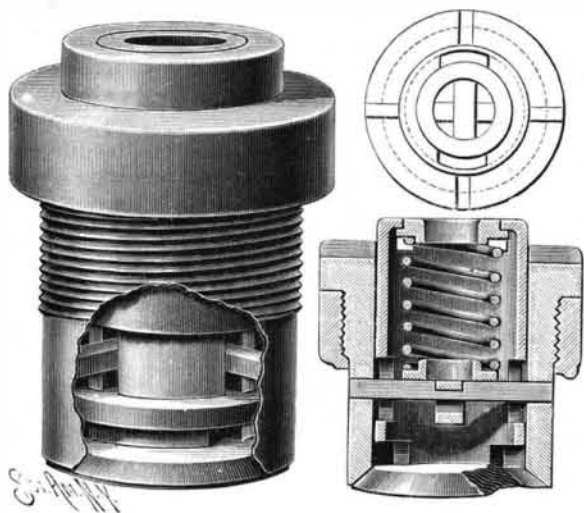


## AN IMPROVED SUCTION VALVE.

The valve shown in the illustration is especially designed for use on air compressors. It is of strong and simple construction and permits of ready access to all its parts, the arrangement of which is such as to prevent the valve from being accidentally drawn into the cylinder. It has been patented by Mr. William H.

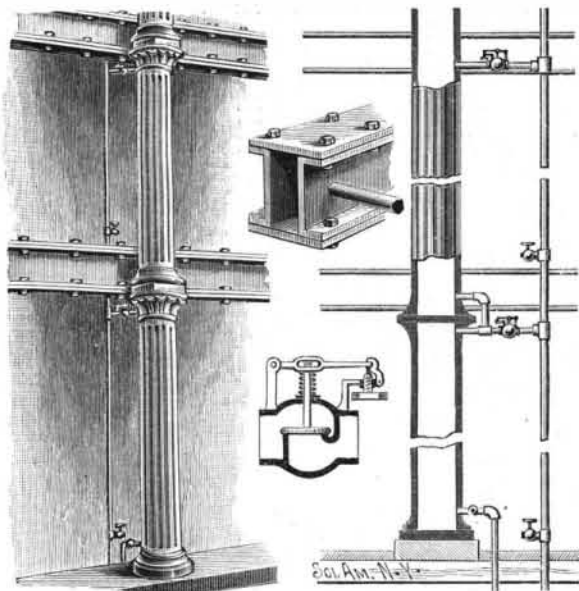


BRENNER'S SUCTION VALVE.

Brenner, Sr., of Port Carbon, Pa. The figures at the right in the picture represent plan and side sectional views, the valve casing being partially broken away in the view in perspective. The valve proper is formed with a cylindrical wall or extension fitted to slide in the valve casing, and in this wall, near the valve, are openings to permit air to pass into the cylinder when the valve is unseated. In this wall are also opposite openings through which extends a bar fastened to the valve casing, limiting the inward motion of the valve, and this bar is engaged at its middle by an eye of a rest forming a seat for the inner end of a coiled spring abutting at its outer end against a cap. This cap is formed with opposite lugs, so that it may be easily removed and access had to replace the spring while the compressor is in motion, and by removing the valve casing from the head of the cylinder any repairs that may be necessary may be made to the valve.

## PROTECTING IRON WORK IN BUILDINGS FROM FIRE.

The iron columns and girders now so generally used in large buildings form an element of weakness in case of extensive conflagrations, which it is designed to ob-



WILLIAMS' APPLIANCES FOR COOLING IRON STRUCTURES.

viate by the improvement shown in the accompanying illustration. The invention has been patented by Mr. Charles J. Williams, of No. 253 Fourth Street, Milwaukee, Wis. As shown in the perspective and sectional views, a riser connected with a water service pipe extends up through the building, the admission of water to the riser being controlled by valves, while leading from the riser to the hollow iron columns, at various elevations, are branches normally cut off by thermally-controlled valves. A detail view of a form of such valve is shown in one of the small figures, the valve operating automatically under the influence of heat, as in case of a fire, to admit water to a column, while a waste pipe connection is provided for draining off the water. It is not proposed to keep the hollow iron columns filled with water, but to simply flood them during a conflagration. A connection from this water service system also leads to the hollow girders, as indicated in another view, the thermal controlled branches being extended in such manner as to distribute the water wherever it may be required.

## The Pope and the Phonograph.

The Pope gave a private audience on March 19, in his study, to Mr. Stephen Moriarty, who was introduced by Mgr. Merry del Val, the papal chamberlain. Mr. Moriarty had with him a phonograph, by means of which he delivered an address in Italian congratulating the Pope on the occasion of his episcopal jubilee. He went on to say that he felt deeply honored in being the bearer of two messages—one from the late Cardinal Manning and the other from Cardinal Gibbons, Archbishop of Baltimore, who would in their own voices express their devotion to his holiness. He concluded by begging the Pope to speak into the phonograph some expression of love and his blessing, which might be delivered to the Roman Catholics of America on the occasion of the opening of the Chicago Exhibition. He pointed out that if the Pope granted his request, it would be the first time in the history of the Papacy that the voice of the Sovereign Pontiff had been heard in America.

The Pope then listened to the message from the late Cardinal Manning, in which his eminence asked for a blessing and expressed a hope that the Catholic faith would soon spread over the whole world. The Pope was greatly affected when he heard the voice of the dead cardinal. He then heard the message of Cardinal Gibbons, who asked for the blessing of God upon the Pope. His holiness promised to send a phonographic message to the United States, and invited Mr. Moriarty to return for another audience. This was given on Monday, in the Pope's private study, the members of the Papal Court being present. At the request of his Holiness, the messages of Cardinal Manning and Cardinal Gibbons were repeated on the phonograph. The members of the Papal Court were amazed at hearing the voices of the two cardinals loudly and clearly reproduced, while the Pope sat back on his throne smiling at their astonishment. The Pope then said: "I will now send my message to the people of the United States," and, bending over the phonograph, he spoke into it. Then, turning to Mr. Moriarty, he said: "I hand you this message; guard it carefully, for it is the expression of my love for all the people of the United States. I wish you to deliver it with your own hand to the President." This message, which is in Latin, by the Pope's special request will not be published before it has been reproduced in America.

## Harness Polish.

|                 |            |
|-----------------|------------|
| Glue .....      | 4 ounces.  |
| Vinegar.....    | 1½ pints.  |
| Gum arabic..... | 2 ounces.  |
| Black ink.....  | 8 ounces.  |
| Isinglass.....  | 2 drachms. |

Break the glue in pieces, put in a basin, and pour over it about a pint of the vinegar; let it stand until it becomes perfectly soft. Put the gum in another vessel, with the ink, until it is perfectly dissolved; melt the isinglass in as much water as will cover it, which may be easily done by placing the cup containing it near the fire about an hour before you want to use it. To mix them pour the remaining vinegar with the softened glue into a sand pan upon a gentle fire, stirring it until it is perfectly dissolved, that it may not burn on the bottom, being careful not to let it reach the boiling point—about 82° C. is the best heat. Next add the gum, let it reach the same heat again; add the isinglass. Take from the fire and pour it off for use. To use it, put as much as is required in a saucer, heat it sufficiently to make it fluid, and apply a thin coat with a piece of dry sponge. If the article is dried quickly, it will have the better polish.—Phar. Era.

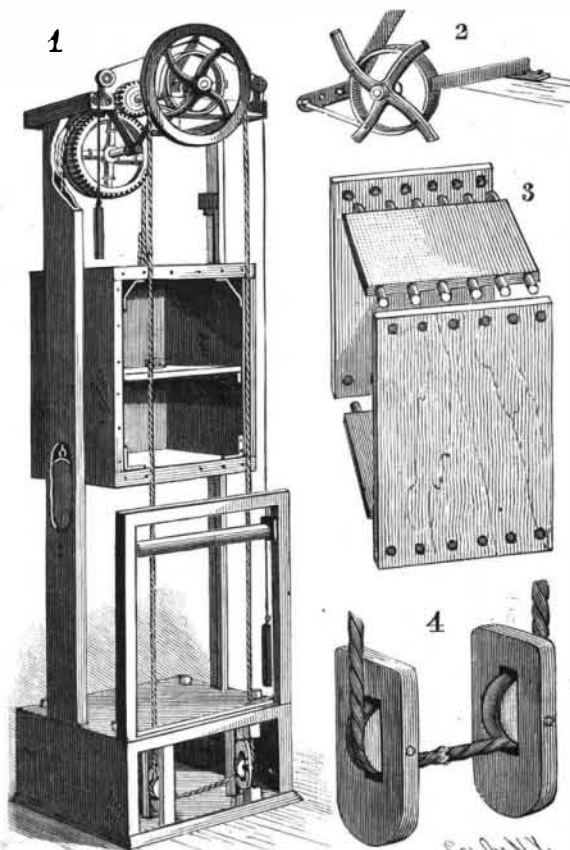
## AN IMPROVED BOILER FURNACE.

A steam boiler furnace designed to afford a large heating surface, and so constructed that but little heat will be lost by radiation from the brick walls, is shown in the engraving, and has been patented by Mr. William J. Richards, Hotel Brunswick, Marquette, Mich. The sides of the fire box are formed by water legs consisting of two side boilers, which also form the side walls of the entire furnace. In the illustration, one of these side boilers is shown disconnected and swung away from its normal position, as it may be desirable to do sometimes in making repairs, etc. There is a combustion chamber to the rear of the bridge wall and at the back end of the boiler, the products of combustion passing thence through the flues to the smoke box in front. The feed pipe enters the bottom of the boiler at its rear, and branch pipes lead therefrom to the side boilers. The front end of the water space of the central boiler is connected with the side boilers by pipes, the rear ends of the boilers being also similarly connected, to establish free circulation of water in the three boilers. The steam dome is supported transversely over the middle boiler, pipes leading to it from the steam space of each of the three boilers. In case a series of such boilers are used in a large plant, all but the outer ones of the side boilers are then heated on both faces, whereby the fuel burned will be utilized to the greatest advantage.

## AN IMPROVED DUMBWAITER.

The waiter represented in the illustration embodies improvements in construction for which a patent has recently been issued to Mr. Anton Larsen, Nos. 413 and 415 East 124th Street, New York City. Fig. 1 shows the device in perspective, Fig. 2 a portion of the brake, Fig. 3 the manner of constructing the frame, and Fig. 4 the means of keeping the hand rope straight, without danger of kinking, in all kinds of weather.

Upon the inner face of the hoisting wheel is an annular flange around which is held a spring metal brake strap secured at its ends to a pivoted lever, attached to which is a cord, extending in opposite directions over friction pulleys at either side of the shaft, counterpoise weights being attached to the ends of the cord. The position of the lever and the balance of the weights are so arranged

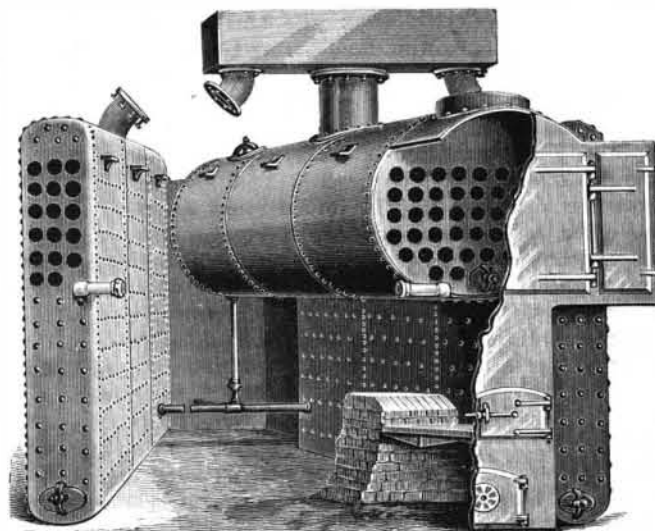


LARSEN'S DUMBWAITER.

that when the brake is applied or taken off it remains in the position in which it is left, the brake being prevented from sagging when held out of braking position by means of a spring. The construction of the frame of the waiter with dowels adapted to enter apertures, as shown in Fig. 3, is designed to afford an advantageous method of connecting the parts.

The endless hand rope by which the waiter is operated passes over friction pulleys in the bottom of the shaft, as shown in Fig. 4, these pulleys being free to move up and down according to the tension upon them, and a friction roller is also journaled in the upper portion of the lower opening in the elevator shaft to prevent the usual wearing and chafing of the hand rope.

The drum shaft is at one side of and below the drive shaft, a pinion on the latter meshing with a gear on the winding drum, so that the lifting chain or cable is not interfered with by the drive shaft or its pinion.



RICHARDS' BOILER FURNACE.

The end of the cable carrying the counterbalance weight of the waiter is inclosed in a casing, the weight being slightly more than sufficient to balance the waiter.