

(No Model.)

L. SMITH.

MOUTH PIECE FOR PNEUMATIC LIFTING APPARATUS FOR GRAIN
CONVEYERS.

No. 323,224.

Patented July 28, 1885.

Fig. 3

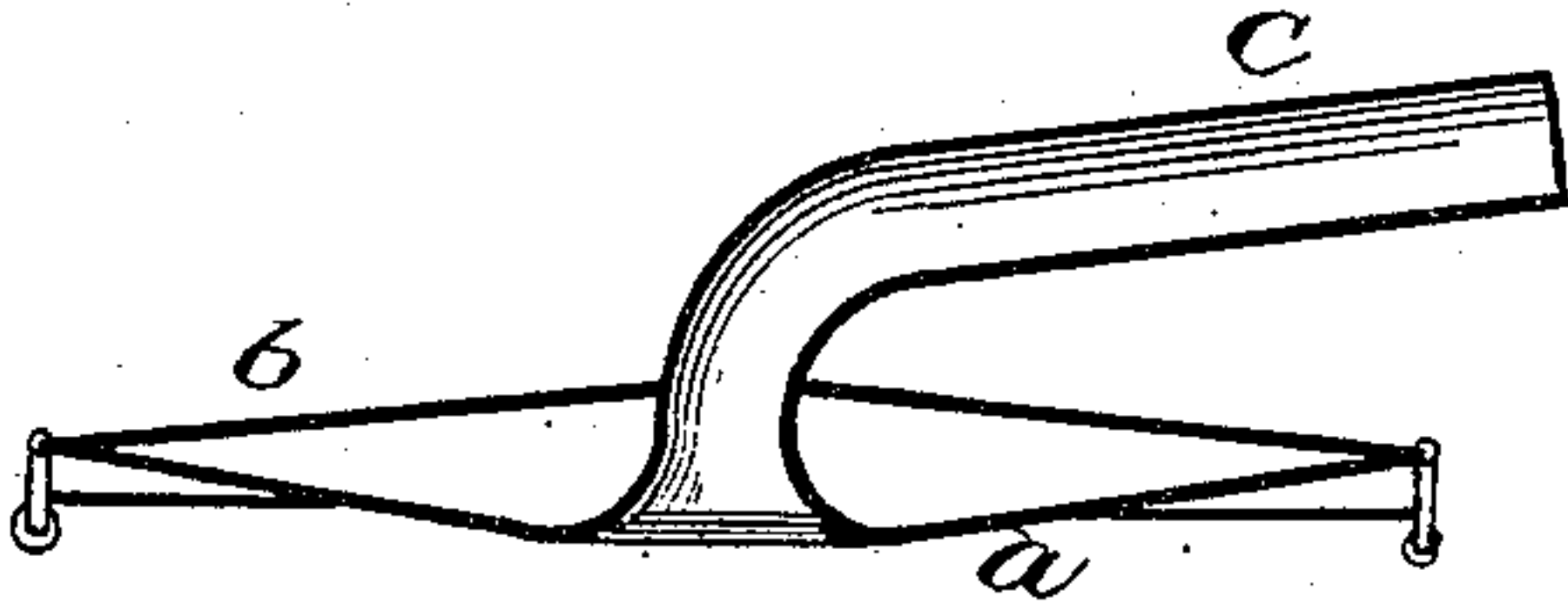


Fig. 1.

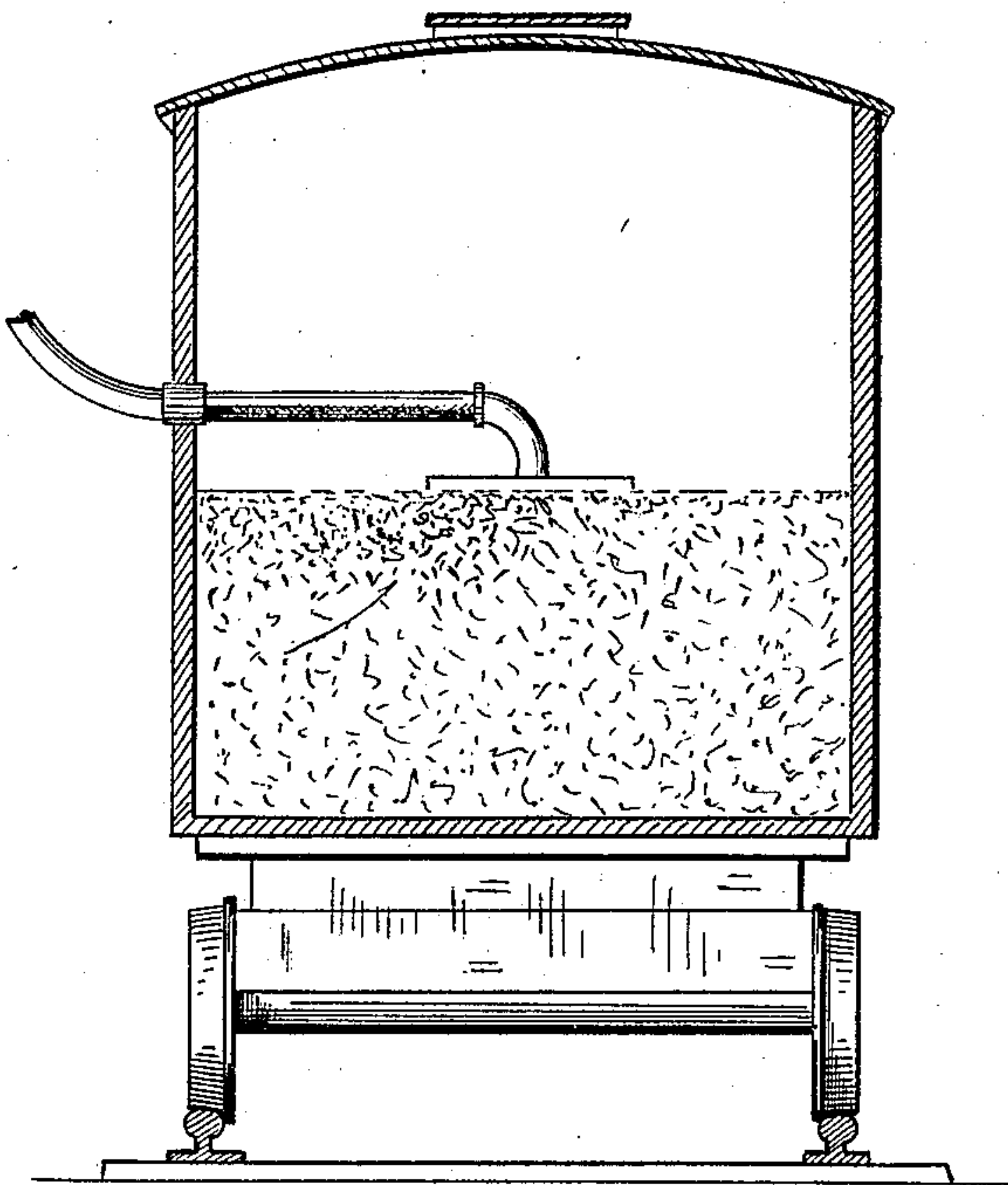


Fig. 4.

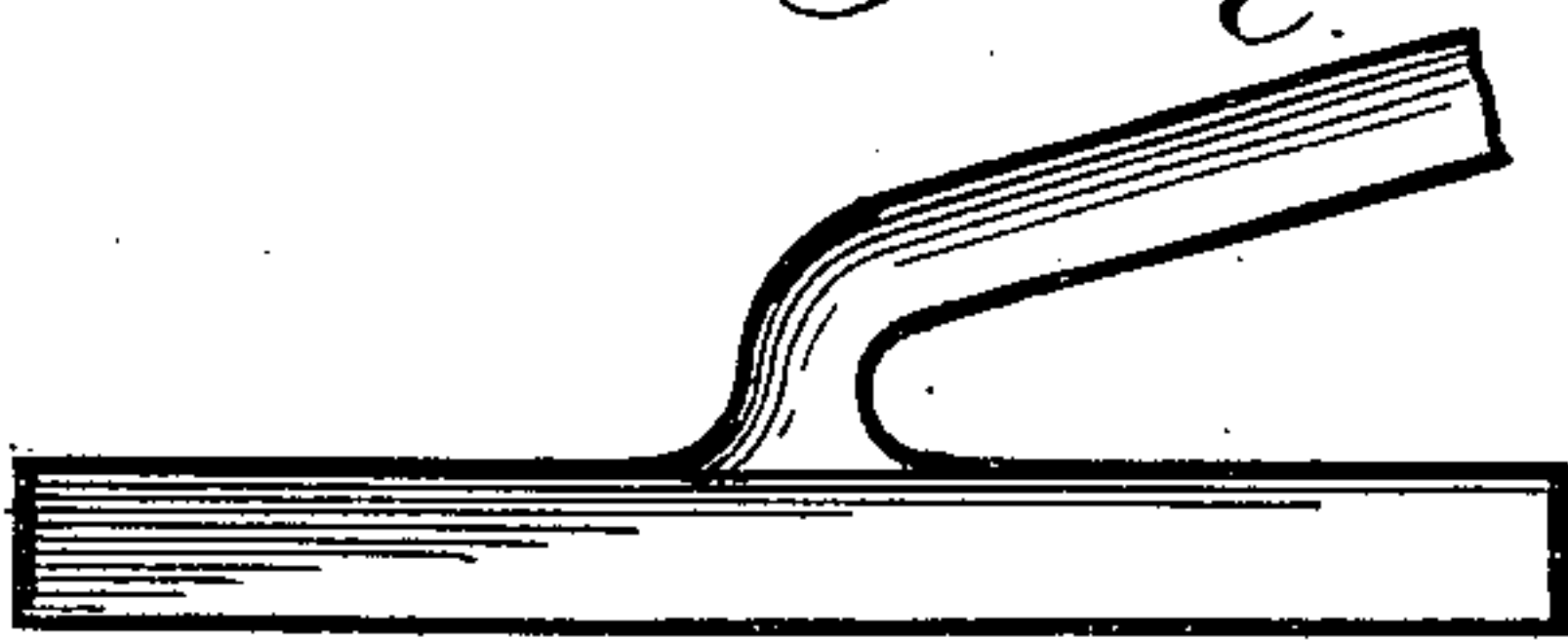


Fig. 5.

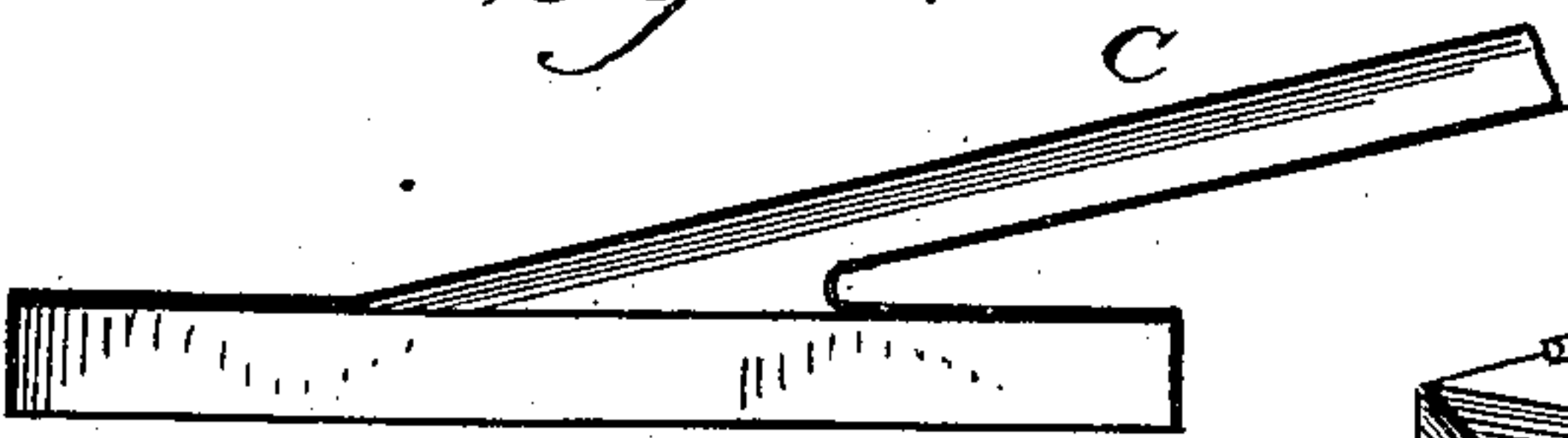


Fig. 2.

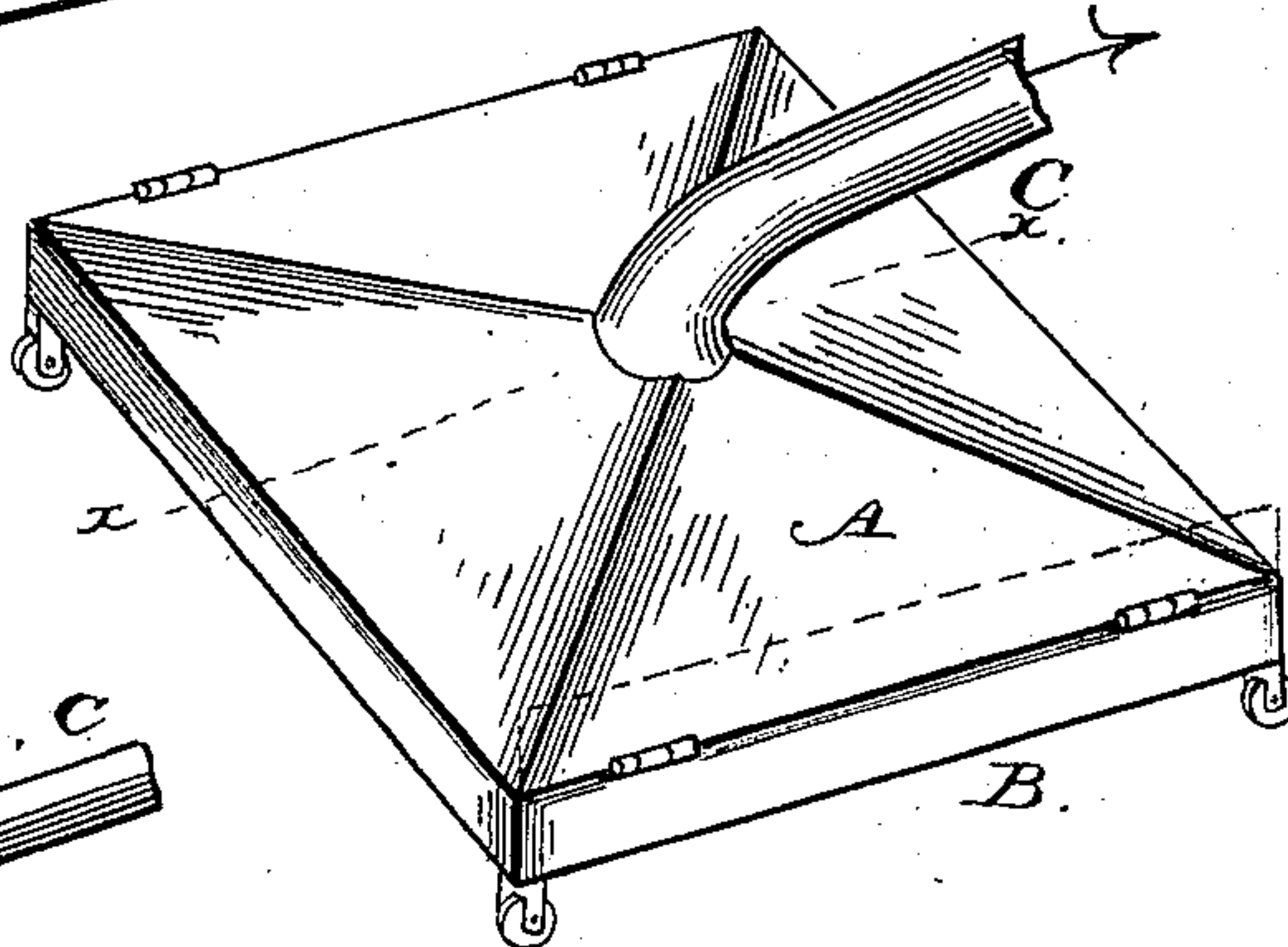
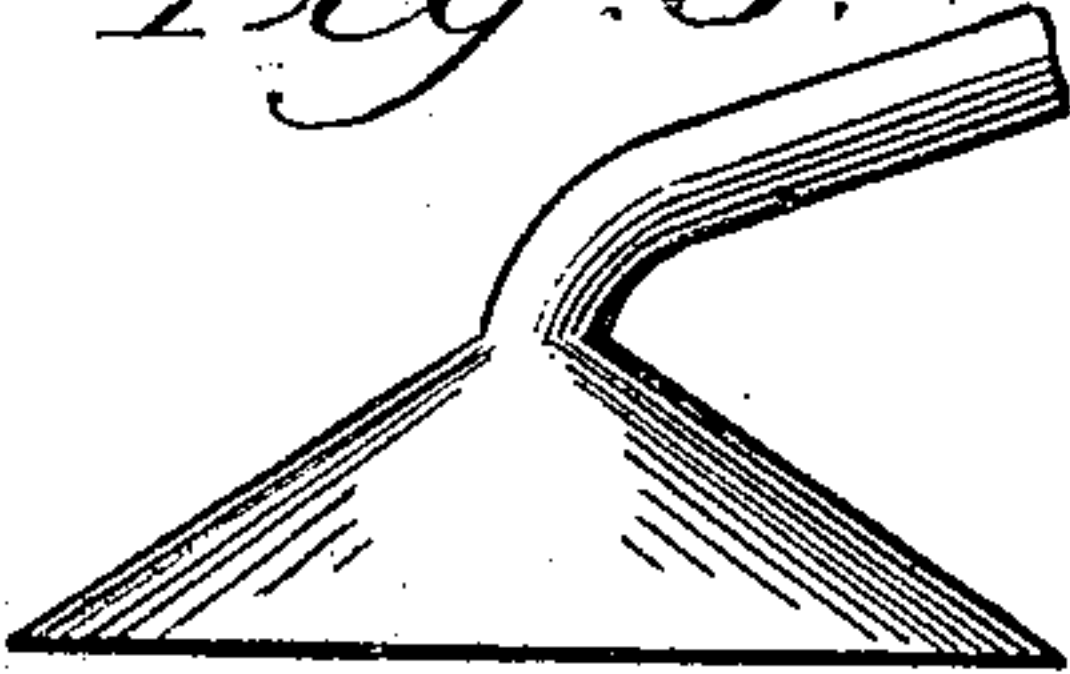


Fig. 6. c



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LYMAN SMITH, OF KANSAS CITY, MISSOURI.

MOUTH-PIECE FOR PNEUMATIC LIFTING APPARATUS FOR GRAIN-CONVEYERS.

SPECIFICATION forming part of Letters Patent No. 323,224, dated July 28, 1885.

Application filed January 17, 1885. (No model.)

To all whom it may concern:

Be it known that I, LYMAN SMITH, of Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Mouth - Pieces for Pneumatic or Lifting Apparatus for Conveying Grain; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

This invention has for its object to expedite and facilitate the handling and transfer of grain and other material that is capable of transfer by pneumatic apparatus, patented to L. La Rue Smith, November 28, 1882, No. 268,303, and No. 268,305, November 28, 1882, granted to me, and in the system as described in said patents, and in patents granted to me of a later date for improvements on method for transferring grain pneumatically and automatically, &c., but particularly as an improvement on Patent No. 289,315, dated November 27, 1883, in which is a mouth-piece for use at the end of a supply-pipe, and adapted to be conveniently moved about a car or other receptacle to collect the grain therein contained. In this latter patent the mouth-piece is supplied with air by tubes adapted for that purpose, whereby the air and grain, as it passes through the tube, forms a kind of semi-fluid as it passes to the receiver; but in this construction, as well as in all others known to me, the volume of outside air is too great, and much of the power of the suction-engine is wasted sucking said volume. The flow of air and grain in these old methods is also very irregular, and so much so that the vacuum is very much diminished and frequently destroyed. To overcome these defects, and to utilize the full power of the suction-engine, and to increase the carrying capacity of the machine with the same power, and to otherwise perfect the operation of the apparatus above referred to, are the general objects of my invention.

To this end my invention consists in form-

ing a mouth-piece preferably flat, or nearly so, which piece is provided with a flange all around its periphery in such manner that when the mouth-piece is thrown on top of the grain the edge of the flange sinks beneath its surface and prevents the entrance of the external air; but at the same time the surface of the mouth-piece is in sufficiently close contact with the grain as not to permit volumes of air to pass into it without carrying the grain with it.

Many improvements have been made with a view of overcoming these difficulties, and they have shown and fully demonstrated the fact that a large quantity of air permeates the body of grain in bulk in cars, elevators, and ships, and to such an extent that, when properly controlled, no outside air whatever is required in the manipulation of my pneumatic process.

Heretofore quantities of air had to be supplied to the mouth-piece to make the machine work; but in sucking or drawing in the air with the grain the volume of air was so great that much power of the machine was wasted in pumping said air.

My new mouth-piece is made to cover a large area of the surface of the grain, and the edges of the flange sink into the grain below its surface, preventing the admission of outside air, so that air sufficient is found in the body of grain covered by the mouth-piece to form, with the grain, a semi-fluid, in which condition it is taken up the tube and passes to the receiver without external air and, therefore, loss of power. This condition is maintained without fluctuation for the reason that much of the large space beneath the mouth-piece forms alone an air-chamber, which regulates the vacuum to an even pressure. This process continues until the vessel is entirely emptied.

In order to illustrate a few of the many ways that my mouth-piece may be constructed, reference is had to the accompanying drawings, in which—

Figure 1 shows a car loaded with grain, the mouth-piece being in position for operation. Fig. 2 shows a side elevation and plan in perspective; Fig. 3, a cross-section taken on the line X X, Fig. 2. Figs. 4, 5, and 6 are views

of modified forms, as my invention is designed to cover all forms without departing from the spirit thereof.

Like letters will indicate like parts in all the 5 figures.

A is the mouth-piece, and B the flange. C is the take-up tube, which carries the grain to the receiver.

In many instances the suction-pressure is 10 quite great and requires considerable resistance to prevent a collapse of the mouth-piece. To avoid this I make the mouth-piece double, as shown in section at Fig. 3. It also occurs 15 that as the grain is being sucked up into the tube when the space between the grain and the mouth-piece is large, the grain forms what I call a "cone," which interferes with perfect operation. To prevent this the inner plate, *a*, 20 is bellied downward, which brings the mouth of the tube close to the grain, and thus the "coning" of the grain is prevented. Again, if the mouth of the tube is too far from the grain more air in proportion is sucked in, which interferes with the proper suction of 25 the grain. The upper plate, *b*, is slightly inclined upward, so that it sheds any grain resting upon it. Thus it will be seen that this form of mouth-piece performs three function—*i. e.*, the strengthening of the mouth- 30 piece, the prevention of the coning the grain, and the shedding thereof.

It will be observed that the form shown by Fig. 2 is provided with hinged flanges. The object of this is that generally when a car is 35 being emptied the middle is emptied first, leaving the sides filled up, so that a flat mouth-piece could not have equal bearing to the surface of the grain, it being naturally at an inclination. To avoid this the hinged flange is 40 thrown up, which opens a mouth for the grain to enter at the side of the mouth-piece, and in this way every particle is sucked up. The mouth-piece is also provided with small wheels or casters, so that it can be readily 45 run around the floor of the car without trouble. It is obvious that any other means may be employed for this purpose.

The construction of Figs. 4, 5, and 6 may be plainly understood, keeping always in mind 50 that better work is done when the pipes and nozzles are without curves.

The operation of this mouth-piece will be readily understood from what has already been stated without further description; but I may remark that my invention is designed 55 to cover any means whereby the air is excluded from the surface of the grain while being sucked up to the receiver by canvas, india-rubber, sheeting, or in any manner whatever, as I claim, broadly, the process of 60 sucking or drawing the grain up without outside air, and with the air actually permeated through the grain and embodied in the interstices between the grain in bulk.

I hereby give notice that a separate appli- 65 cation will be made covering the specific construction of the mouth-piece.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is— 70

1. The manner herein described of conveying grain and sucking or drawing it into a receiver by first covering the surface of grain in bulk or a portion thereof, then forming a vacuum or suction under said covering, and then 75 drawing the grain or other material therefrom.

2. The manner herein described of lifting or transferring grain, of first covering the surface thereof, excluding external air from under 80 said covering, then imparting a sucking or drawing action to the grain beneath the covering, which gives to it the character, when mixed with air already mingled with the grain, of a semi-fluid, and then drawing it off by 85 means of a suction-machine.

3. The method herein described of conveying grain, which consists in first covering the surface of the grain, thereby excluding the air, forming an air-chamber above the mouth of the 90 suction-pipe, and then imparting a sucking or drawing action to the grain beneath the cover, whereby said grain is drawn off as a semi-fluid.

In testimony that I claim the foregoing as my own I affix my signature in presence of two 95 witnesses.

LYMAN SMITH.

Witnesses:

O. E. DUFFY,
J. F. WHITE.