

No. 683,036.

Patented Sept. 24, 1901.

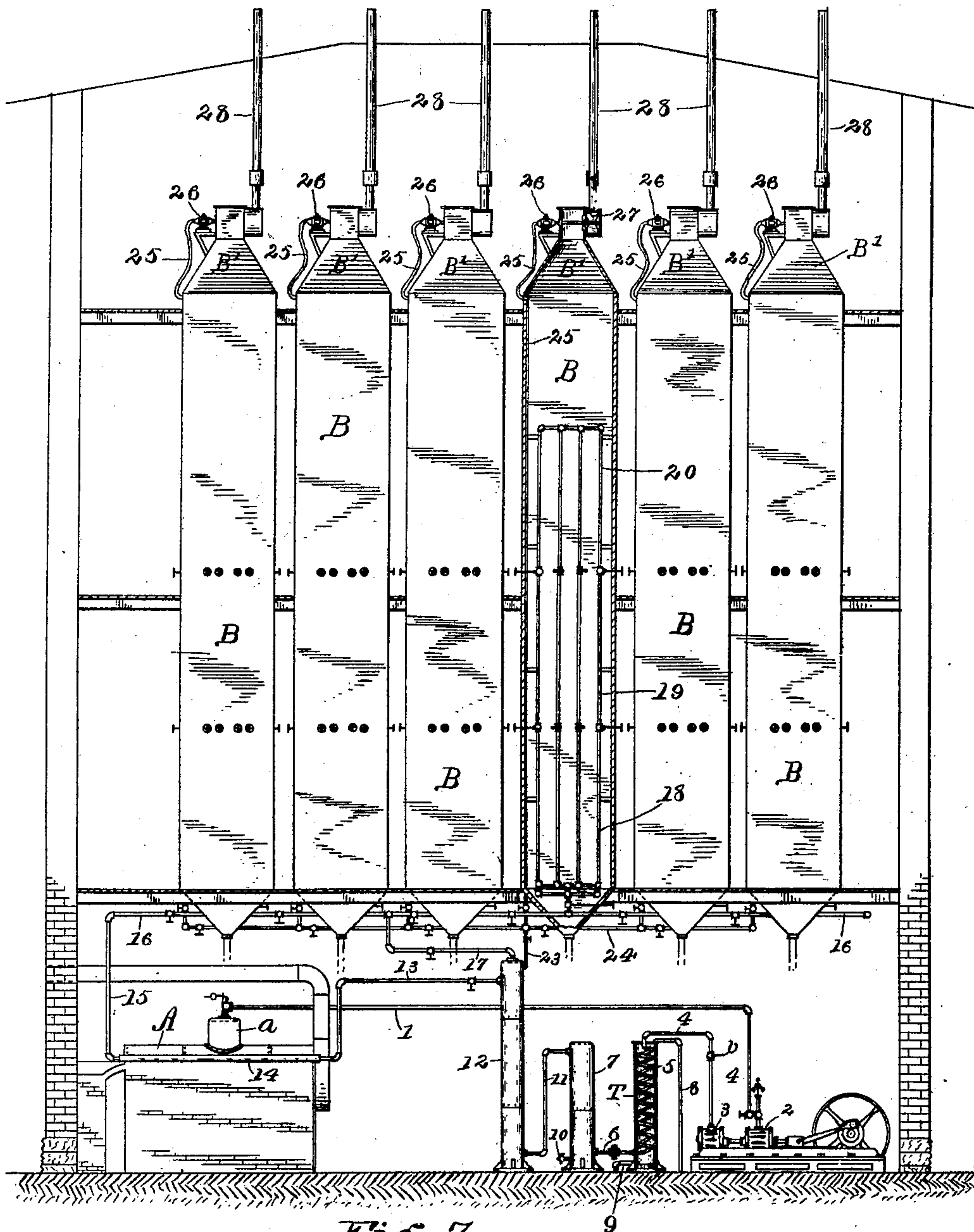
G. R. GORHAM.  
GRAIN TREATING APPARATUS.

(Application filed Oct. 13, 1898.)

(No Model.)

2 Sheets—Sheet 1.

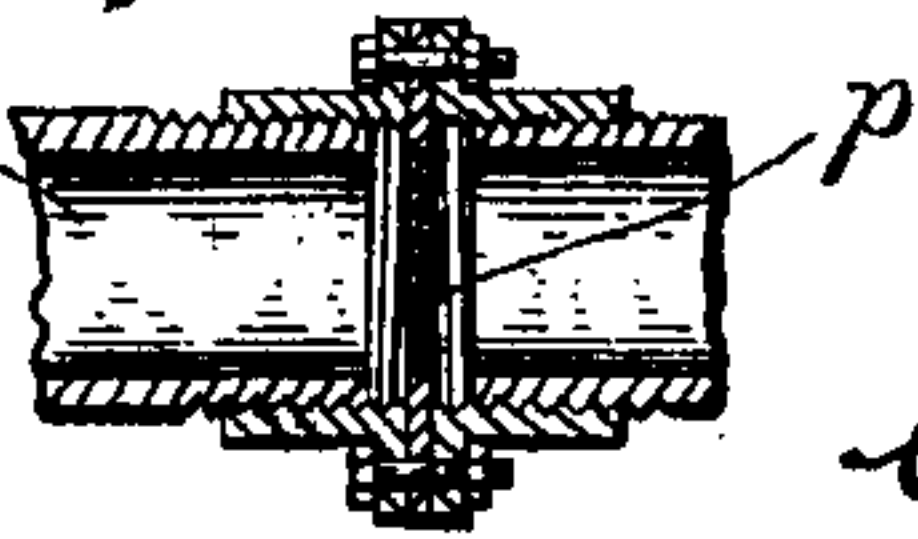
*Fig. 1.*



*Fig. 7.*

WITNESSES:

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2 Sheets—Sheet 2.

Fig. 2.

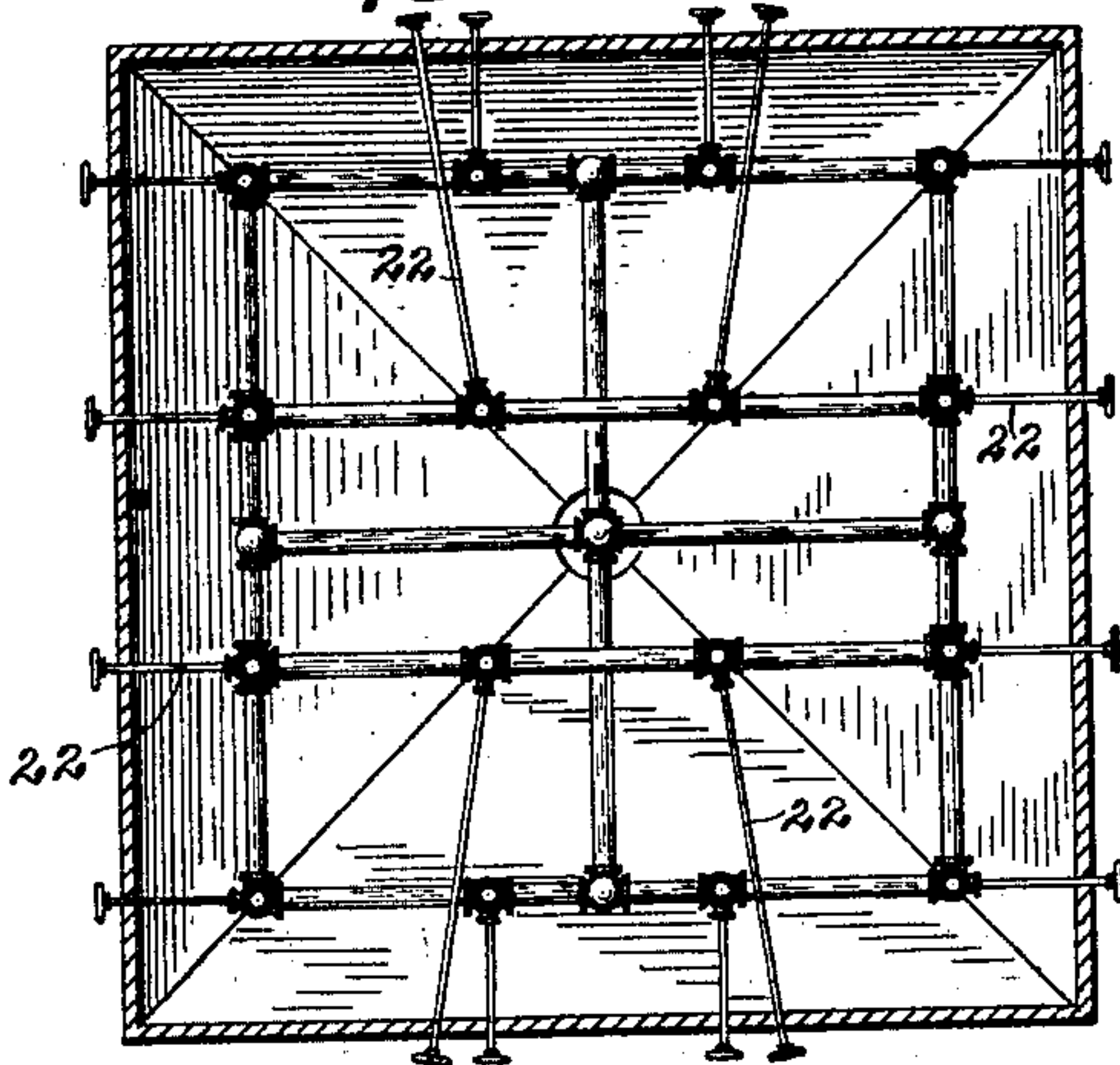


Fig. 3.

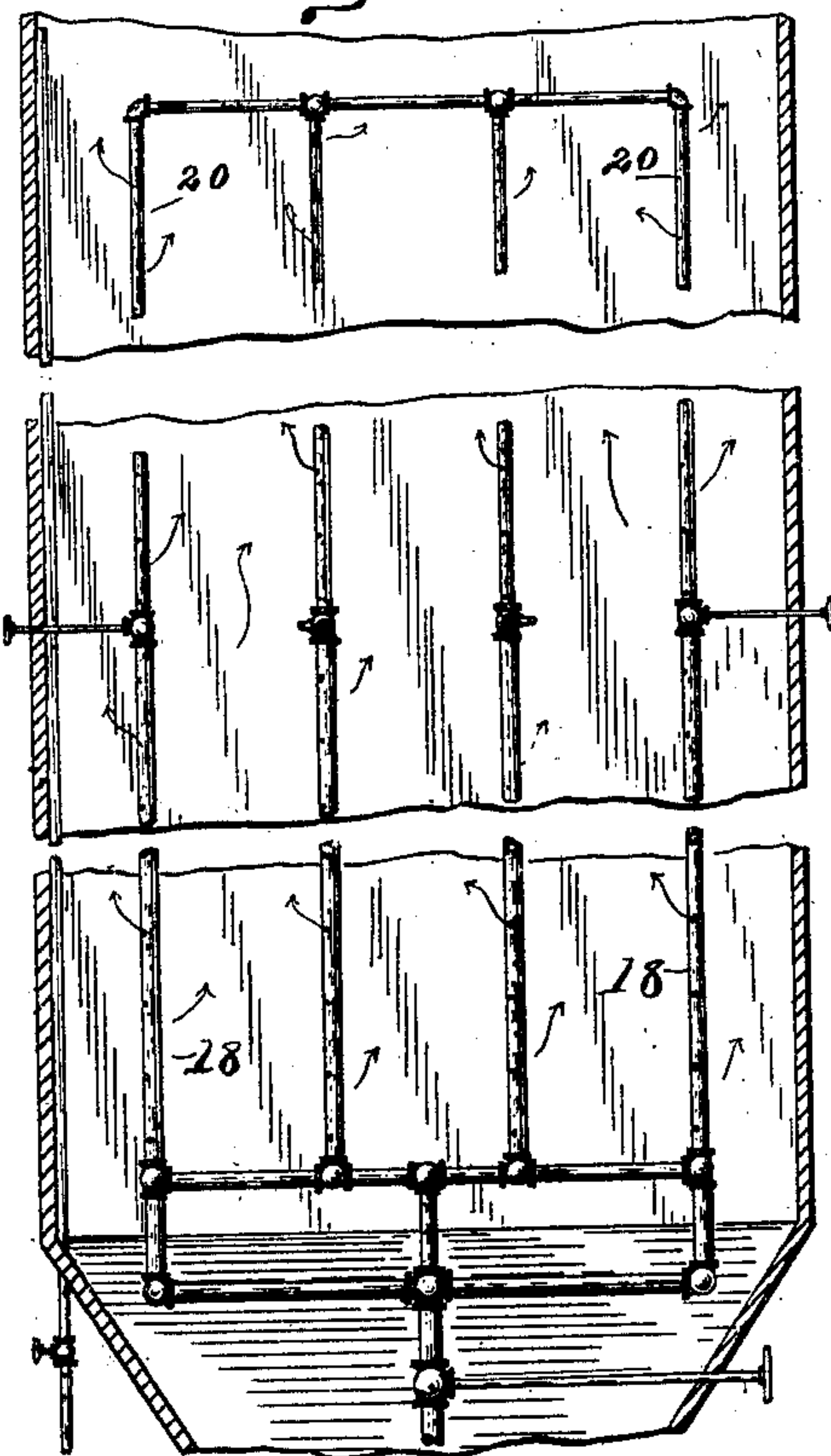


Fig. 4.

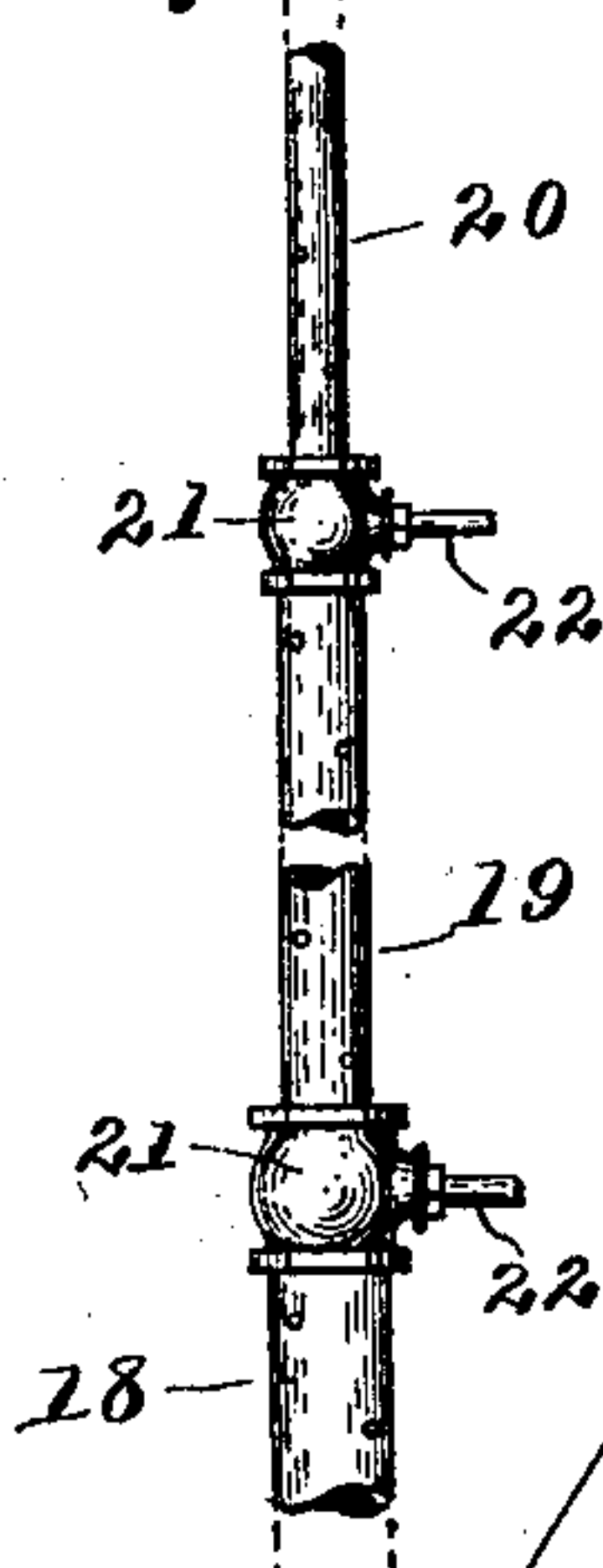


Fig. 5.

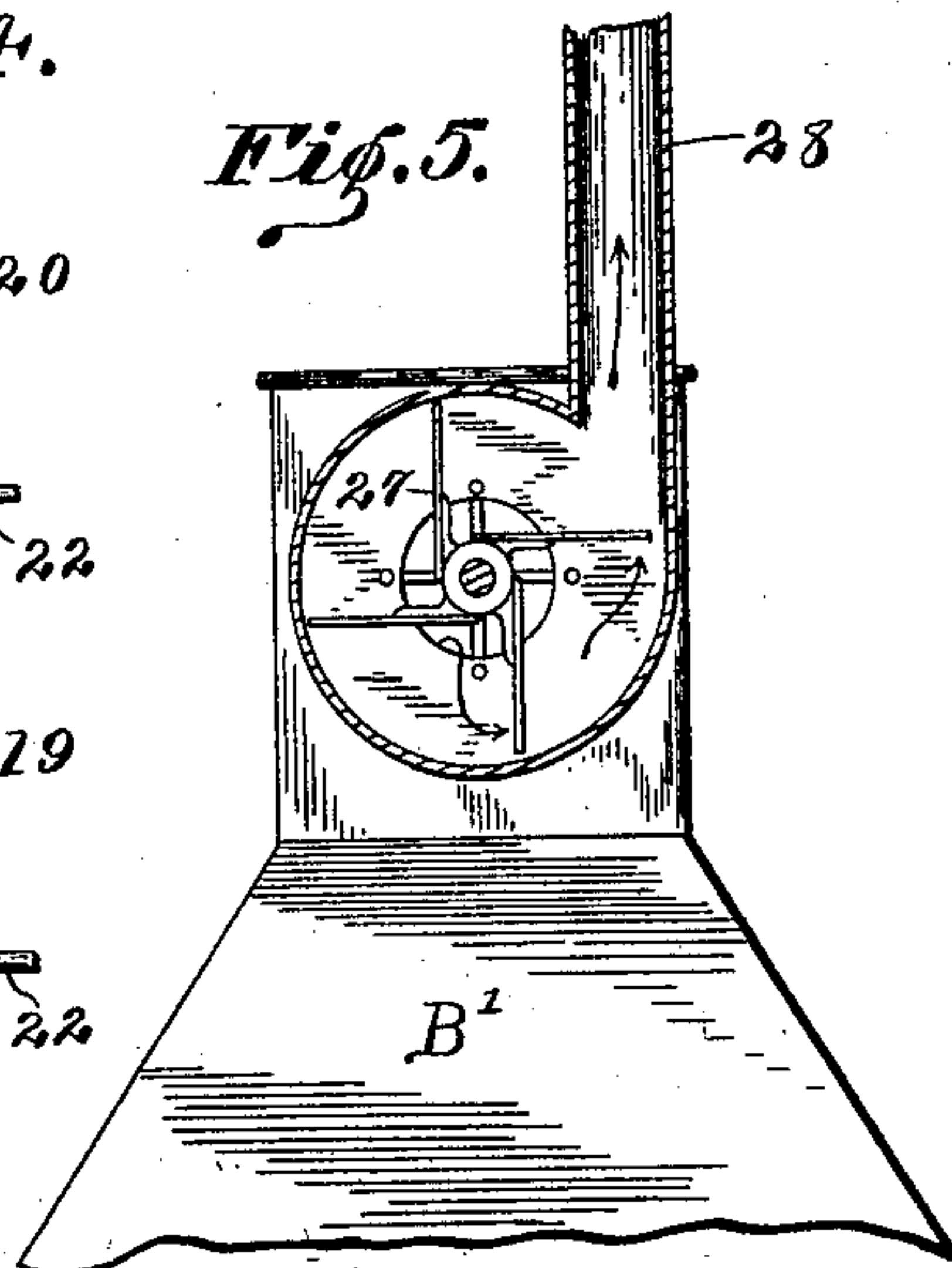
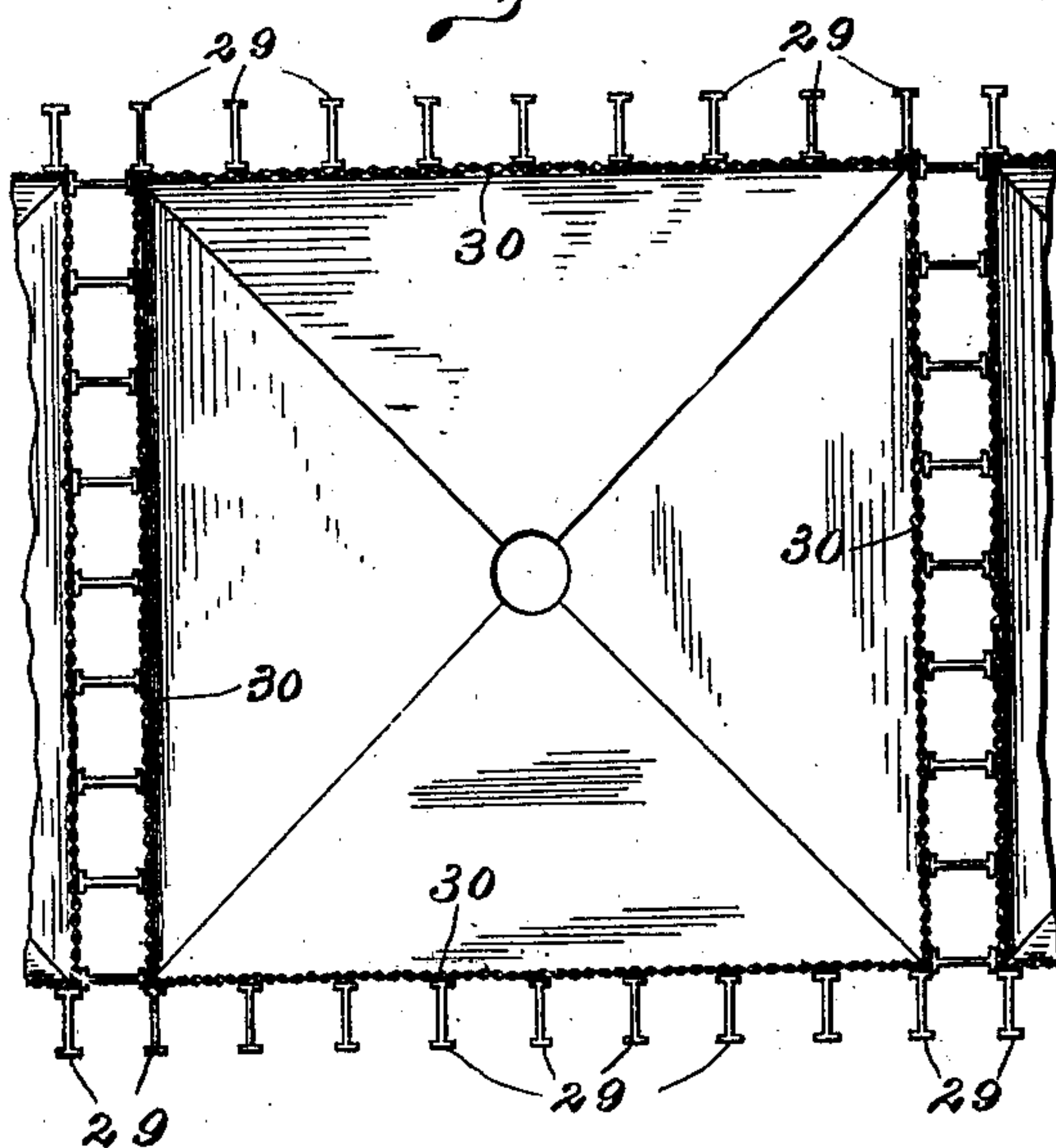


Fig. 6.



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# UNITED STATES PATENT - OFFICE.

GEORGE R. GORHAM, OF CHICAGO, ILLINOIS.

## GRAIN-TREATING APPARATUS.

**SPECIFICATION** forming part of **Letters Patent No. 683,036**, dated September 24, 1901.

Application filed October 13, 1898. Serial No. 693,452. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE R. GORHAM, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Grain-Treating Apparatus, of which the following is a specification.

My present invention consists in certain improvements upon and additions to that shown and described in Letters Patent No. 604,880, granted May 31, 1898, upon my application, whereby new and better results are secured, as will be hereinafter more particularly described and claimed.

Referring to the accompanying drawings, which are made a part hereof and on which similar reference-characters indicate similar parts, Figure 1 is a sectional view of an elevator containing apparatus embodying my present invention; Fig. 2, a horizontal sectional view of one of the grain-holding bins; Fig. 3, a central vertical sectional view of such a bin, showing the pipes, &c., at various heights, portions being broken away to admit of a larger scale than would otherwise be possible; Fig. 4, a fragmentary view of portions of one of the vertical air-conducting columns, illustrating more clearly the different sizes of pipe used in each column; Fig. 5, a detail view illustrating one of the exhaust-fans by which air is exhausted from the bins; Fig. 6, a horizontal sectional view similar to Fig. 2, but omitting to repeat the pipes, showing a complete metallic construction for such bins; and Fig. 7, a longitudinal sectional view of the pipe 6, showing a baffle-plate therein.

As in the apparatus described in my above-mentioned patent the plan illustrated is appropriate to a large elevator or grain warehouse wherein a steam plant forms a portion of the equipment. Such a plant includes one or more boilers A to generate steam for the usual purposes of such elevators, and such boilers are utilized in carrying out my present invention. The grain-bins B, except as will be hereinafter described, are ordinary elevator-bins, and the general construction and arrangement of the building may be understood to be, except so far as is otherwise herein stated, such as are in common use.

Running from the boilers or the steam-dome

a thereon is a pipe 1, which runs to the steam-cylinder 2 of an air-compressor and conveys steam thereto to actuate the same. From the compressing-cylinder 3 of said air-compressor a pipe 4, having a check-valve *v*, leads to a coil 5, contained within an upright tank T, and continues at 6 to a second tank 7. The air as it leaves the compressor-cylinder 3 is at a high temperature and contains a considerable quantity of moisture. Cold water is kept flowing through the tank T by means of an ingress-pipe 8 and a discharge-pipe 9, and this serves to extract the heat from the air passing through the coil 5 and also acting as a condenser to precipitate the moisture therein, so that such moisture will settle in the form of water in the bottom of the tank 7, whence it can be drawn off through the cock 10, situated in said tank near its bottom. I insert in the pipe 6 a perforated baffle-plate *p*, as illustrated in Figs. 1 and 7. The damp air as it passes through said pipe strikes this plate, with the effect that the moisture gathers on the surface of said plate and is thus more rapidly precipitated than if it were allowed to flow through the pipe uninterruptedly. A pipe 11 leads from the upper portion of the tank 7 to the bottom portion of another tank 12. By the time the air has reached this latter tank the moisture therein is thoroughly extracted, so that dry air only is supplied to the grain.

In the process of extracting the moisture just described the temperature of the air is sometimes reduced below the point at which it is desirable to supply it to the grain. I therefore provide for warming it by artificial heat, in doing which I conduct it by means of the pipe 13 into and through a tube 14, situated in contact with or closely adjacent to the boiler A, and which is thus kept heated. From thence the air passes, by means of the pipe 15, to the main distributing-pipe 16. If the air does not need warming, it passes direct from the tank 12 by means of the pipe 17 to said main distributing-pipe 16. From this main distributing-pipe 16 a branch leads into each of the grain-bins B and connects with the system of perforated air-columns therein in a manner quite similar to that illustrated in my Patent No. 604,880, above re-



ferred to, although the construction and arrangement are somewhat modified. Instead of using wire-netting for these columns I now prefer to use perforated pipes of the character best shown in Fig. 4. The lower portions 18 of these pipes should be of a larger size than the portions 19 and 20, and may, for example, be two inches in diameter, while the portions 19 may, for example, be one and one-half inches and the portions 20 one inch in diameter, respectively. The change in size occurs, preferably, at the points where the valves 21 are interposed, which valves are operated from the outside by means of handles 22 in the same manner as shown in my said former patent.

Leading also from the tank 12 is a pipe 23, which runs to the distributing-pipe 24, and leading from this distributing-pipe 24 is a series of pipes 25, which lead to air-motors 26 above the grain-bins B. As shown in one of the bins in Fig. 1, there is an exhaust-fan 27 upon the shaft of each air-motor 26, and these exhaust-fans are adapted to exhaust the air from the interior of the grain-bins and force it out through the pipes 28 to the outside, said bins being provided with the otherwise-closed tops B', to which the exhaust-fans are connected in the manner shown in Figs. 1 and 5. This arrangement is especially useful in preventing the accumulation of foul or explosive gases in the bins.

In Fig. 6 I have shown a new and improved construction for the exterior of the bins. Instead of being built up of wood, as has been common, I stand numerous metal I-beams 29 on end near together and form the walls with which the grain comes in immediate contact from strong wire-cloth 30, the strands of which are driven firmly together, making a close mesh. This construction is not only absolutely fireproof, but the walls are filled with fine perforations through which air may be drawn or forced and the grain contained in the bins thus ventilated. For example, with the exhaust-fan 27 and the top or hood B' arranged above the bin air can be drawn from all directions through the grain and driven to the outside of the building, and when such an exhaust-fan is out of use or not employed and the perforated air-columns are arranged in the center of the bins, as shown, then air can be forced through the grain and will escape from inside the bins to the outside to between the vertical I-beams, the spaces between which form flues, up which the air and gases may escape to above the bins, and thence to the outside of the elevator-building.

Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a grain-treating apparatus, the combination with a bin having an exhaust at one end, of a series of perforated pipes extending thereinto, each pipe comprising a plurality of sections, the diameters of the respective sections gradually decreasing toward the exhaust end of the bin, and means for delivering dehydrated air into the interior of the bin through said pipes, substantially as described.

2. In combination, a plurality of bins, exhausts at one end of each bin, and means for forcing dehydrated air under pressure through the bins, comprising suitable inlets thereinto, a heater, a compressor communicating therewith, a condensing-chamber T connected to the compressor, a settling-tank 7, a receiving-tank 12, and suitable connections between the tanks and the inlets to the bins, substantially as described.

3. In combination, a plurality of bins, exhausts at one end of each bin, and means for forcing dehydrated air under pressure through the bins, comprising suitable inlets thereinto, a heater, a compressor communicating therewith, a condensing-chamber T connected to the compressor, a settling-tank adjacent the condensing-chamber, a pipe intermediate the same, a perforated baffle-plate *p* in said pipe, a receiving-tank 12, a pipe between the settling and receiving tanks, and connections between the receiving-tank and the bins, substantially as described.

4. In combination, a plurality of bins, exhausts at one end of each bin, suction-fans associated with each exhaust, a motor adjacent each fan, means for forcing dehydrated air under pressure into the bins, comprising suitable inlets thereinto, a heater, a compressor communicating therewith, a condensing-chamber T connected to the compressor, a condensing-tank adjoining the condensing-chamber, a receiving-tank 12, pipes leading from the receiving-tank to the inlets of the respective bins, and auxiliary pipes also leading from the receiving-chamber to the respective motors at the exhaust ends of the bins to supply an operating energy thereto, substantially as described.

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 10th day of October, A. D. 1898.

GEORGE R. GORHAM. [L. S.]

Witnesses:

CHESTER BRADFORD,  
JAMES A. WALSH.