. One of the most interesting events was a one-mile race between two 10-horse-power single-cylinder Cadillac machines, each of which carried 10 passengers. The winner covered the mile in 2:46. A 3-mile match race was won in 4:04 4-5 by a 26-horse-power Oldsmobile, with two Ardsley machines second and third. A tug of war between a 24-horse power Autocar and a similar machine gave an effective demonstration of the efficiency of the single-disk clutch lined with cork, which seemed to hold better than the multiple-disk type of clutch used in the latter car.


An Automobile Obstacle Race. A Car Making a Quick Turn As It Passes Through a Line of Chairs.


The Four-Cylinder Engine of the Christie Racer, Showing the Exhaust Valve at the Top.


The Christie 135-Horse-Power Racer Which Recently Made a Record of a Mile in 35 1-5 Seconds.

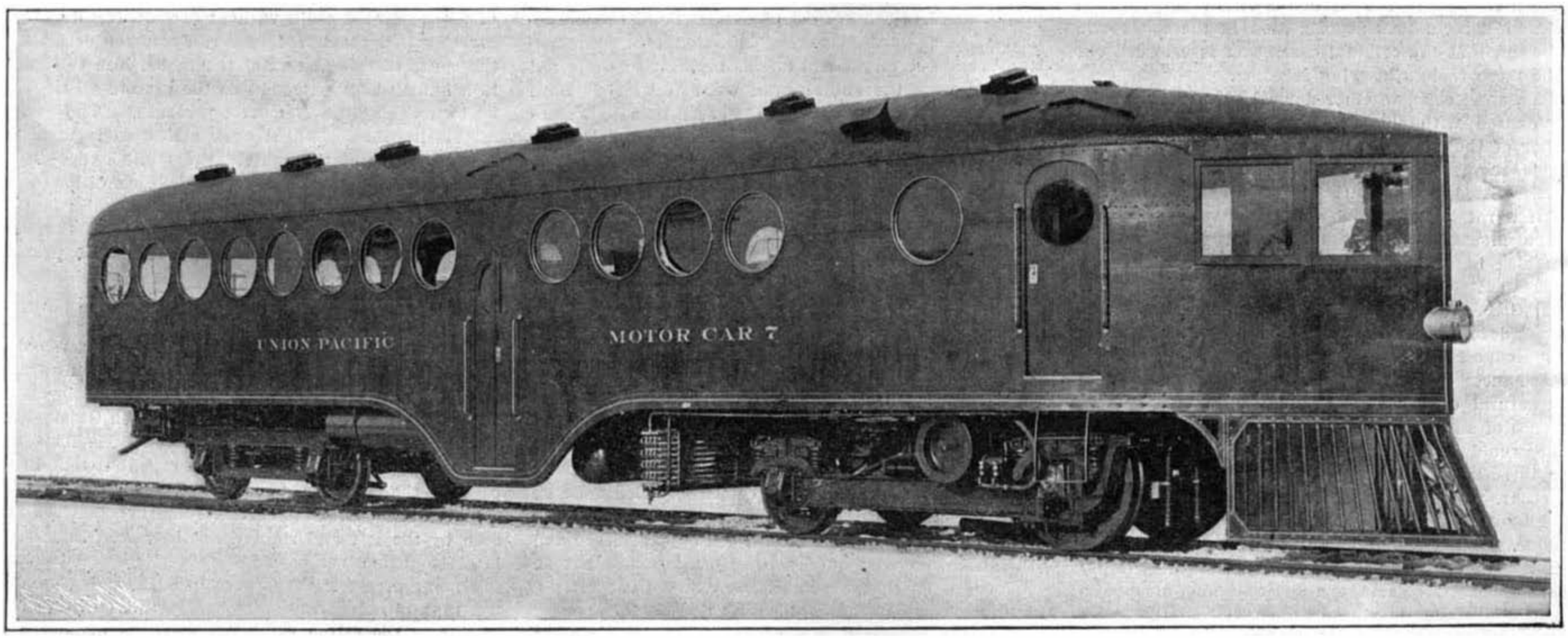
THE RECONSTRUCTED CHRISTIE RACER AND ITS RECORD AT THE AUTOMOBILE CARNIVAL.

◆

UNION PACIFIC MOTOR CAR NO. 7.

The accompanying illustration is of the latest of the Union Pacific gasoline motor cars, constructed for suburban passenger traffic and inspection service on the lines of that road. While conforming in general to the plan of construction of its predecessors, all of which are now in successful operation on various parts of the Harriman railroad system, No. 7 shows numerous structural differences, which make it a decided improvement over the earlier designs. The car was built in the Omaha shops of the Union Pacific Railroad, and has recently undergone a series of successful tests between that city and Grand Island, in which it has demonstrated excellent hill-climbing ability over fairly stiff grades, and has developed a maximum speed of 53 miles an hour. The average speed for runs of four to five hours was from 34 to 36 miles.

The appearance of the car is attractive, and carries with it the appearance of being speedy. Among the conspicuous features of the design are the round, port-hole-like windows, the sharp forward end tapered to a knife-like edge, and the convenient side entrances. The rear end, too, is rounded off as in the earlier motor cars, to avoid the vacuum created by a car with the usual square end. The door apertures for the side entrances are so constructed that by means of patented



UNION PACIFIC MOTOR CAR NO. 7.

steel framing the side of the car is in nowise weakened, as the depressed side sill is incorporated into the uninterrupted steel frame. By the slightly increased thickness of the side plates and the additional strength secured in this framing, a great increase in the general structural rigidity of the car is obtained. Notwithstanding that the roof is 9 inches lower than in the previous motor cars, the ventilation is said to be equally good. The square design of the window has been done away with, to allow the substitution of the round portholes, which are air, water, and dust proof. The appearance is similar to that of the porthole of a vessel, and the arrangement successfully gives protection against all the elements, a feature which is almost impossible to attain even with the double sash of the finest Pullman cars. By the use of the round windows, and the elimination of large wooden posts, a gain of 8 inches in the interior lateral dimensions is made.

The framework of the car is entirely of steel; the structure is 55 feet long over all, weighs 58,000 pounds, and has a seating capacity of seventy-five. The interior is handsomely finished in English oak with built-up veneered wood seats. The exterior construction has been designed throughout to avoid projections, which are apt to increase the friction of the air against the body, and such projections have been almost entirely eliminated, with the exception, of course, of the necessary ventilators on the roof.

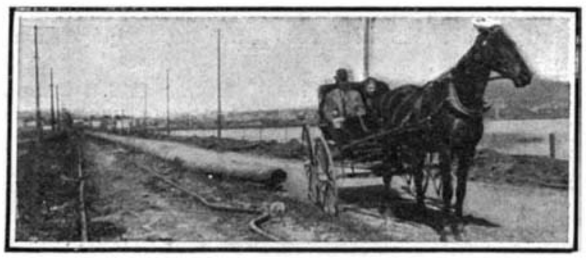
The engine is a six-cylinder, Standard gasoline motor located over the forward trucks, which are of special design to meet this requirement. An improvement in the construction of this car is the cast-steel "skirk," the engine-bed truck frame combination casting, which is a prominent factor in developing the practical side of the motor car for every-day service. The power of the engine is transmitted from the crank-shaft by means of chain gearing, cast-steel gears being used for setting the car in motion. There are only two speeds; the first, in which the gears are employed, being up to 10 miles an hour. By means of an "octoroon" clutch, which may be thrown out of mesh, the engine is connected directly with the driving axle. The chain gearing is arranged for the second speed, up to 50 miles per hour. Compressed air is used for starting the engine, for operating the clutch mechanism and the air brake, and for whistle signals. An auxiliary air pump has been provided for emergency in case of shortage of the air, which is ordinarily supplied by a small air pump driven from the main engine crank-shaft. The air tanks, located under the body of the car, are of large capacity and of sufficient size for all ordinary requirements.

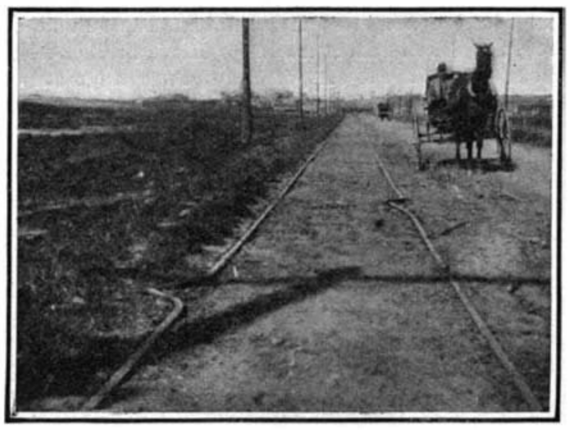
The controlling devices are of simple design, and are largely mechanical in operation. Special effort has been made to do away with the complicated machinery sometimes found necessary for the utilization of gas power in propelling railway motor cars. The equipment includes a powerful acetylene headlight and an acetylene gas system for interior illumination. The lamps for the latter purpose are provided with opalescent panels, which give a powerful light for reading purposes, while the general illumination of the car is subdued and restful to the eye. The accommodations for the passengers in general are simple, but comfortable. By improved engine construction, greater weight of the car, and increased rigidity of the framework, the unpleasant vibration often encountered in motor cars has been largely eliminated. By lengthening the car and providing double trucks the so-called "galloping" has been avoided.

◆

THE EARTHQUAKE AND THE TRACKS OF A TROLLEY LINE.

Whatever seismologists may or may not know about the causes of earthquakes they are at least agreed that such displacements of the earth's crust as San Francisco recently witnessed are due to the sliding, bending, crumpling, and cracking of rocks. The origin of such a disturbance may be best described as a wrench which both compresses and distorts.


Rails Buckled by the Earthquake.


Effect of Longitudinal Compression on Rails.

In the accompanying two illustrations, which were kindly furnished by a subscriber, the effects of the compression are admirably shown in the bending of the rails of a trolley line leading out of San Francisco. Each rail may be said to have been pushed longitudinally from each end, with the result that it bent. Hold one end of a wire in each hand; push your hands together, and a like effect will be produced. If the wire is very long it will buckle at several points. In the case of the railroad the buckling occurred over a distance of about three miles.

The accompanying photographs were taken about eleven miles south of San Francisco, entirely out of the influence of fire.

◆

FIREPROOFING AT SAN FRANCISCO.

In speaking of the effects of the San Francisco disaster on buildings of steel and masonry, and the successful way in which, taken as a whole, they withstood the ordeal, a distinction should be made between the damage wrought by the earthquake and that due to the fire which followed. We have spoken in this journal of the triumphant manner in which such buildings withstood the disaster, and in using that term, we have had in our minds more particularly the earthquake shock, which seems to have had very slight visible effect upon buildings constructed on the skeleton-frame plan. As far as we have been able to learn, the wrenching and twisting did surprisingly little damage to these buildings, most of it being confined to the loosening, and in some cases throwing down, of portions of the tiling, brickwork, or other walling and partition material.

Of the effects of fire upon such buildings, and the way in which the different systems of fireproofing would withstand a fierce conflagration, there was not so much doubt; for when, some two years ago, the great fire at Baltimore swept through several modern skeleton steel buildings from basement to roof, many valuable lessons were learned as to the fire-resisting qualities of these structures. The earliest information received from San Francisco, whether from correspondents or in the form of photographs, showed that none of the steel buildings had been absolutely destroyed, and that most of them were standing apparently intact as to their steel framework. We have recently been favored, however, by Mr. D. W. Terwilliger, an architect of Los Angeles, Cal., with some very instructive photographs, showing the interior of some of the burned buildings, which were taken by him early in May. They prove conclusively that in the presence of a fierce fire, the integrity of the steel columns and floor beams is entirely dependent upon the quality of the so-called fireproofing in which they are incased. Where, as in the case of two of the columns, shown in our illustrations, there was no fireproofing, or the fireproofing was of a faulty character, the heat proved sufficient to reduce the strength of the metal to a point at which it crumpled up under the superimposed load, and the column sank bodily upon itself in its own axial line. That the subsidence of the columns should have taken place in such a true vertical direction is to be attributed to the fact that they were held in vertical line both at top and bottom by the ceiling and floor structure. Had all the columns on these particular floors been denuded of their fireproof material and exposed to the same heat, the whole building must inevitably have collapsed.

In our various articles on the fire we have strongly advocated the use of concrete as being the material which presents the most perfect fire-resisting qualities, and it so happens that in a comparison of two of the photographs sent us by our correspondent, our readers will find a most striking proof of the correctness of this view. We refer to the two views which were taken in the basement of the Ahrensen Building. Photograph No. 1 represents a steel column in this basement, which was supposed to have been rendered fireproof by incasing it in hollow tile. The tiling was stripped off by the heat, or possibly by the shock of the earthquake (although on this point we have no information), and under the weakening action of the fire the column has telescoped on itself for a distance of 10 or 12 inches. Sixteen feet distant from this column is another, which had been fireproofed by incasing it in concrete; but although it must have been exposed to the same shock and the same heat, the concrete is still in place, apparently in perfect condition, and the column within it is presumably uninjured. Just how great a heat it must have endured, may be judged by the condition of the sidewalk lights and beams, the beams being bent down, and the lights being partially melted and hanging from the beams like icicles.

On the first floor of this building was a corner store, which also shows the failure of the hollow tiling,

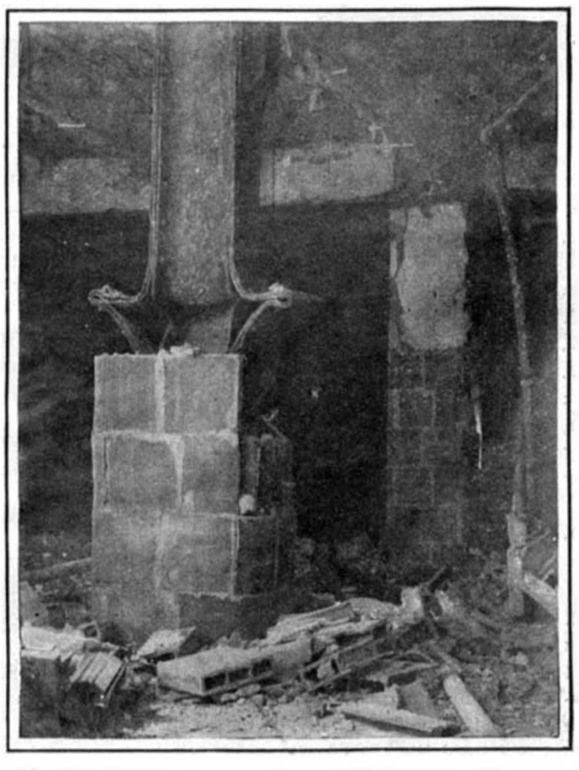


Fig. 1.—Column Incased in Hollow Tile, Stripped of Its Covering, and Buckled, Sinking 12 Inches.

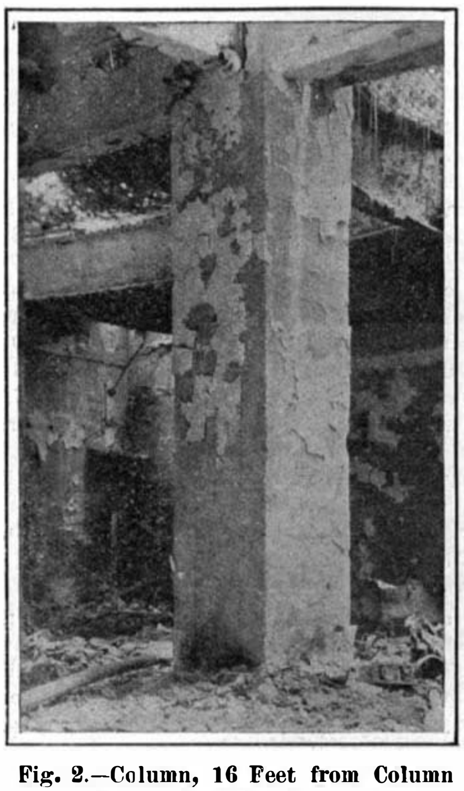


Fig. 2.—Column, 16 Feet from Column in Fig. 1. Incased in Concrete, Was Not Injured.

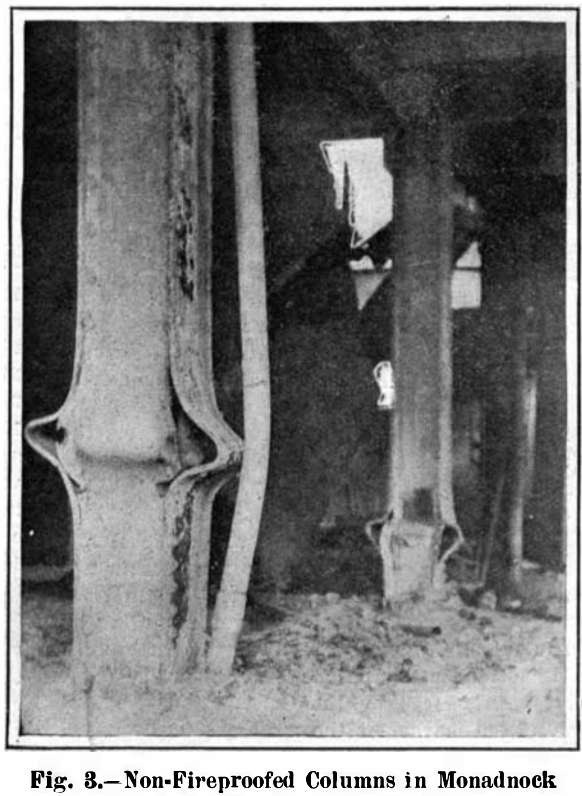


Fig. 3.—Non-Fireproofed Columns in Monadnock Building, Buckled and Shortened 10 Inches.

FIREPROOFING AT SAN FRANCISCO.