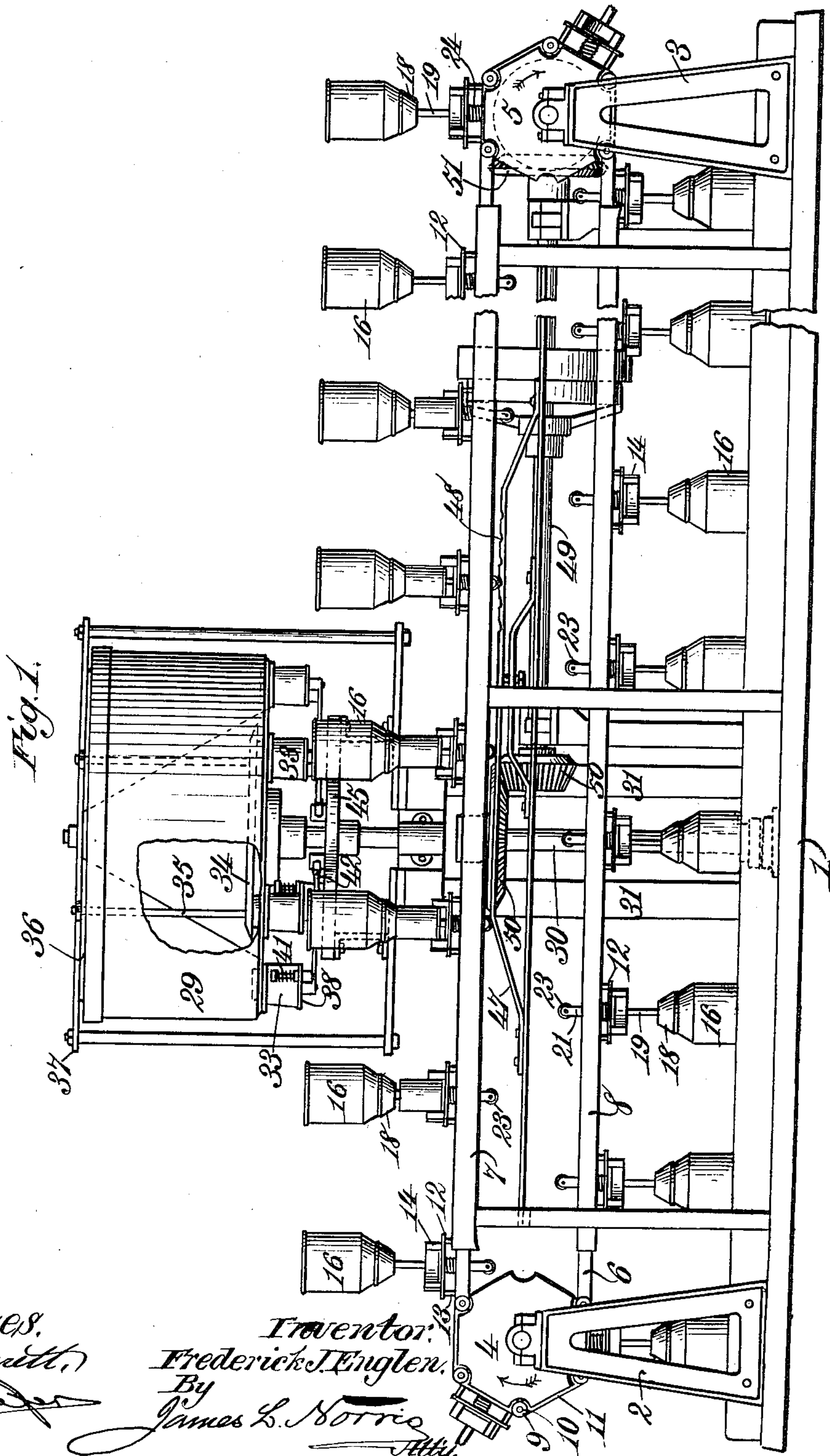


993,230.

F. J. ENGLN.
FILLING MACHINE.
APPLICATION FILED JAN. 22, 1910.

Patented May 23, 1911.

3 SHEETS—SHEET 1.



Witnesses.
Robert G. Smith,
[Signature]

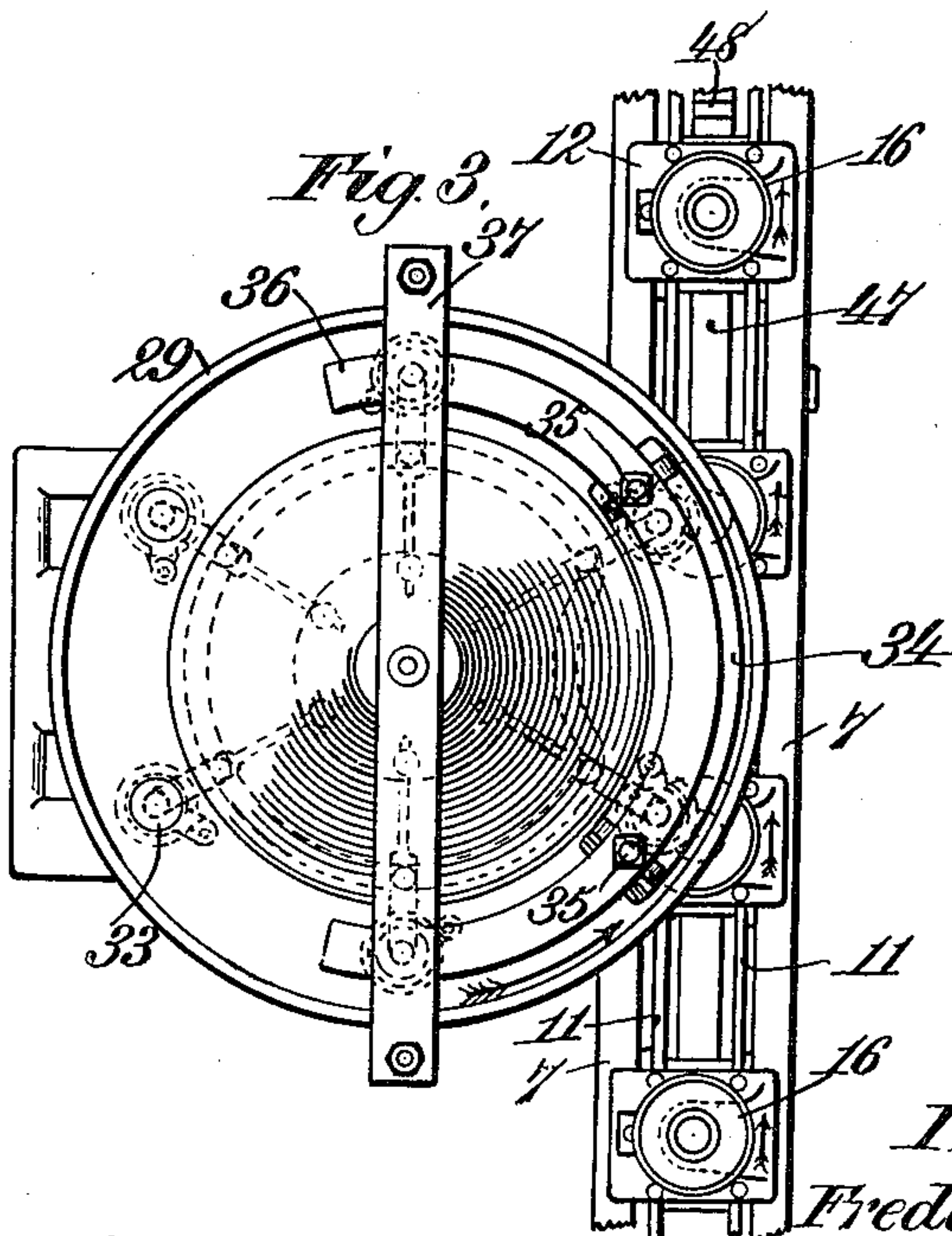
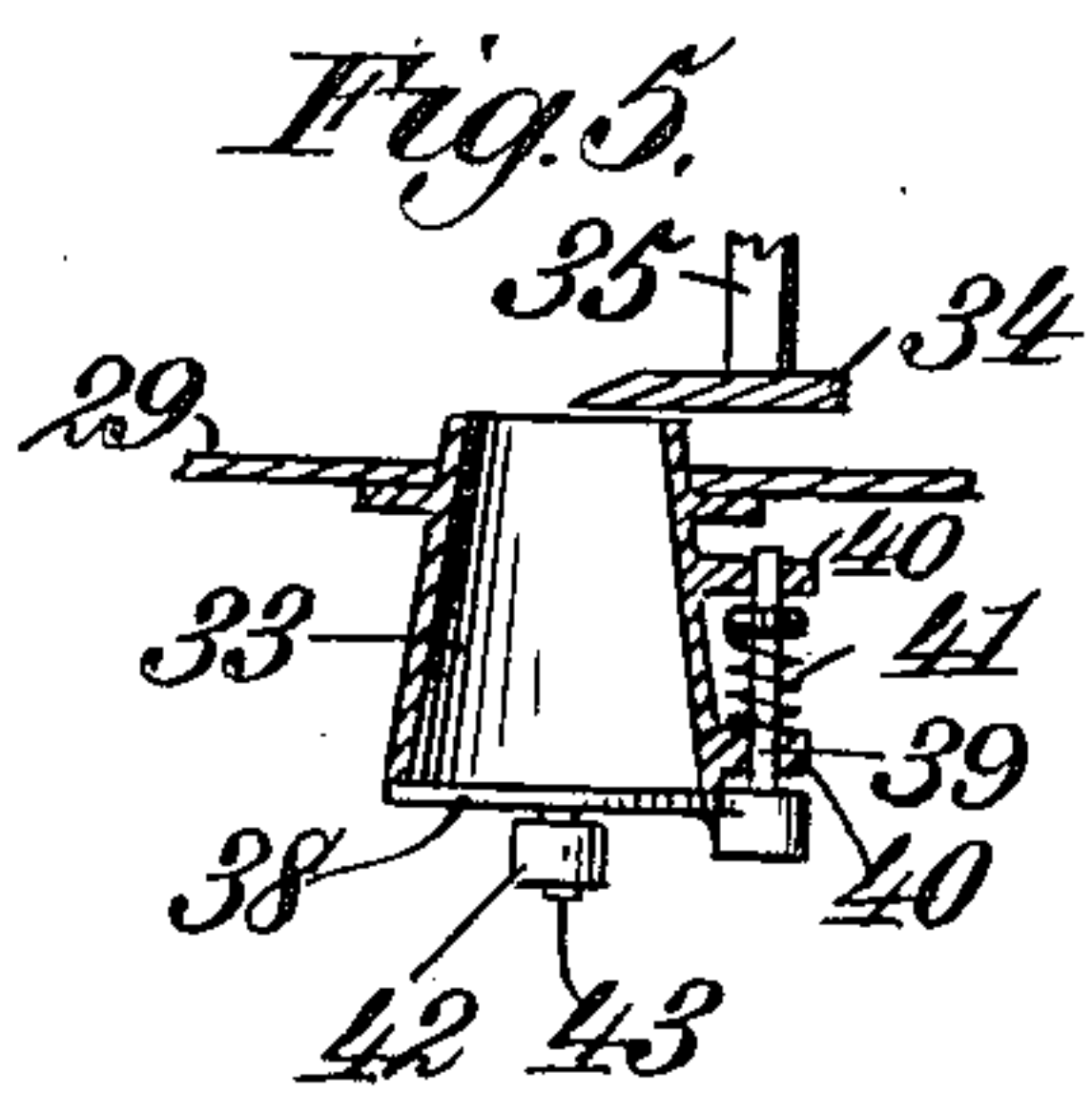
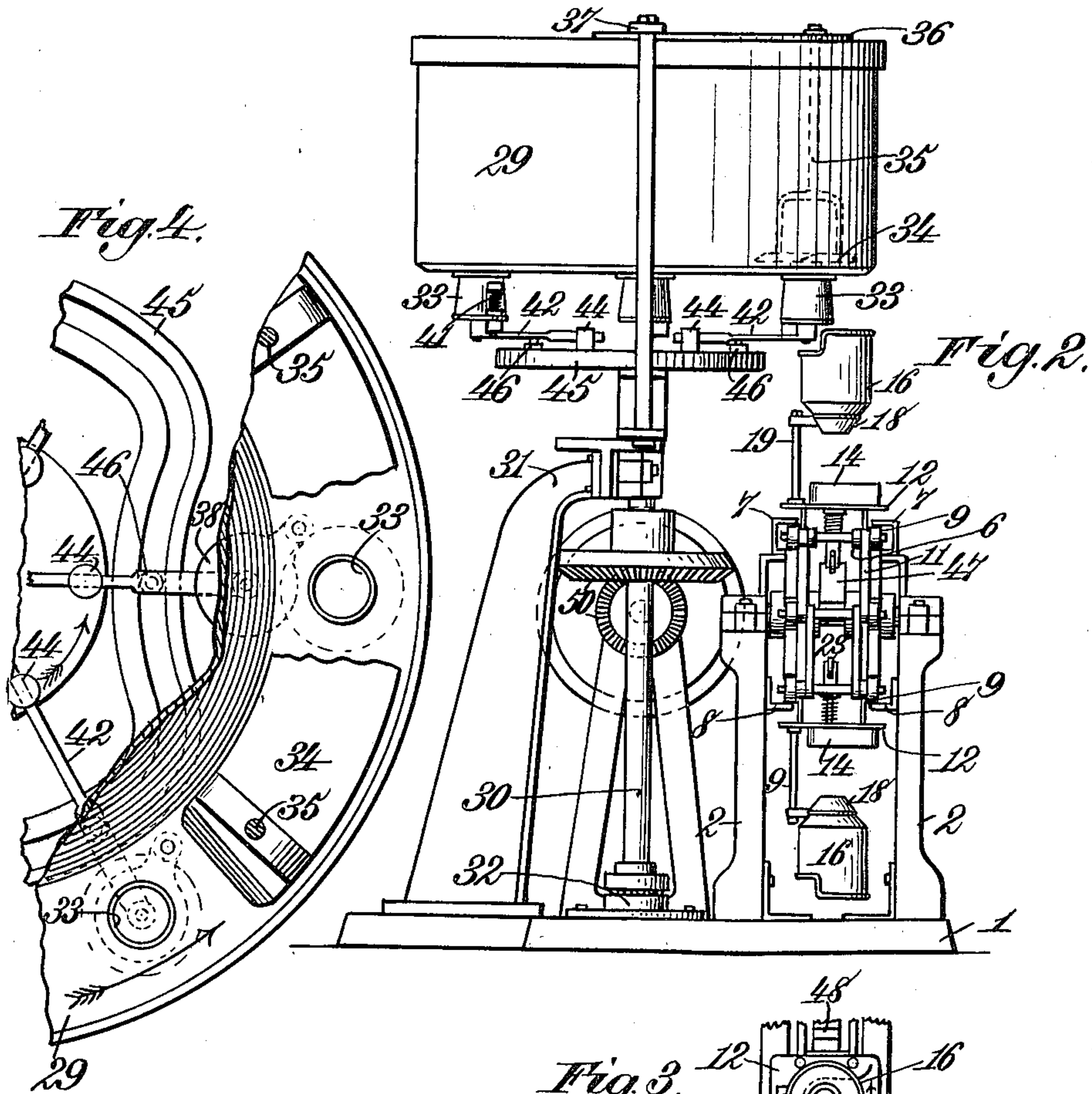
Inventor:
Frederick J. Englen.
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3 SHEETS—SHEET 2.



Witnesses.
Robert Cornett.
[Signature]

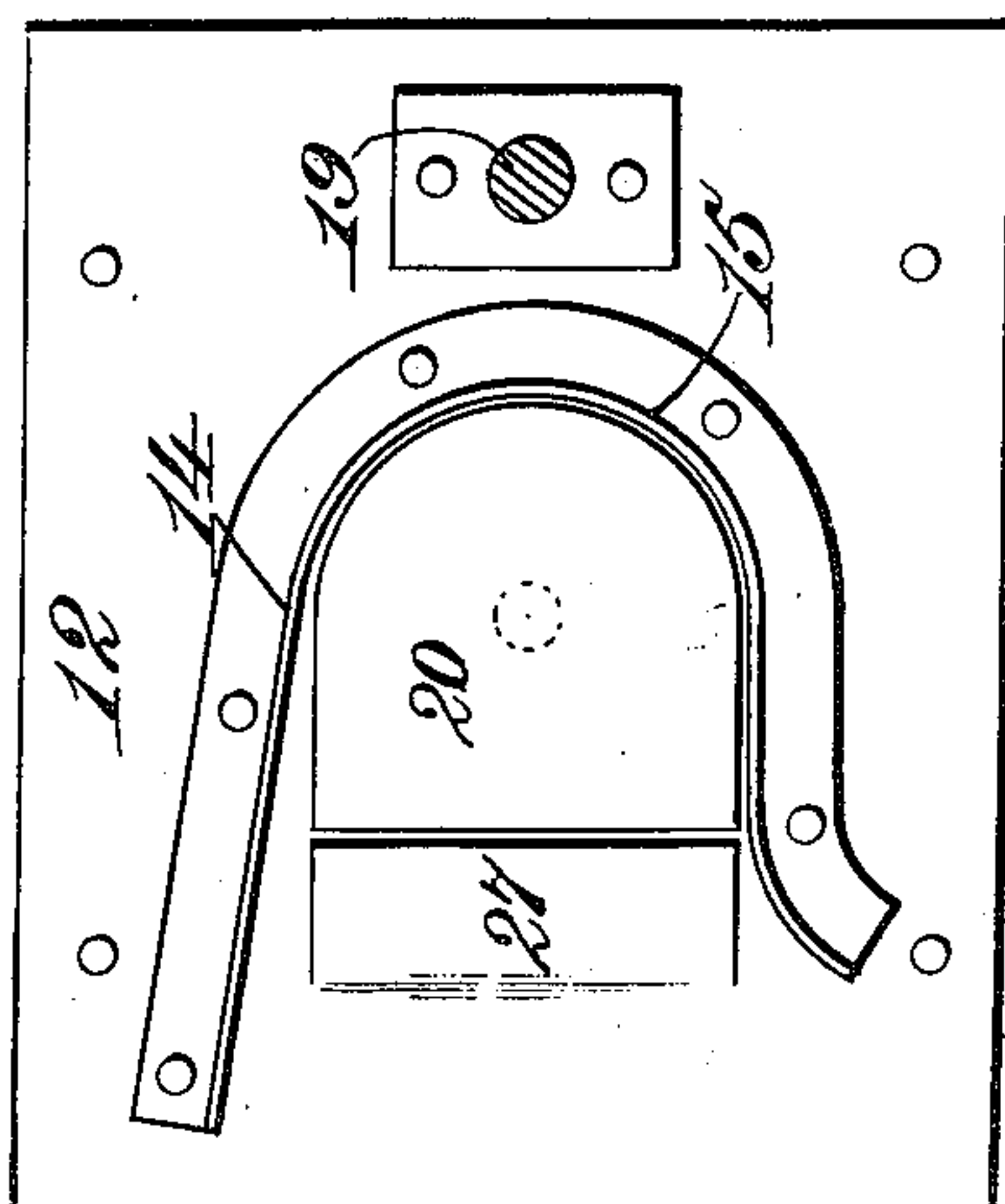
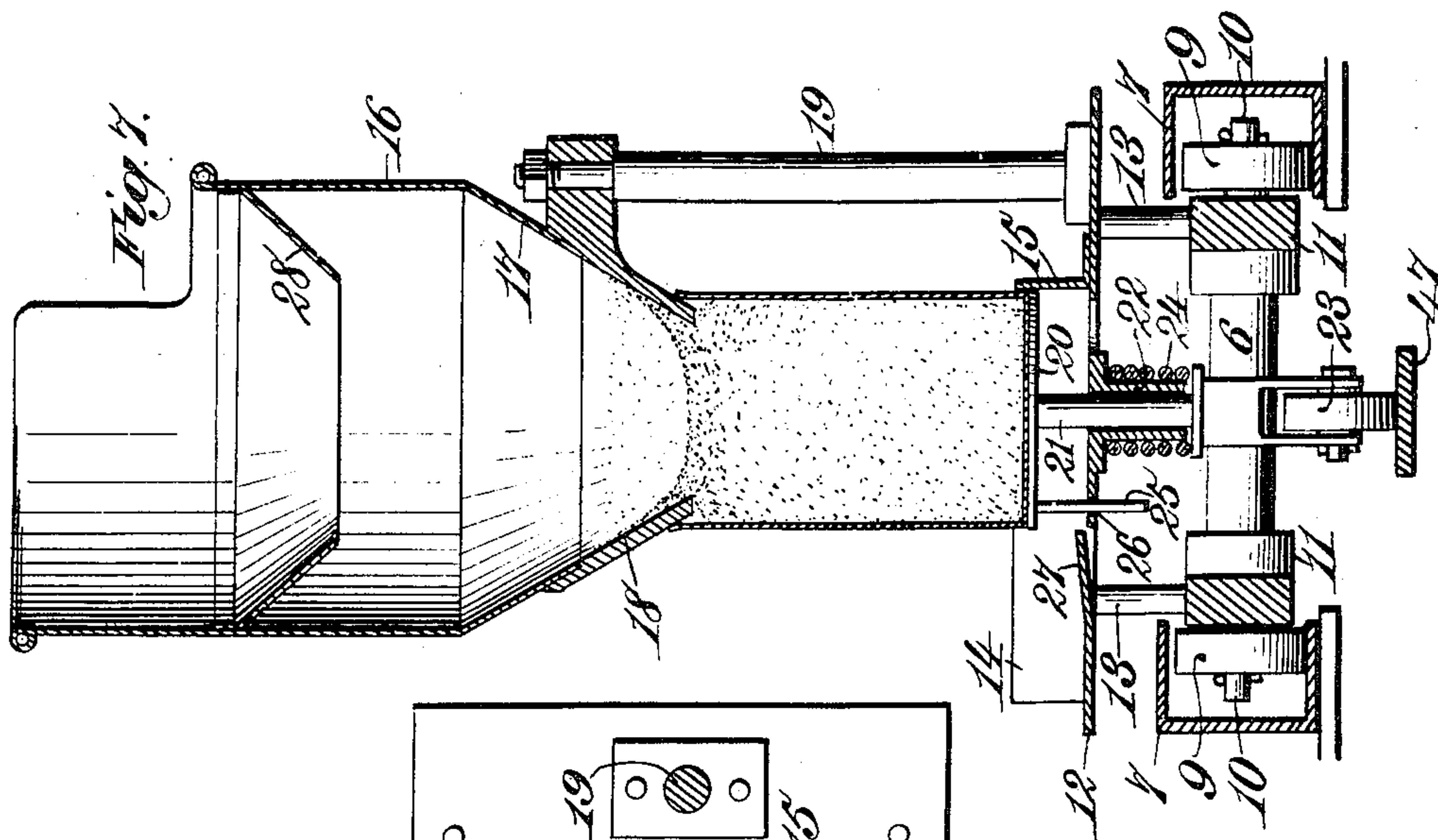
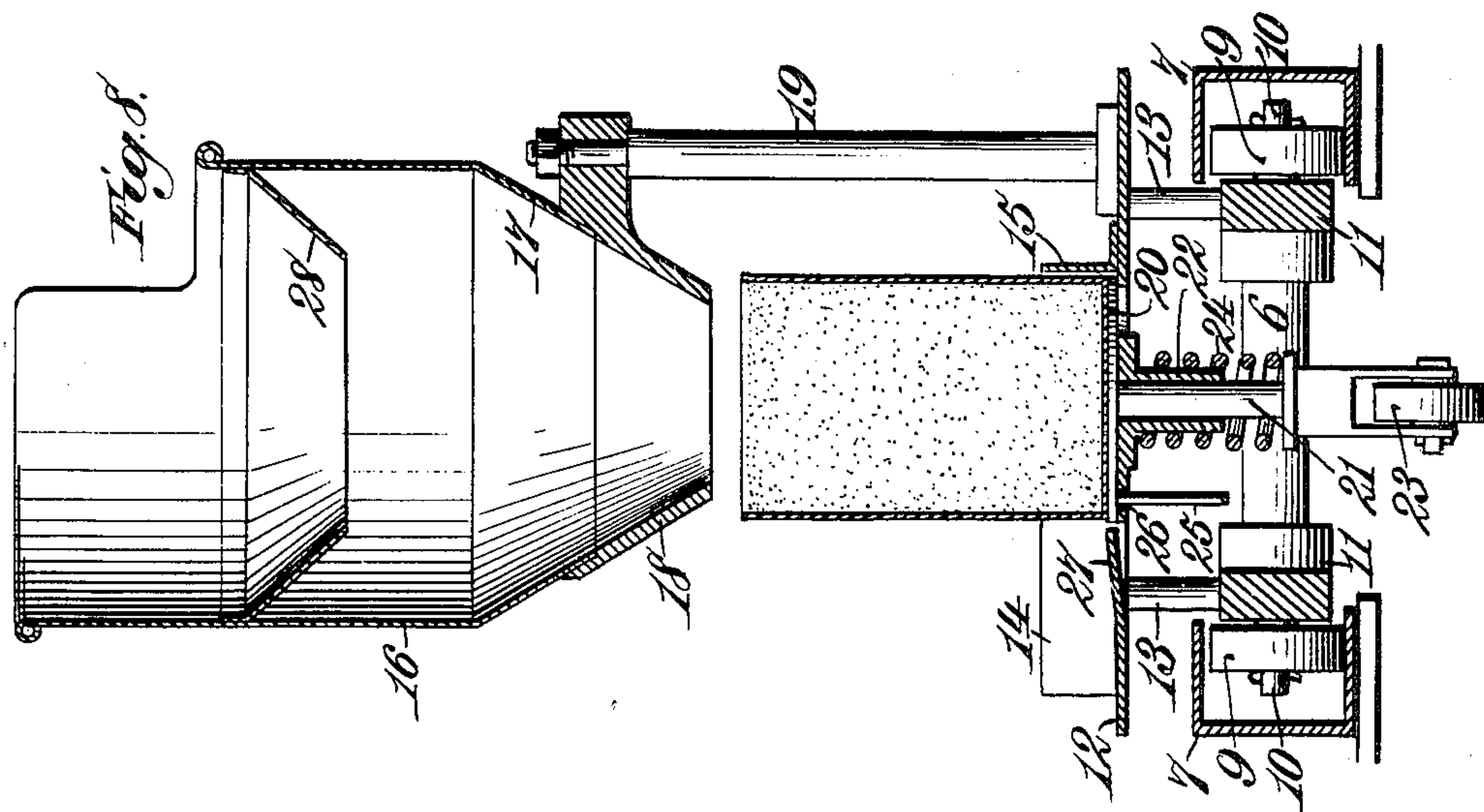
Inventor.
Frederick J. Engler.
By *James L. Norris*
[Signature] Att'y.

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3 SHEETS—SHEET 3.



Witnesses:
Robert Everett,
J. B. Keeler

Fig. 6.

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Atty.

UNITED STATES PATENT OFFICE.

FREDERICK J. ENGLIN, OF SOUTH OMAHA, NEBRASKA.

FILLING-MACHINE.

993,230.

Specification of Letters Patent.

Patented May 23, 1911.

Application filed January 22, 1910. Serial No. 539,522.

To all whom it may concern:

Be it known that I, FREDERICK J. ENGLIN, a citizen of the United States, residing at South Omaha, in the county of Douglas and State of Nebraska, have invented new and useful Improvements in Filling-Machines, of which the following is a specification.

My present invention relates to improvements in machines for filling cans or other receptacles with predetermined or measured charges of a commodity, and it has for its object primarily to provide an improved machine of this general class which is relatively simple in its construction and which is capable of rapidly filling cans or receptacles with measured quantities of a commodity and more especially materials of a powdery nature whereby the charges of material may be accurately measured and by the aid of hoppers which travel with the cans or receptacles and receive the measured charges of material and remain in operative relation with the cans, the powder is given ample opportunity to enter and fill the can or receptacle without loss or escape of the material so that each can or receptacle will with certainty receive a full charge of the material.

Another object of the present invention is to provide a machine of the class specified wherein the cans or receptacles to receive the material are carried past the charge-receiving position by means of a conveyer, and hoppers individual to the cans are mounted to travel with the conveyer and first receive the charges of material for the respective cans or receptacles and maintain an operative relation with the cans or receptacles for a period of time sufficient to insure a complete emptying of the contents of the traveling hoppers into the respective cans or receptacles, the construction of these traveling hoppers moreover being preferably such that they will cooperate with the mouths of the cans or receptacles and thereby serve not only to form a dust or powder-tight connection therewith, but will also insure a proper shaping of the can mouths.

Another object of the invention is to provide a can or receptacle filling machine having a conveyer for the cans or receptacles and hoppers to travel with the conveyer in connection with simple but efficient means

for first moving the cans into operative relation with the traveling hoppers in order that they may correctly receive the contents thereof and subsequently vibrating the cans or receptacles in order to agitate and thereby settle their contents, the cans and the respective traveling hoppers being moved to and from operative relation automatically as the cans or receptacles are carried from the filling point.

Other objects of the invention are to provide an improved form of reservoir adapted to contain the material with which the cans or receptacles are to be filled, the reservoir being preferably revoluble and carrying a series of measuring cups or receptacles which successively empty their contents into the traveling hoppers as the latter pass the filling point, suitable discharge valves being provided for the measuring cups which have means for automatically opening them to discharge their contents at the filling point.

To these and other ends, the invention consists in certain improvements, and combinations and arrangements of parts, all as will be hereinafter more fully described, the novel features being pointed out particularly in the claims at the end of the specification.

In the accompanying drawing: Figure 1 is a front elevation of a filling machine constructed in accordance with the present invention; Fig. 2 represents an end elevation of the apparatus as viewed from the left in Fig. 1; Fig. 3 is a top plan view of the apparatus, the ends of the conveyer, however, being broken away; Fig. 4 is a detail view of a portion of the hopper showing two of the valves and the means for operating them; Fig. 5 is a detail sectional view of one of the measuring cups and its discharge valve, this view showing one end of the shutter which cuts off the flow of material from the reservoir into the measuring cup as the latter approaches the filling position; Fig. 6 is a top plan view of one of the can supports detached from the conveyer; Fig. 7 is a detail sectional view of one of the can supports, its respective traveling hopper, and the mechanism for carrying the can into operative relation with said hopper, the parts in this view being shown in the relative positions they occupy after a charge of

material has been dumped into the traveling hopper; and Fig. 8 is a view similar to Fig. 7 showing the can or receptacle after it has received a full charge of material and is ready for removal from the conveyer.

Similar parts are designated by the same reference characters in the several views.

In the accompanying drawing, I have shown a machine which is capable of handling materials of different kinds. That form of the invention, however, is particularly adapted to fulfil the requirements of a filling machine for depositing measured quantities of powdery or dusty substances into cans or receptacles whereby ample opportunity is given the powdery material in which to settle into the cans or receptacles and the escape of the material in the form of dust is avoided or reduced to a minimum.

It will be understood, however, that that embodiment of the invention shown in the accompanying drawing is given essentially as an example, and that certain modifications and changes may be made in the construction and arrangement of the parts whereby the invention may be applied to the best advantage according to the circumstances of each particular case.

In the present instance, the machine comprises a suitable frame 1 having suitable standards 2 and 3 toward its opposite ends which support an endless conveyer which is preferably of the link type, a pair of sprockets 4 and 5 being journaled on horizontal axes upon the respective standards and the link conveyer 6 passes over the sprockets, the upper and lower stretches of the conveyer preferably lying substantially in horizontal planes. This conveyer carries supports for the cans or other receptacles that are to be filled, and in order to properly support the upper and lower stretches of the conveyer, pairs of opposed channel-shaped tracks 7 and 8 are preferably provided which form runways for rollers 9 which latter are journaled upon the pintles 10 which pivotally connect the conveyer links 11, the upper stretch of the conveyer thus forming in effect a flat and firm platform.

The supports for the cans or receptacles are suitably connected to the conveyer so that cans placed upon these supports will be successively carried to and from the filling position. In the present instance, each can support comprises a plate 12, a suitable number of these plates being rigidly attached to the conveyer at appropriate intervals, one of these plates in the present instance being attached to each alternate link of the conveyer by means of studs 13. The upper side of this plate is provided with a guard 14 which is open at one side of the conveyer and toward the opposite side of the conveyer it has a concentric portion 15 which conforms substantially to the cur-

vature or shape of the can or receptacle that is to be filled whereby a can inserted through the open side of the guard will be properly positioned with respect to the filling devices to be hereinafter described.

According to the present invention, a filling hopper is mounted to travel with each can or receptacle, such hopper being capable of receiving a full charge of the material and of emptying such charge into the can. The traveling hopper 16 in the present instance has a contracted or tapered bottom 17 which fits into a correspondingly tapered section 18, the latter being preferably formed of a casting or otherwise made rigid while the upper portion of the hopper may be composed of sheet metal. The section 18 of the traveling hopper is supported above the can support by means of a standard 19 which connects this section 18 to the plate 12. The bottom of the tapered hopper section 18 normally stands above the plate 12 a distance greater than the height of the cans or receptacles that are to be filled in order that the cans or receptacles may be inserted with facility beneath the hopper.

According to the present invention, the can or receptacle is lifted into a position to carry its mouth into engagement with the tapered hopper section 18 in order to form a suitably tight joint between the hopper and receptacle. In the present instance, a vertically movable can seat 20 is provided upon which the can or receptacle is mounted for the filling and settling operations, this seat in the present instance being arranged above the center of the plate 12 and is provided with a stem 21 which extends through a suitable guide or sleeve 22 secured to the under side of the plate 12 and is provided at its lower end with an operating roller or its equivalent 23. A spring 24 is interposed between the plate 12 and the stem and normally acts to hold the can seat in depressed position. Relative turning of the can seat about the stem 21 as a center may be prevented in any suitable way, a stud 25 extending downwardly from the seat in the present instance and operates through an aperture 26 formed in the plate 12. In order to facilitate the application of the cans or receptacles to the seat, an incline 27 is preferably formed in the plate 12 so as to provide an approach to the seat. In order to prevent the development of dust when the material is dumped into the traveling hopper, a frusto-conical flange 28 is preferably provided within this hopper and serves in effect to trap the material when it is dumped into the hopper.

As each can or receptacle upon the traveling support reaches a predetermined point, it automatically receives a charge of material. The filling mechanism shown in the present instance embodies a revoluble reser-

5 voir 29 which is arranged above the conveyer and is supported on a shaft 30, the latter being journaled in a suitable bearing bracket 31 which is rigidly secured to the base, and the bottom of the shaft 30 is supported in a suitable step bearing 32. This reservoir 29 may be of any suitable capacity and it is provided with a set of measuring cups 33 which depend from its bottom and are arranged at appropriate intervals with respect to the spacing of the can supports upon the conveyer. These measuring cups are preferably flared toward their lower ends in order to facilitate the dumping of their contents, and they communicate at their upper ends with the interior of the reservoir at all times except when they approach the discharging position. After each measuring cup has received a full charge of material, its communication with the reservoir is automatically cut off by means of a shutter plate 34 which is supported in stationary position within the revolving receptacle and covers the tops of the measuring cups while the latter are in proximity to their discharging position. This shutter may be supported in any suitable manner, a pair of rods 35 being shown in the present instance which are attached to a segmental member 36, the latter in turn being secured to a frame 37 which is secured to a suitable stationary part of the machine frame.

35 The bottom of each measuring cup is provided with a valve which controls the dumping of its contents, the operation of this valve being automatic. In the construction shown, a valve 38 is provided which is in the form of a plate which is mounted in pivotal relation to the measuring cup by a pintle 39 which latter is journaled in supporting lugs 40 formed at one side of the cup. In this construction, the valve in turning about the pintle 39 as an axis will cover and uncover the bottom of the measuring cup. In order to retain the valve 38 upon its seat, a spring 41 may be provided which in the present instance acts upon the pintle 39 and tends to draw the valve 38 into proper engagement with the bottom of the cup. Each valve is provided with an actuating rod 42 which is pivotally connected to the valve at 43 and is slidably supported at its inner end by a guide 44. In order to effect an automatic opening and closing of the valves, a cam 45 is provided which has a suitably shaped track or groove in which rollers or projections 46 upon the valve actuating rods 42 operate. This cam may be stationary, it having a suitable offset whereby the valve actuating rods for the respective measuring cups will be drawn inwardly to open the corresponding valves as the respective measuring cup reaches a filling position with respect to a receptacle on the conveyer, the upper end of each measuring cup being

closed by the shutter plate 34 while the valve at its lower end is open so that a properly measured quantity of material will be dumped into the traveling hopper for each receptacle.

In the handling of powdery materials, a certain amount of air becomes mixed therewith which renders it difficult to fill receptacles with proper quantities of material and, moreover, the air entrained in the material causes ordinarily a considerable waste owing to the development of dust. According to the present invention, the difficulties heretofore experienced in the handling of powdery materials are obviated by maintaining the relation between the filling hopper and the can or receptacle and vibrating the can or receptacle while its relation with the hopper is maintained, the traveling hopper being of a capacity that will enable it to instantly receive a full charge of the material as it passes the filling reservoir, while the can remains in operative relation with the hopper and is agitated to such an extent as will insure its receiving the full contents of the hopper. In the present instance, each can is carried into operative relation with its respective traveling hopper immediately before reaching the charge-receiving position by means of a track 47 which is stationary and coöperates successively with the rollers 23 upon the different can seats, the forward end of this track being inclined so that the can seats will be elevated to carry the cans or receptacles thereon into elevated position so that their mouths will be engaged by the flared bottom section 18 of the hopper, and toward the opposite end this track may be provided with a suitable number of notches, projections or equivalent devices 48 to engage these rollers and thereby impart a vibratory movement to the can seat whereby the contents of each can will be agitated in a manner that will effect an escape of the air and a settling of the contents. The lifting of the can mouths into engagement with the flared hopper bottoms also serves to correct any irregularities in the shape of the can mouths. Before the filled cans reach the opposite end of the conveyer, the rollers upon the can seats leave the track 47 permitting a lowering of the filled can and the latter may be then removed from the conveyer by any suitable means.

The conveyer and revoluble reservoir should be driven at such relative speeds as to insure a proper registration between each measuring cup upon the reservoir and one of the traveling hoppers on the conveyer. In the present instance, a driving shaft 49 is provided which is connected to the supporting shaft 30 of the revoluble reservoir by means of the bevel gearing 50 while the opposite end of this shaft may be connected

through bevel gearing 51 to one of the sprockets, it being shown connected to the sprocket 5 in the drawing.

In operation, the conveyer and the revoluble supply receptacle operate simultaneously and at such relative speeds that the traveling hoppers moving with the conveyer and the measuring cups revoluble with the supply receptacle will be brought successively into coöperative relation, the charges of material being dumped automatically and successively from the measuring cups into the traveling hoppers, the capacity of the latter being such as to permit a full charge of the material to be dumped quickly into the hopper. While the cans or other receptacles are passing the filling position and for a period thereafter, such cans or receptacles are held in elevated position so that their mouths form a substantially tight connection with the lower tapered ends of the respective hoppers above them. This relation which is so maintained between the can and hopper provides ample time in which all the material in the hopper may settle into the can or receptacle, so that the latter is certain to receive a full charge and there is no escape of the material in the form of dust or leakage. Moreover, the agitation to which the can or receptacle is subjected after it has almost received a full charge of the material insures a compacting of the material into the can or receptacle, such agitation aiding in the freeing of powdery material of entrained air. The prolonged period during which the can or receptacle remains in connected relation to the hopper also allows powdery materials ample time to fill the can or receptacle notwithstanding variations in the rate of flow of such material due to its hygroscopic properties.

The present invention provides a relatively simple but efficient machine for rapidly filling cans or other receptacles with commodities of different kinds, and while the machine shown in the present instance may be used to particular advantage in handling powdery materials, it will be understood that the invention is not so limited. Furthermore, it is to be understood that the invention is not limited to the filling of cans, as obviously receptacles of different kinds can be filled by machines constructed in accordance with the present invention.

I claim as my invention:

1. In a filling machine of the class described, the combination of a movable support for imparting traveling movement to a receptacle, a supply reservoir, a charge-holding hopper movable with said support and coöperative with a receptacle thereon, said hopper having a tapered outlet, and means operative to introduce the tapered outlet of said hopper into said receptacle to form a close connection between such parts

and to maintain such connection for a period sufficient to permit the receptacle to receive the entire contents of said hopper.

2. In a filling machine, the combination of a conveyer, a support movable therewith for imparting a traveling movement to a receptacle, a supply reservoir embodying means for forming charges of material, a charge-holding hopper mounted to move with said support and having a tapered discharge end, and means for forcibly introducing the tapered discharge end of said hopper into the mouth of a receptacle on said support to re-shape the mouth of said receptacle and to maintain a dust-tight connection between such parts after said hopper has received a charge of material from the supply reservoir.

3. In a filling machine, the combination of a traveling conveyer embodying a set of flexibly connected supports capable of movement transverse to the direction of movement of the conveyer, each conveyer embodying means for positioning a can or receptacle thereon, a supply reservoir, and a set of charge-holding hoppers individual to and mounted on said supports so as to move with said conveyer while such hoppers maintain an operative connection with receptacles mounted on said supports, each hopper having a tapered portion to enter the mouth of the respective receptacle and to cause the mouth of said receptacle to conform to the shape of such hopper.

4. In a filling machine, the combination of a traveling conveyer, a set of supports carried by said conveyer and embodying can seats movable vertically with respect thereto, a charge forming supply reservoir, a set of hoppers individual and fixed to said can supports so as to move with the conveyer, said hoppers being arranged to successively receive and hold full charges of material from said reservoir and having tapered portions arranged to enter and expand the mouths of the respective cans, and means for establishing and maintaining an operative connection between the tapered portions of said hoppers and the mouths of the respective cans or receptacles resting on said can seats for a predetermined period after such hoppers have received charges of material from the reservoir.

5. In a filling machine, the combination of a traveling conveyer, a set of supports carried thereby and embodying can seats mounted for vertical movement with respect to the supports, a charge forming supply reservoir, a set of hoppers individual to said can supports and secured to the supports of the conveyer, said hoppers being arranged to receive and hold full charges of material from said reservoir and having conical discharge ends to enter and form a true fit with the mouths of the respective

cans, and means for elevating the can seats to carry the mouths of the cans or receptacles thereon into engagement with the exterior of the conical discharge ends of the respective hoppers, to re-shape the mouths of the cans or receptacles and to form a close connection between such parts preparatory to the reception of the charges by said hoppers.

6. In a filling machine, the combination of a conveyer, a set of flat can supports flexibly connected to and carried by said conveyer and mounted for vertical movement with respect thereto, each can support being capable of supporting a can in upright position thereon, a set of charge-holding hoppers individual to and mounted rigidly on the can supports and connected to travel with the conveyer, a supply reservoir for successively depositing charges of material into such traveling hoppers, and means operative upon the can supports for establishing and maintaining an operative connection between the hoppers mounted rigidly on said supports and the respective cans or receptacles resting upon said supports subsequent to the reception by each hopper of a charge of material from said reservoir.

7. In a filling machine, the combination of a traveling conveyer embodying a set of flexibly connected supports carried thereby, each support embodying a can seat movable vertically with respect thereto, a charge-holding hopper carried by and mounted rigidly on each support of said conveyer and having a tapered bottom to enter the mouth of a can or receptacle resting on the can seat of said support to form a true and dust-tight fit with said can or receptacle, a supply reservoir for depositing a charge of material into said hopper, and means for producing a relative movement between said hopper and the can seat of said support to establish an operative connection between said hopper and a can or receptacle resting on said seat.

8. In a filling machine, the combination of a conveyer for advancing cans or receptacles to be filled, a supply reservoir having a shaft for mounting it revolubly, a set of measuring cups carried by said reservoir and operative to receive material therefrom, means for cutting off communication be-

tween the reservoir and the measuring cups as the latter approach discharging position, valves for closing the bottoms of the measuring cups, and means for automatically opening said valves to discharge the contents of the measuring cups embodying reciprocatory members operatively connected to the respective valves and revoluble with the reservoir, and an annular stationary cam coöperative with said reciprocatory members.

9. In a filling machine, the combination of a conveyer for feeding cans or receptacles to a filling position, a reservoir having a shaft for revolving it, a set of measuring cups carried by the reservoir and arranged to receive material therefrom, a plate mounted in stationary position within the revoluble reservoir and operative to close the entrances to the measuring cups as the latter approach the can-filling position, valves controlling the bottoms of the measuring cups, and means operative to automatically open the valves of the measuring cups to discharge the contents thereof while the entrances to such cups are closed by said stationary plate.

10. In a filling machine, the combination of an endless flexible conveyer embodying a plurality of longitudinally spaced supports, each support having a vertically movable can seat, a hopper having a standard which rigidly connects it to the respective support of the conveyer, the discharge end of each hopper being tapered, a reservoir embodying means for depositing charges of material successively into the hoppers, and a track having a smooth portion operative to lift the can seats with the cans thereon to forcibly introduce the tapered portions of the conveyers into the mouths of the cans to form and maintain a close connection between such parts, said track also having a toothed portion to impart vibratory motion to the can and the hopper while a close connection is maintained between such parts.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FREDERICK J. ENGLIN.

Witnesses:

THOMAS CREIGH;

JOHN B. LINDSEY.