No. 862,231. PATENTED AUG. 6, 1907.

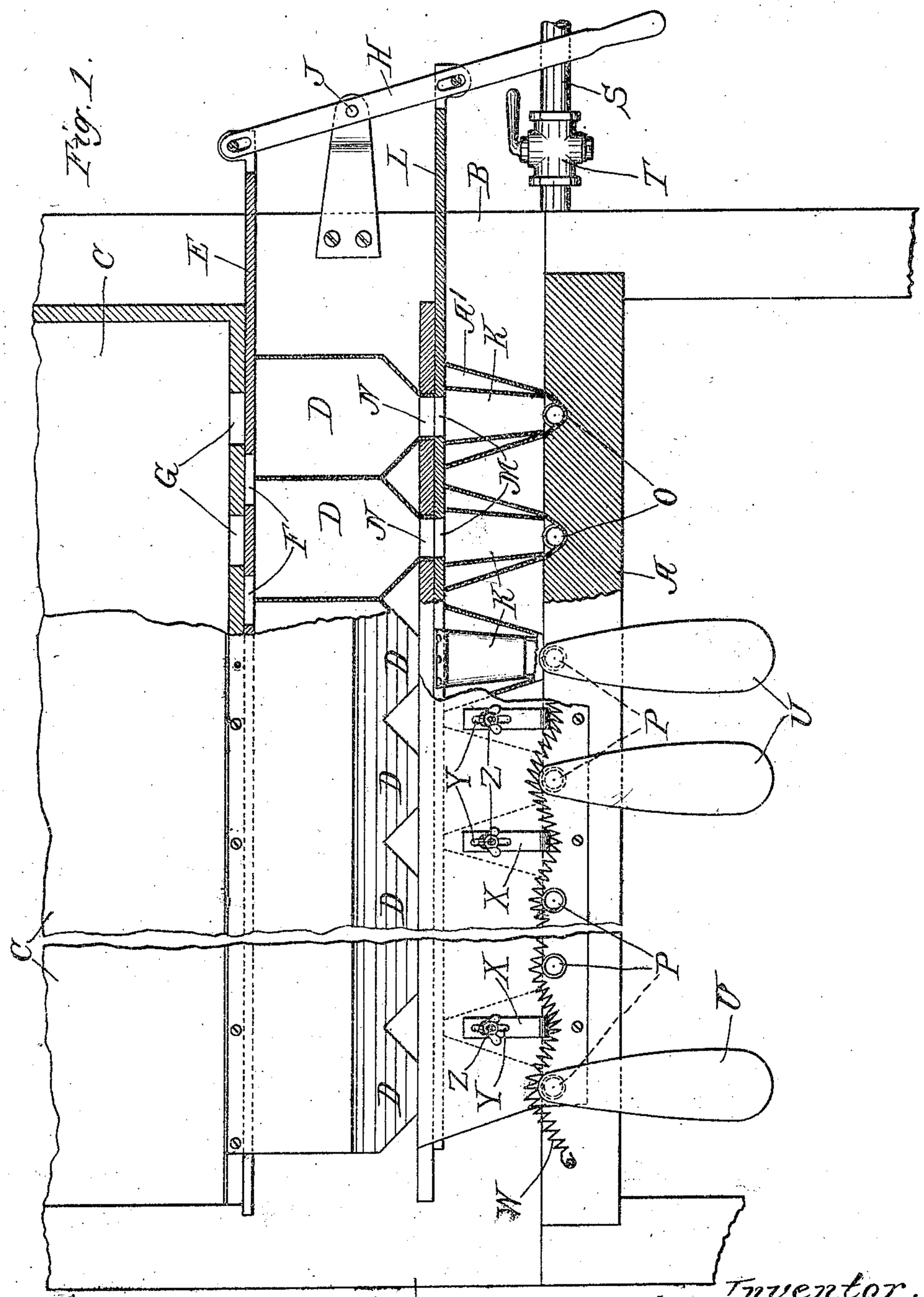
A. M. BATES.

BAG FILLING APPARATUS.

APPLICATION FILED JAN. 11, 1904.

4 SHEETS—SHEET 1.

Fig. 1.




Witnesses.
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4 SHEETS—SHEET 2.

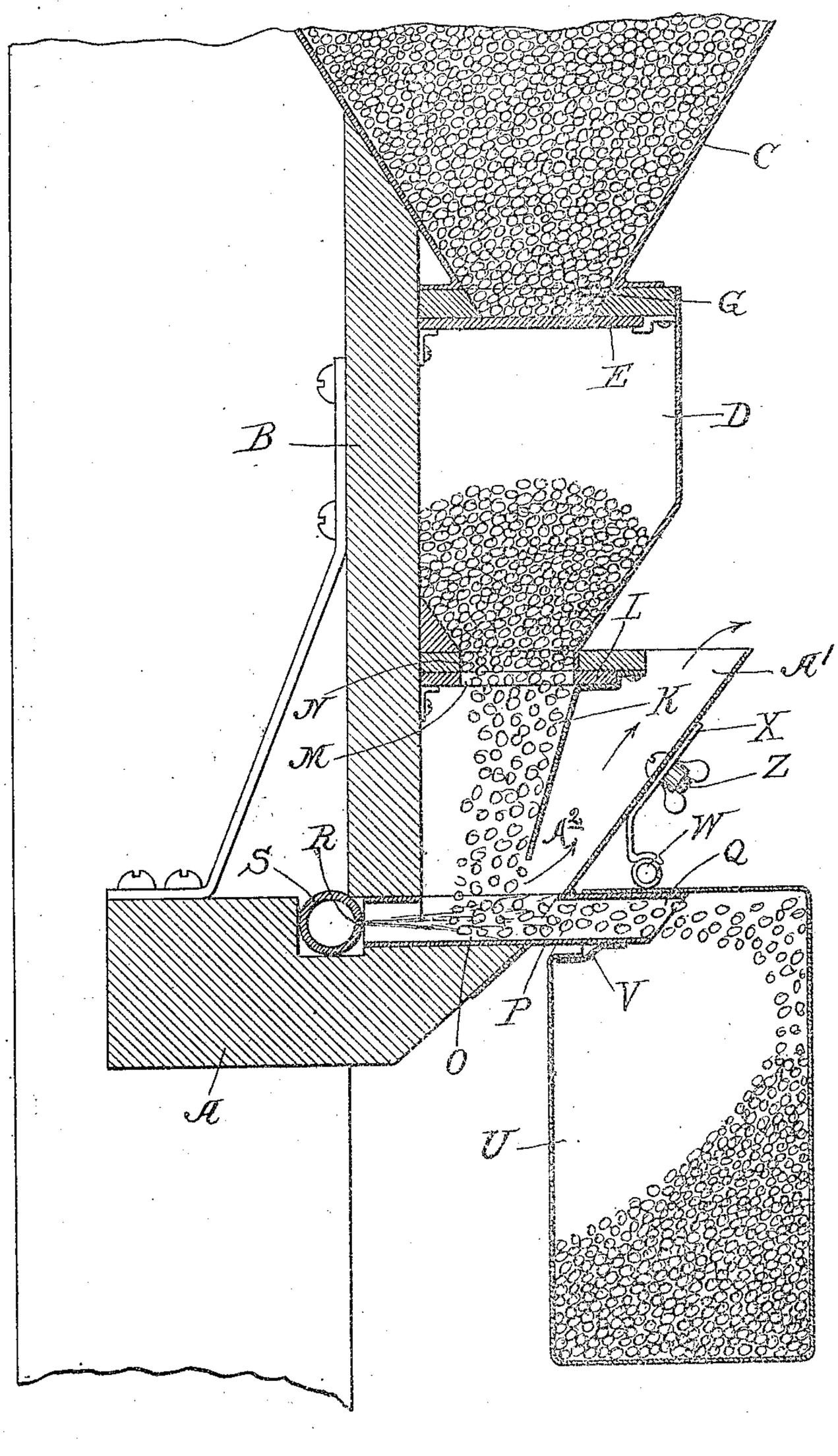


Fig. 2.

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4 SHEETS—SHEET 3.

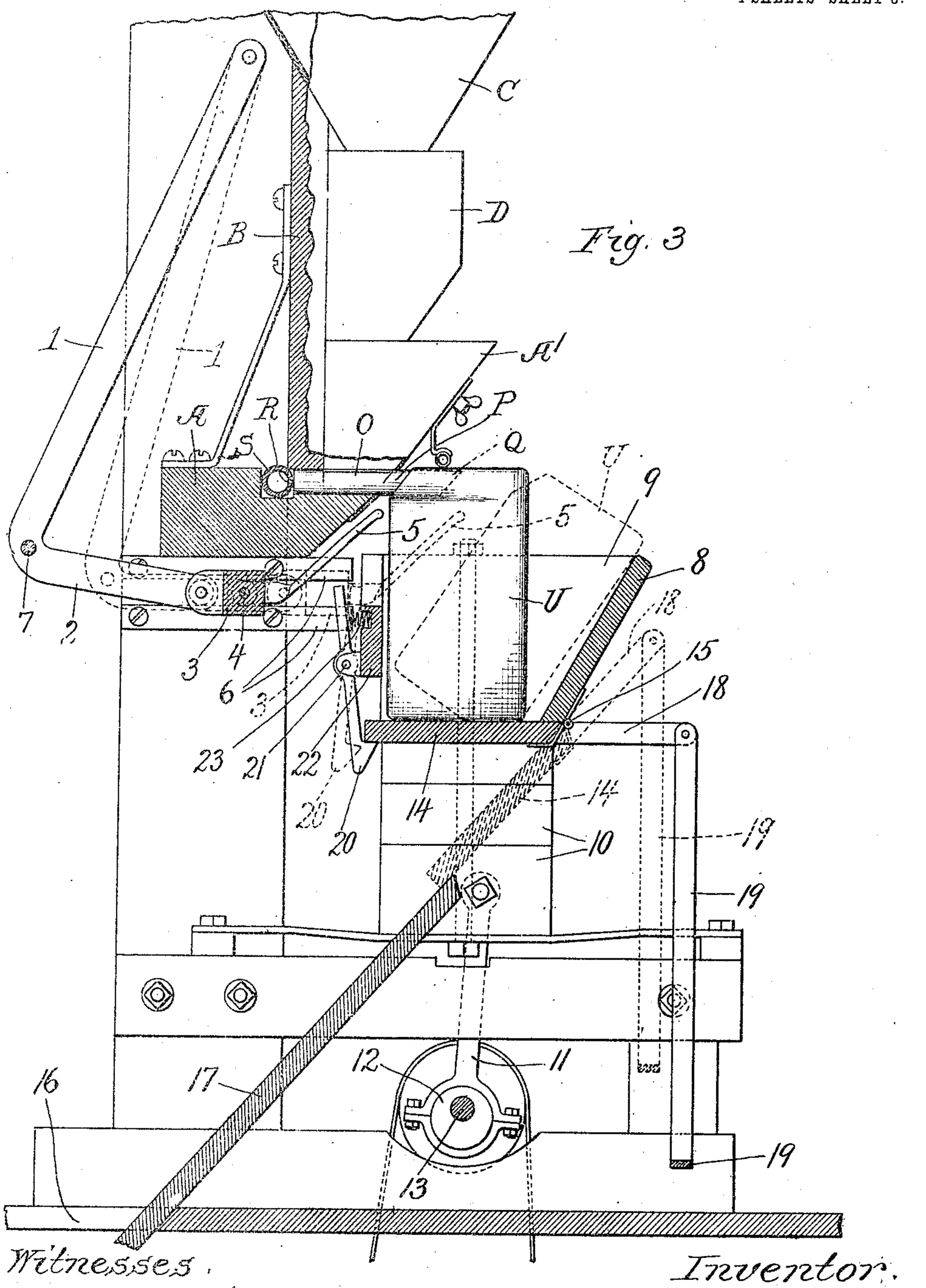


Fig. 3

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4 SHEETS—SHEET 4.

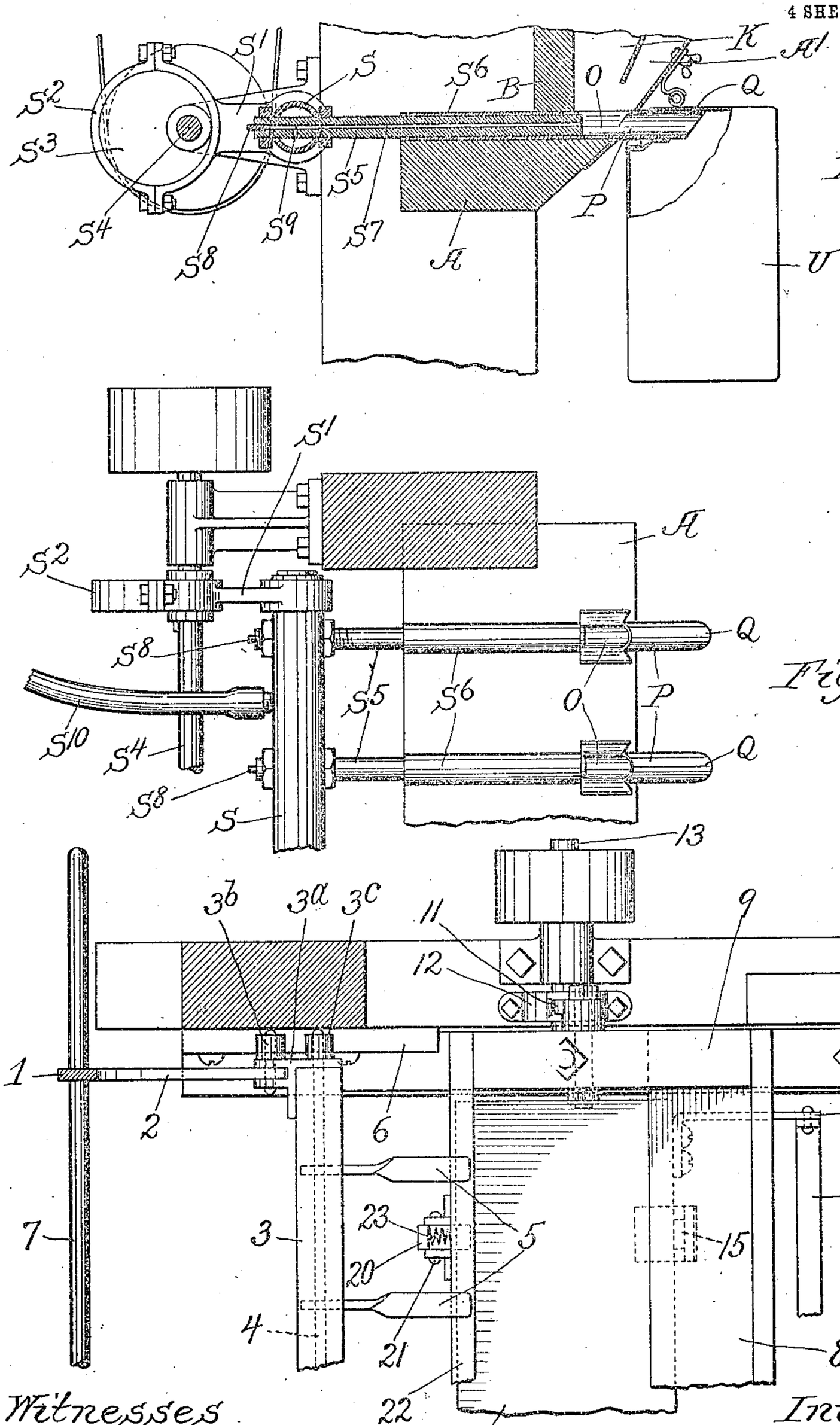


Fig. 5.




Fig. 6.




Fig. 4.

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# UNITED STATES PATENT OFFICE.

ADELMER MARCUS BATES, OF CLEVELAND, OHIO, ASSIGNOR TO BATES VALVE BAG COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF WEST VIRGINIA.

## BAG-FILLING APPARATUS.

No. 863,231. Specification of Letters Patent. Patented Aug. 6, 1907.

Application filed January 11, 1904. Serial No. 188,402.

*To all whom it may concern:*

Be it known that I, ADELMER MARCUS BATES, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Bag-Filling Apparatus, of which the following is a specification.

My invention relates to apparatus for filling valve bags, and has for its object, among other things, to provide means for filling bags with granular or powdered substances, and without injuring the exterior surfaces of such substances; for inflating valve bags prior to the process of filling them, where that is desirable; for cleaning such substances as they are being filled into the bags when that is desirable; and for accomplishing other results as hereinafter set forth.

My invention is illustrated somewhat diagrammatically by the rough outlines of the machine which contains the same, and which is set forth in the accompanying drawing, wherein

Figure 1 is a front view of my apparatus with parts shown in section and other parts broken away; Fig. 2 is a vertical cross section; Fig. 3 is a cross-section of one device for discharging bags; Fig. 4 is a plan view of a portion thereof, and Figs. 5 and 6 are diagrammatic views of another device for discharging the bags.

Like parts are indicated by the same letters in all the figures.

A is the base of the machine formed of any material and supported in any desired way; B is the back of the machine supported on the base A; C is a storage hopper; DD a series of measuring hoppers. The supply to each measuring hopper is controlled by a valve board E, having apertures FF, adapted to register with apertures GG, in the bottom of the hopper C when the measuring hoppers DD are to be filled. The valve board E, is secured to the end of the lever H, which is pivotally mounted at J on a bracket extending from the back board B; KK are a series of downspouts abutting against the valve board L, which is provided with apertures MM, adapted to register with the apertures NN in the bottoms of the hoppers DD. The end of the valve board L is pivotally connected to the lever H. These parts may have any desired relation to each other, but as shown they are mounted so that when one set of openings is open the other is closed. The valve boards may be controlled by separate levers. Each down-spout K terminates in a semi-tubular bottom portion O, in the base board A. This semi-tubular portion may be arranged in any desired manner, but projecting beyond the base board it takes the form of a tube P, with a forwardly projecting upper portion Q, and serves as a filling tube. Into this semi-tubular part there leads a passageway R, very small in cross section and leading from the pipe S which is supported on the base A, and controlled by the valve T. U is the bag; V the valve lip which may be of cloth. W is a coiled spring which lies along and upon the tubes P to hold the bags in position, and this spring is adjustably depressed at intervals by means of the blocks X which are in turn held by means of the slots Y and set screws Z in any desired relation. $A^1$ is an upwardly leading spout connected below with the forward end of the semi-tubular piece O and the lower end of the spout K as shown at $A^2$. It will be understood, of course, that in describing these parts I have paid no attention to their relative sizes or proportions, and that they may be greatly varied without departing from the spirit of my invention. It is clear, also, that some of these features may be eliminated, and others may be greatly modified without abandoning my invention. I only use the drawing as another means of describing or suggesting the subject matter of my invention.

In the case of certain kinds of granular substances the attempt to permit them to pass through a small passageway is frequently attended by crowding, packing and ultimate injury to the grains. It is part of the purpose of my invention to force such substances into the bag by air pressure, thus, applying the plunger and preventing the wedging or crowding of the grains together where one plunger is used, for, if such substances are fed by a plunger, the grains will abrade and injure one another. If the grains become somewhat clogged or crowded under air pressure there is not the danger of bruising and breaking as in case of force applied by a rigid plunger. For many materials it is highly desirable to feed them laterally or horizontally into the bag and particularly because when this is done the bag can be held in a horizontal position. It is much easier ordinarily to so hold the bag than to hold it in any other manner. It is also desirable to fill very rapidly, and this can be effected by air pressure. Since I leave an opening $A^2$ into the spout $A^1$, the air is discharged partially at that point, thus carrying out with it chaff, dust and the like. This opening $A^2$, through which refuse materials are discharged is also important as leaving means of access to the inner part of the tube and spout. It is possible, also, by this arrangement of parts, to inflate the bag and also to blow the sizing out of it when either or both of these results are desired. In the case of a paper bag being filled the air is permitted to escape from the bag by means of the cloth valve lip V which surrounds the filling tube, but leaves a screened opening through which the air can escape.

In Figs. 1 and 2 I have not shown any apparatus for agitating or shaking the bags as they are being filled for the purpose of causing the material to settle therein; such device can be applied if desired. In some cases this will be unnecessary as the filling of the bag will be

accomplished by the application of the air to the material.

In Figs. 3 and 4, I have shown, somewhat diagrammatically, a form of jigging device to agitate the bags and also a form of device for discharging the same. 1 is an arm pivoted to the frame and having a forwardly projecting lower portion 2 attached to a cross-bar 3. There must be two or more of the arms 1, and the cross-bar 3 is thus arranged at one side of the bags while they are being filled. The connection between the bar 3 and the arm-end 2 is at each end of the bracket $3^a$, to which the arm 2 is pivoted and which is supported by the two rollers $3^b$ $3^c$ which travel between the guide-rails 6—6. The bar 3 has through it a rod 4 on which are mounted within the bar 3 a series of upwardly bent pusher fingers 5—5. A cross-rod 7 connects the two elbow crank levers formed by the parts 1 and 2, and this cross-rod 7 may be manipulated to move the pusher fingers in or out to force the bags away from the filling tubes PP on which they hang. When they are forced from such tubes, they fall in the inclined position indicated in Fig. 3 against the back 8 of the jigging board or frame. This back or frame-piece connects with the end pieces 9—9, which are mounted on the vertical parts 10–10, which are in turn supported by the pitman 11–11 from the eccentric 12—12 on the shaft 13. Thus the jigging-board or frame is kept in vertical motion.

The bottom of the frame 14, on which the bags really rest, is hinged at 15—15 so that it can be swung down into the position shown in dotted lines in Fig. 3. A hole in the floor, at 16, permits the bags to drop through as they pass down the chute 17. Backwardly projecting from this bottom 14, is the lever 18, with the treadle 19 hanging therefrom, so that the operator can easily restore the bottom to the position shown in full lines in Fig. 3. This bottom is held in such position by means of the hooks 20—20, pivoted at 21 to the fixed bar 22—22, associated with the jigging board and held in locking position by the spiral spring 23. The upper end of the hook 20 lies in the path of the bar 3, so that when the latter has moved far enough in, as indicated in dotted lines in Fig. 3, to tilt the bags over and free them from the tubes P, the hook will also be swung on its pivot and the bottom 14 will be released so that the bags can fall down as above described. These parts, as above suggested, are to be taken as diagrammatic and their parts may be greatly varied without departing from the spirit of this part of my invention. What is here important is a jigging board of such a nature that during a portion of the jigging process, the bag may be free to hang on its filling tube, while during the remainder of the process it is supported on the jigging-board. It is also important to have some means for pushing the bags off when they are filled. Thus unfilled bags when put on the tubes PP with the bottom in the position shown in dotted lines hang freely and though the jigging board is still being vertically moved, the bags are not affected. When the jigging board is thrown up into the position shown in full lines, it begins to act upon the bags.

Referring to Figs. 5 and 6, I here show diagrammatically a modification of parts of Fig. 2. For example, if in Fig. 2, no means be shown for pushing the filled bags off, they will hang there, and it would only be under certain special conditions or circumstances that they could be pushed off by the air pressure. I desire to combine plungers and an air device, so that the bags may be filled by air and then be pushed off by the plungers. The pipe S is changed somewhat in form and located beyond the base-board A. This pipe is connected at its ends with arms $S^1$ $S^1$ from the eccentric-strap $S^2$ on the eccentric $S^3$, driven by the shaft $S^4$. The plungers $S^5$ consist each of a long inwardly projecting portion which is supported in the tube-like part $S^6$ on the base A, and the projecting end of which is passed through the pipe S, being screwed so as to be air tight. This plunger $S^5$ may be a tube with a small axial aperture $S^7$ and it may be plugged at $S^8$. A small perforation $S^9$ in this tube plunger within the pipe S, permits the air which is led to such pipe S by hose connection $S^{10}$ to pass into the tube aperture $S^7$, and thence out of the end of such tube plunger.

The use and operation of my invention are as follows: When a given kind of material is to be filled it may be applied to the storage hopper in suitable quantities. By the arrangement of the two board valves, attached to one and the same operating arm, an intermediate set of measuring compartments or hoppers may be produced. They, of course, may be dispensed with if they are unnecessary. When the arm is thrown in one direction the openings in the storage hopper are free, and the material can flow thence into the measuring hoppers until all are filled. By reversing the arm the feed will be cut off but each measuring hopper will be connected with its appropriate down-spout. As soon as this is done the material begins to flow down the spout into the lower semi-tubular portion. Assuming that the bags are all in position and are held there by the spiral spring, they may now be filled by turning the air valve and allowing a current of air to flow into the pipe. Any desired pressure may be used as the case may require. This air escapes through the very small holes, R, into the back end of each of these semi-tubular parts whence it rushes forward carrying a stream of the material into the bag, and also blowing the chaff, dust and the like from the material up through the hood or discharge-way, $A^1$. It will be understood that when the measuring hoppers are filled the lever is reversed to cut off the supply above and permit the material from each hopper to flow into its appropriate down-spout. The process of filling the bags will continue until each has been filled, and the material has been entirely exhausted from each of the measuring hoppers. The lever can then be reversed and the bags be removed and new ones be slipped onto the tubes while the material is re-filling the measuring hoppers.

Of course, it will be understood that the material can be supplied in any desired manner, and with or without measurement or by bulk or weight. The essential point is that the material is fed by air pressure to the bag, and that the chaff, dust and the like may be blown out of the material without other contrivance than that here shown. In order to inflate the bags, or blow the sizing out of them, the air may be turned on before the supply of material is turned on.

When the jigging device is used, the bags are pushed off when filled in a group, and then, by dropping them down the hinged bottom, they will all slide out

onto the chute below and thus to the packing-tables. There are many kinds of bags used and some of them are so shaped that when empty they are much longer than when filled. For example, the satchel bottom bags are of this class, and it is necessary, in order that such bags may be properly filled, that the bottom may be properly expanded by the material from within before the jigging process begins. There may be various reasons for this not necessary here to be discussed. In any event, with the device of Fig. 3, the bags are simply suspended from the filling tubes QQ and then supplied with a certain quantity of material. This drops down into the bag, expands the bottom, and brings it into a proper condition to rest upon the bottom of the jigging-board. The operator may then throw the bottom up and thus the jigging is applied to the bags themselves. Some method of discharging the bags automatically or in groups is necessary, because, to pull them off by hand, would be too expensive and require too much time.

With regard to the device of Figs. 5 and 6, no such pushing-off device as that shown in Fig. 3 is necessary for, when the bags are filled, the plunger will itself force material into the bag sufficiently to fill the same and cause the bag to be pushed off of the tube.

It is obvious that I have shown the parts in Figs. 5 and 6 diagrammatically and it might be better to greatly change these parts. The openings from the tube-like part O into the hopper K and the spout $A^1$ should be controlled or of such size as to permit the plunger to bring about the described result.

I claim:

1. The combination of a suitable supporting frame with a horizontally disposed tube having a free projecting bag supporting end, an air blast device having an opening into the other end of the tube, a material reservoir with an opening into the tube between the bag supporting end and the air blast device opening, and means for holding the bag onto the bag supporting end.

2. The combination of a suitable supporting frame with a tube having a free projecting bag receiving end, an air blast device having an opening into the other end of the tube, a material reservoir with an opening into the tube between the bag receiving end and the air blast device opening, and means for holding the bag onto the bag receiving end of the tube.

3. The combination of a suitable supporting frame with a tube, an air blast device at one end thereof, the two connected by a passage-way approximately central to the cross-section of the tube and of a much smaller cross-section than the tube, means for supporting the bag at the other end of the tube, and a material reservoir connected with the tube intermediate its two ends.

4. The combination of a suitable supporting frame with a tube having a reciprocating plunger therein at one end, a bag receiving end portion at the other end of the tube, a material supply opening into the tube intermediate the plunger and the bag receiving end, and an air blast device adapted to discharge into the tube between the plunger and the bag receiving end.

5. The combination of a suitable supporting frame with a tube having a reciprocating plunger therein at one end, a bag receiving end portion at the other end of the tube, a material supply opening into the tube intermediate the plunger and the bag receiving end, and an air blast device adapted to discharge into the tube between the plunger and the bag receiving end, said air blast device connected to such tube by an opening through the plunger.

6. The combination of a suitable supporting frame with a tube having a reciprocating plunger therein at one end, a bag receiving end portion at the other end of the tube, a material supply opening into the tube intermediate the plunger and the bag receiving end, and an air blast device adapted to discharge into the tube between the plunger and the bag receiving end, said air blast device connected to such tube by an opening through the plunger, said opening of much smaller cross-section than the tube.

7. The combination of a suitable supporting frame with a series of filling tubes, a material supply with a series of discharge-ways one opening into each tube, a series of plungers adapted to reciprocate one in each tube, and an air blast device with a series of passage-ways one opening into each tube.

8. The combination of a suitable supporting frame with a series of filling tubes, a material supply with a series of discharge-ways one opening into each tube, a series of plungers adapted to reciprocate one in each tube, and an air blast device with a series of passage-ways one opening into each tube, such air supply passage leading through the plunger and discharging from the end thereof into the tube.

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