

No. 684,036.

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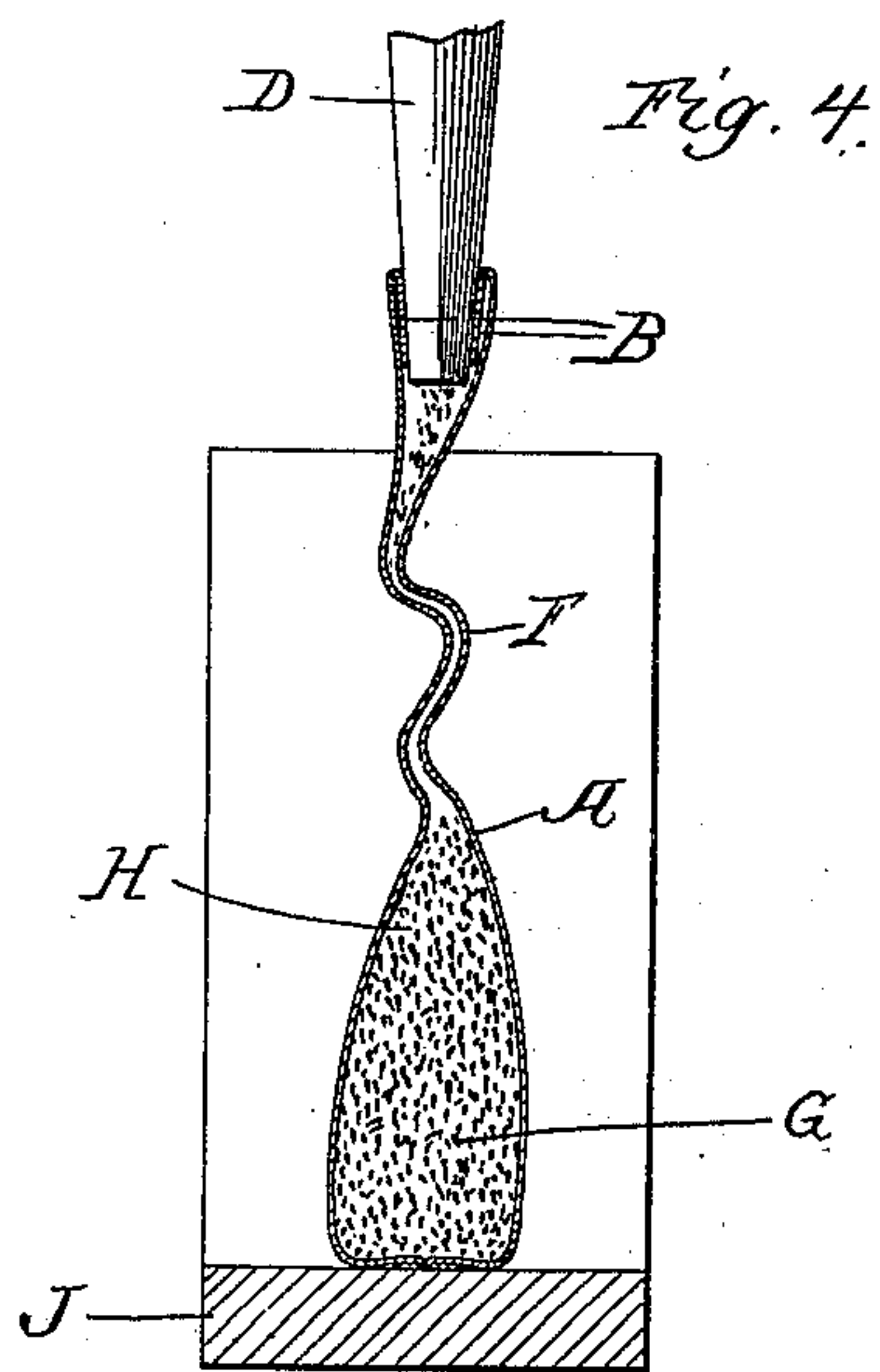
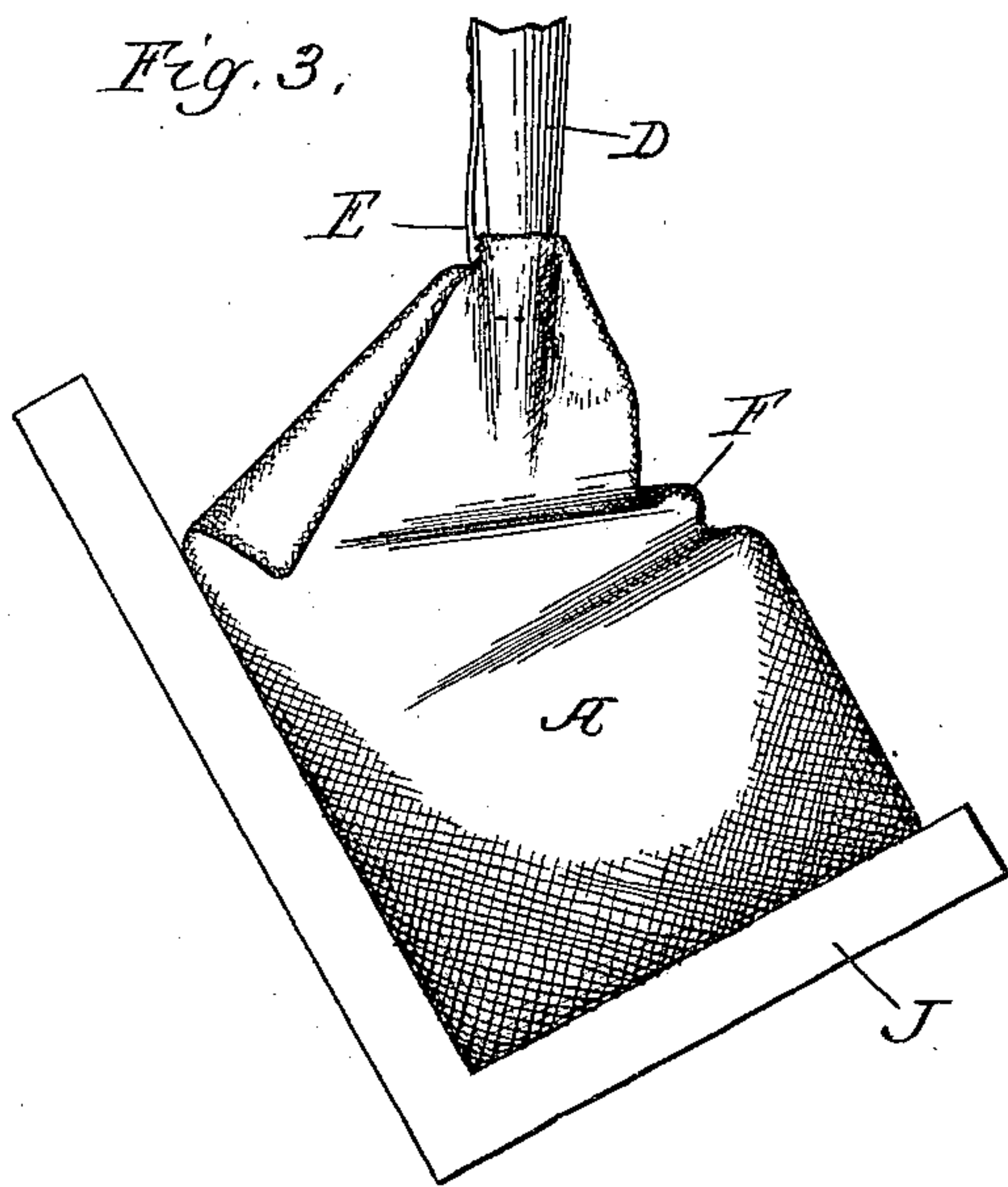
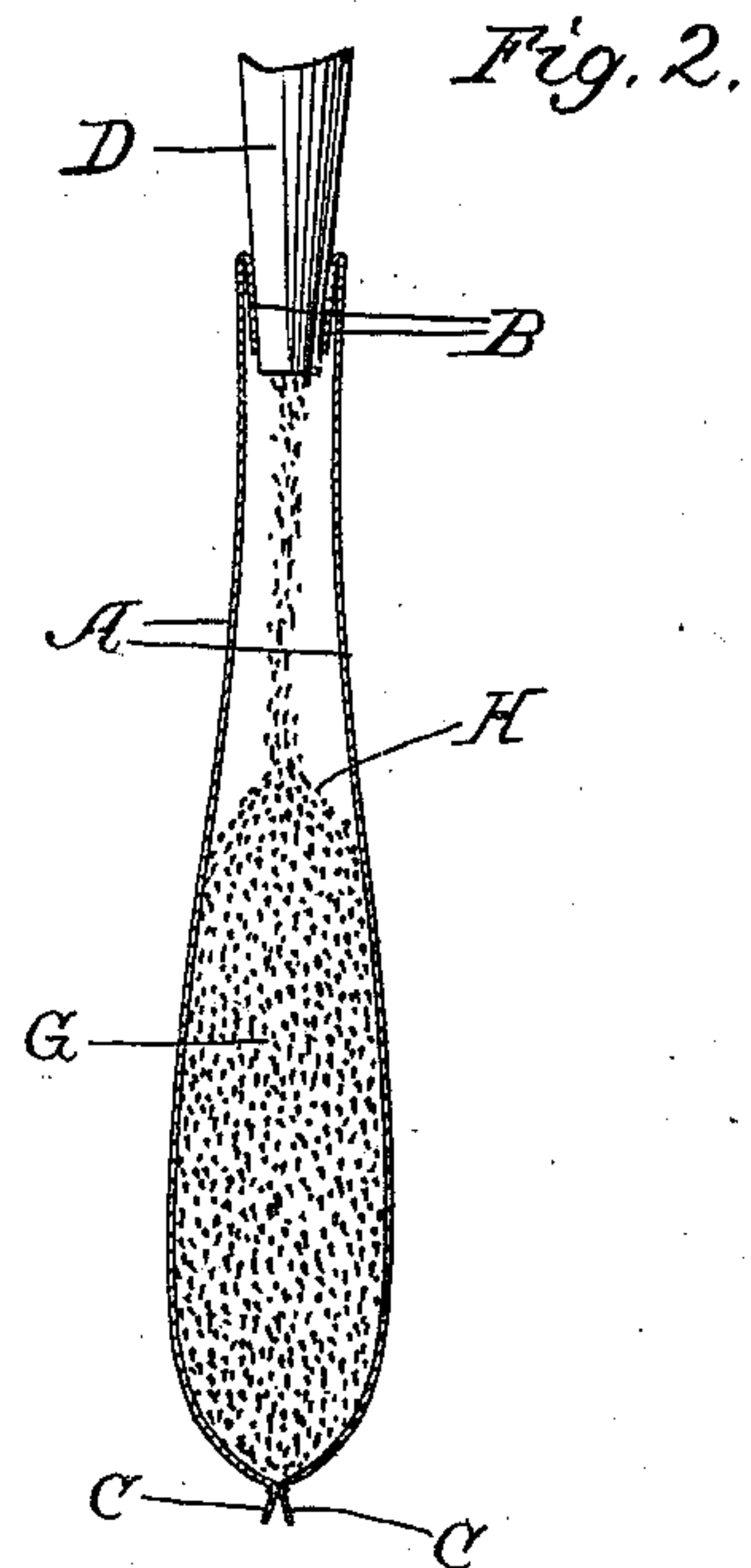
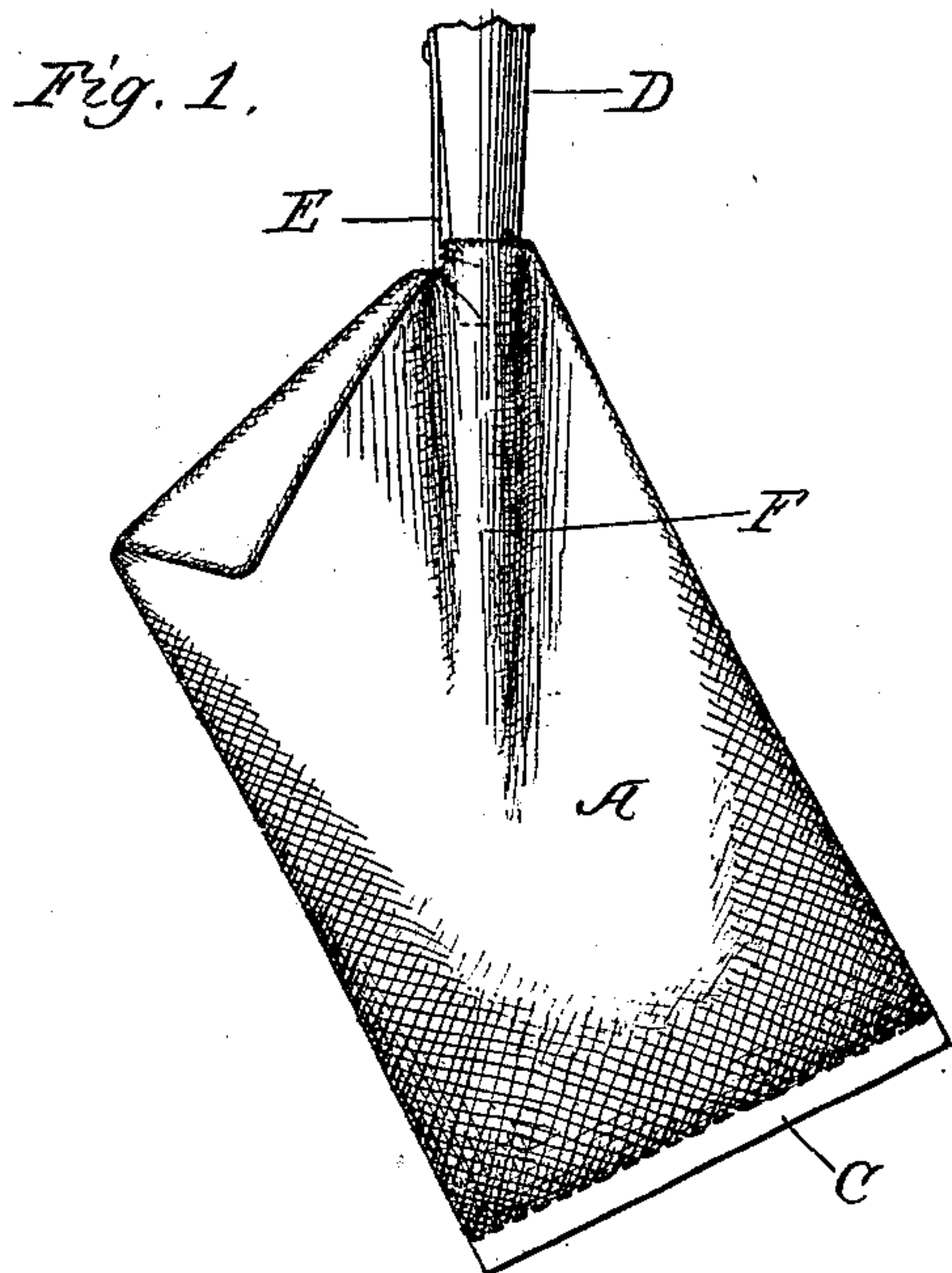
A. M. BATES.

PROCESS OF FILLING VALVED BAGS WITH GRANULAR OR POWDERY SUBSTANCES.

(Application filed Jan. 18, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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PROCESS OF FILLING VALVED BAGS WITH GRANULAR OR POWDERY SUBSTANCES.

(Application filed Jan. 19, 1901.)

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2 Sheets—Sheet 2.

Fig. 5.

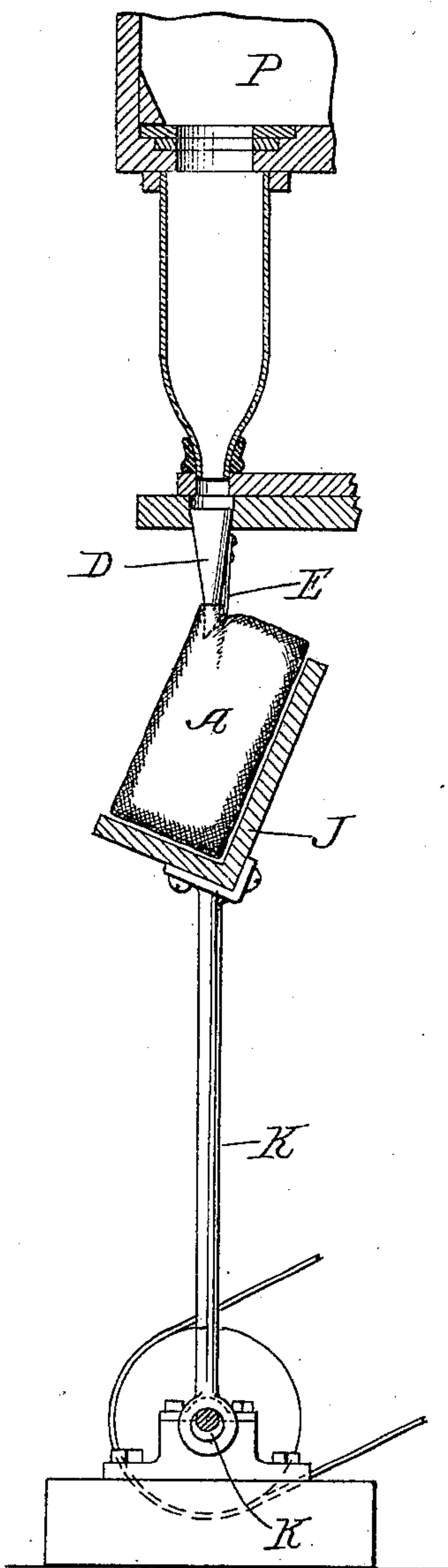


Fig. 6.

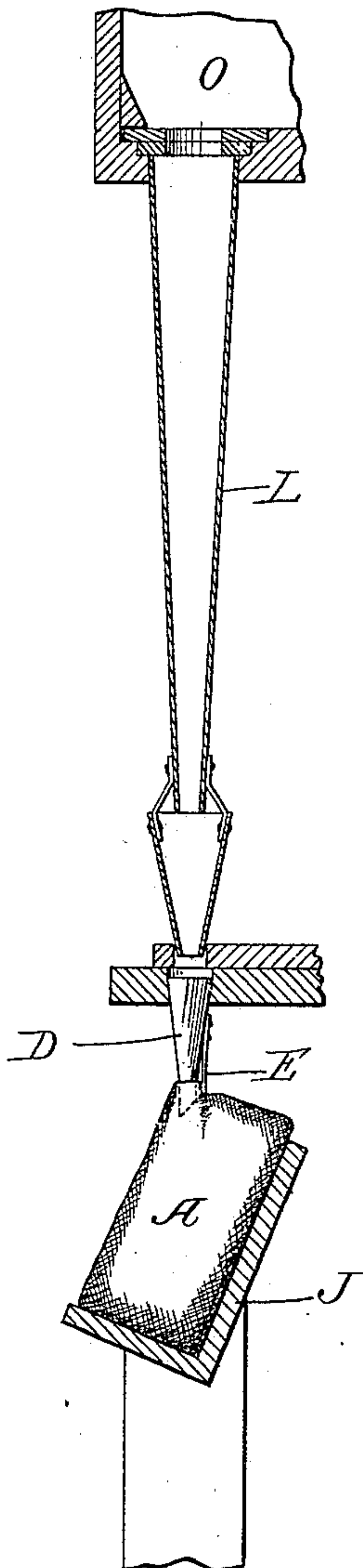
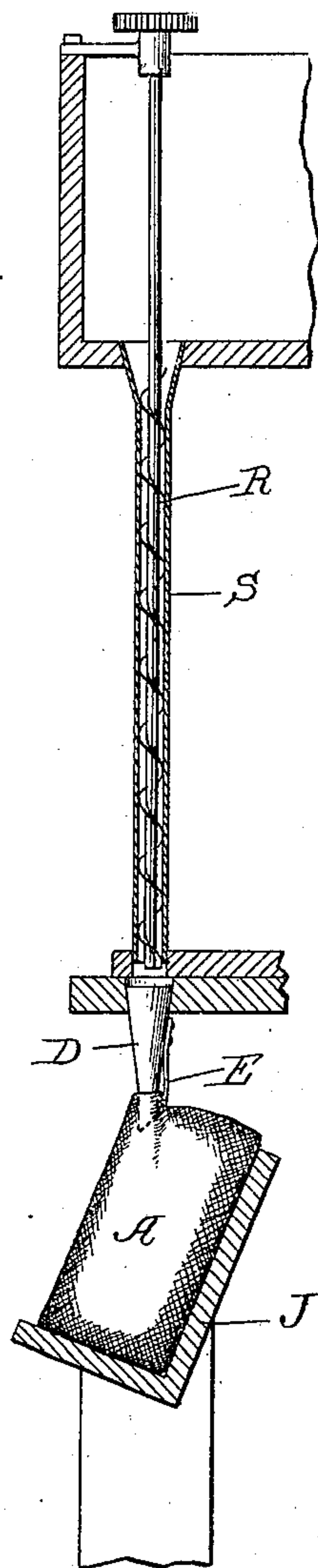


Fig. 7.



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PROCESS OF FILLING VALVED BAGS WITH GRANULAR OR POWDERY SUBSTANCES.

SPECIFICATION forming part of Letters Patent No. 684,036, dated October 8, 1901.

Application filed January 19, 1901. Serial No. 43,851. (No specimens.)

To all whom it may concern:

Be it known that I, ADELMER M. BATES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Processes of Filling Valved Bags with Granular or Powdery Substances, of which the following is a specification.

In attempting to fill valved bags or bags in which a very small opening has been left for the introduction of material there are several difficulties which are encountered. In the first place as the material enters the bag through the pipe or funnel which has been inserted through the valve-opening for that purpose it tends to form a pyramid if the bottom of the bag is supported and if the bottom is not supported it tends to collapse the sides of the bag. In the first case long before the bag is filled some portion of the pyramid stops up the end of the introduction-pipe and in the second case the bag is partially filled with a narrow and thin mass of material deposited between the two collapsed sides. In this case long before the bag is filled the mouth of the introduction-pipe is closed. These actions of course are greatly varied according to the character of the material employed and also depend upon the condition of the material; but in its main features it is a correct statement of what happens under the conditions above referred to in connection with the bagging of powdery or granular substances. These difficulties can be more or less obviated by various devices for suspending the bag. In many cases, however, suspending the bag is impracticable, for the reason that the weight of the material will tear and injure the cloth of which the bag is made. Moreover, when the bag is being filled from a small aperture, which may be at one corner or of course at any other part of the bag, that portion of the bag which, as in the case shown, is adjacent to or near but at the side of or above the mouth of the filling funnel or tube is not easily filled. If a considerable pressure be applied to force the material into the bag, these difficulties may also be to a very considerable extent removed, and such pressure can be applied, as suggested, either by the action of gravity or

the ordinary and usual manner of pouring the material in by a steady stream or the action of a screw or the action of a falling column of material, which is of course again the action of gravity, but applied in a peculiar manner. The difficulties may also be partially obviated by agitating or shaking the bag during the process of filling, which, however, is a difficult thing to do when the bags are suspended from above, for the weight of the material again tends to destroy the bag. These difficulties may further be obviated by supporting the bottom of the bag so as to leave the sides loose and unstrained during the process of filling and also by agitating the bag when in this condition, and particularly by giving the bag a slight up-and-down motion or, in other words, letting it fall rapidly through a short distance or excursion during the process of filling.

It will be understood that the mechanism here shown is simply diagrammatic, as the process can be carried out in various ways and by various machines and by great modifications of those here illustrated. In the drawings, however, I have indicated some devices sufficiently to furnish an explanation of the process. These diagrams I will describe very briefly.

Figure 1 is a side elevation of a bag suspended at the corner and in the process of being filled through a funnel. Fig. 2 is a cross-section through the same. Fig. 3 is a bag being filled where it is resting on a shelf. Fig. 4 is a cross-section through the same. Fig. 5 is an outline of an apparatus wherein the bag is being supported and the material is being fed in and the bag in the process of being filled is being agitated. Fig. 6 is an outline of an apparatus by which the material can be dropped into the bag in what I call a "falling column." Fig. 7 is a similar view showing the material in the process of being fed into the bag by means of a screw.

A A are the sides of a bag.

B B are the valve-flaps.

C C are the flaps at the end of the bag.

D is the filling tube or funnel.

E is the clamp, whereby the bag may be clamped to the tube or funnel and be thus held in position.

F indicates the irregularities in the side of the bag as it hangs partially filled with material.

G indicates the material in the bag.

5 H shows the pyramidal form of the material within the bag.

J is the platform upon which the bottom of the bag rests, the distance between the platform and the support at the upper end of the bag being such that the sides of the bag are loose or not taut.

15 K K indicate the several parts of the agitating mechanism with which such platform may be associated. The arrangement is such that the bag is given an up-and-down motion, or rather the platform on which it rests is given such motion. The parts may be so adjusted and proportioned that the vertical reciprocation is such as to keep the bag in a very rapid upward-and-downward motion, the bag being sometimes and perhaps much of the time in the air or free from the platform.

25 L is the guiding-tube, having a contracted aperture at its lower end and the adjustable aperture at its upper end.

O is the hopper, and by varying the adjustable opening a certain quantity of material can be permitted to flow from the hopper. 30 It drops down through the guiding-tube. The particles are forced inwardly by the sides of such tube and the mass is contracted into a relatively dense column at the point where it emerges from the lower aperture, this aperture being placed in line with the opening of the tube in the bag. Such column of material is dropped almost as a column into the filling tube or funnel, whence it passes quickly into the interior of the bag. This of course 40 is the action of gravity.

P is the hopper, from which the material is allowed to flow in a steady stream into the filling funnel or tube, as indicated.

45 R is a conveyer-screw in the tube S, which, as indicated, connects directly with the funnel, so that with the action of the tube a continuous stream of material may be forced through the tube or funnel into the bag.

50 As previously suggested, these forms are shown diagrammatically. The agitation of the bag may be lateral as well as vertical. After the bag has been filled it is necessary to seat or close the valve when the valve is used, and this requires the forcing of the material within the bag toward the valve or valve end or the end from which the bag has been filled. This is accomplished by rapidly forcing the material toward that end. It can be done by reversing the bag or dropping it 60 in such a way as to bring about this result.

65 The filling of the bag is not of course absolutely completed so long as the valve itself remains open. In other words, the filling is completed as to the bag proper, but not as to that portion of the bag immediately at the valve. In other words, the valve-lips must close together and slightly bulge outwardly,

and to that extent the bag is not of course absolutely full. In filling such a bag the object of course is to take the loose, granular, 70 or powdery material while in its loose and unpacked condition and pack it within the inclosing bag or flexible material so as to make a complete tightly-filled bag and of course to accomplish this result without the final 75 step of sewing or tying the bag or inclosing material.

The use and operation of my process are as follows: The material to be thus packed or condensed within the bag or covering is taken 80 when in its powdery, granular, and loose condition and poured through a small aperture of the valve. It must be in such loose and powdery condition, for if packed or in heavy lumps it of course cannot be introduced. 85 When introduced, it tends, as stated, to form a pyramid or otherwise to fill up the bag imperfectly and cut off the supply at the valve. The second step of my process, therefore, includes the agitation of the bag, not merely by 90 any ordinary shaking or knocking, such as is common with boxes and barrels and bags, but a peculiar sort of agitation of such a nature as to break down the pyramid and pack and condense the material in the bag, and this 95 action involves a positive motion of the bag and contents. This motion should be rapid and through but a short distance or short excursion. In practice the motion of the supporting part toward the bottom of the bag is 100 about four hundred movements per minute. The process works best when the material is introduced by the action of gravity or, in other words, is permitted to freely flow in while in a powdery, granular, and loose state, 105 and the process is also best applied where the bag is held by the corner, as indicated, for in this condition the three remaining corners are thoroughly packed and filled before the problem of filling the last corner and closing 110 the valve is reached. Of course in agitating the bottom of the bag the top of the bag is usually held in a fixed position, and, as shown, the distance between the upper and lower supports is such that the sides of the 115 bag are loose or not taut. When the bag has thus been substantially filled, except as to the immediate valve-space referred to, the covering or bag is not sealed or closed upon its contents, and the last step in my process 120 consists, as stated above, in forcing the mass of material within the bag toward the valve end to seat it. If this is not done, the contents will continue to escape from the valve, the escapement or stream of the material 125 holding the valve open until all or much of the contents has been lost. To obviate this difficulty, as stated above, the valve-lips must be closed and the valve seated, and this is done as described. Thus the loose, granu- 130 lar, and powdery material is by this series of acts performed upon it transformed or reduced to a very solid packed mass inclosed within a continuous flexible covering or bag

and sealed or fastened therein without the final step heretofore necessary, consisting of sewing or tying the bag at the top.

I claim—

5 1. The process of condensing loose, granular and powdery material into a closely-packed form and inclosing it within a substantially continuous, flexible covering or bag, and sealing the covering over such packed material
10 without sewing or tying the same, which consists in the following steps, introducing the material in a loose and unpacked condition and in a relatively small, continuous stream, through a small interiorly - valve-protected
15 opening, into the closed covering or bag, simultaneously agitating the bottom of the bag and the material therein, so as to prevent the material from forming a pyramid or accumulating at or under the small valve-opening to close the same and to distribute and pack such material throughout the covering or bag until the latter is substantially filled and packed, and then violently forcing the material within the bag *en masse* toward the
20 valve to seat it.

2. The process of condensing loose, granular and powdery material into a closely-packed form and inclosing it within a substantially continuous, flexible covering or bag, and sealing the covering over such packed material
30 without sewing or tying the same, which consists in the following steps, introducing the material by gravity in a loose and unpacked condition and in a relatively small, continuous stream, through a small interiorly-valve-protected opening, into the closed covering or bag, simultaneously agitating the bottom of the bag and the material therein, so as to prevent the material from forming a pyramid or
40 accumulating at or under the small valve-opening to close the same and to distribute and pack such material throughout the covering or bag until the latter is substantially filled and packed, and then violently forcing the material within the bag *en masse* toward the valve to seat it.

3. The process of condensing loose, granular and powdery material into a closely-packed form and inclosing it within a substantially continuous, flexible covering or bag, and sealing the covering over such packed material
50 without sewing or tying the same, which consists in the following steps, introducing the material in a loose and unpacked condition and in a relatively small, continuous stream, through a small interiorly - valve - protected opening, into the closed covering or bag, si-

multaneously agitating the bottom of the bag and the material therein by a rapid, short-excursion movement, so as to prevent the material from forming a pyramid or accumulating at or under the small valve-opening to close the same and to distribute and pack such material throughout the covering or bag until the latter is substantially filled and packed, and then violently forcing the material within the bag *en masse* toward the valve to seat it.

4. The process of condensing loose, granular and powdery material into a closely-packed form and inclosing it within a substantially continuous, flexible covering or bag, and sealing the covering over such packed material without sewing or tying the same, which consists in the following steps, introducing the material in a loose and unpacked condition and in a relatively small, continuous stream, through a small interiorly - valve-protected opening, into the closed covering or bag, simultaneously agitating the bottom of the bag and the material therein, so as to prevent the material from forming a pyramid or accumulating at or under the small valve-opening to close the same and to distribute and pack such material throughout the covering or bag until the latter is substantially filled and packed, except about the valve, and then violently forcing the material within the bag *en masse* toward the valve to seat it.

5. The process of condensing loose, granular and powdery material into a closely-packed form and inclosing it within a substantially continuous, flexible covering or bag, and sealing the covering over such packed material without sewing or tying the same, which consists in the following steps, introducing the material in a loose and unpacked condition and in a relatively small, continuous stream, through a small interiorly - valve-protected opening at one corner, into the closed covering or bag, simultaneously agitating the bottom of the bag and the material therein, so as to prevent the material from forming a pyramid or accumulating at or under the small valve-opening to close the same and to distribute and pack such material throughout the covering or bag until the latter is substantially filled and packed, and then violently forcing the material within the bag *en masse* toward the valve to seat it.

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