No. 822,568. PATENTED JUNE 5, 1906.

E. B. ANDERSON.

CAKE FORMING MACHINE.

APPLICATION FILED AUG. 4, 1905.

4 SHEETS—SHEET 1.

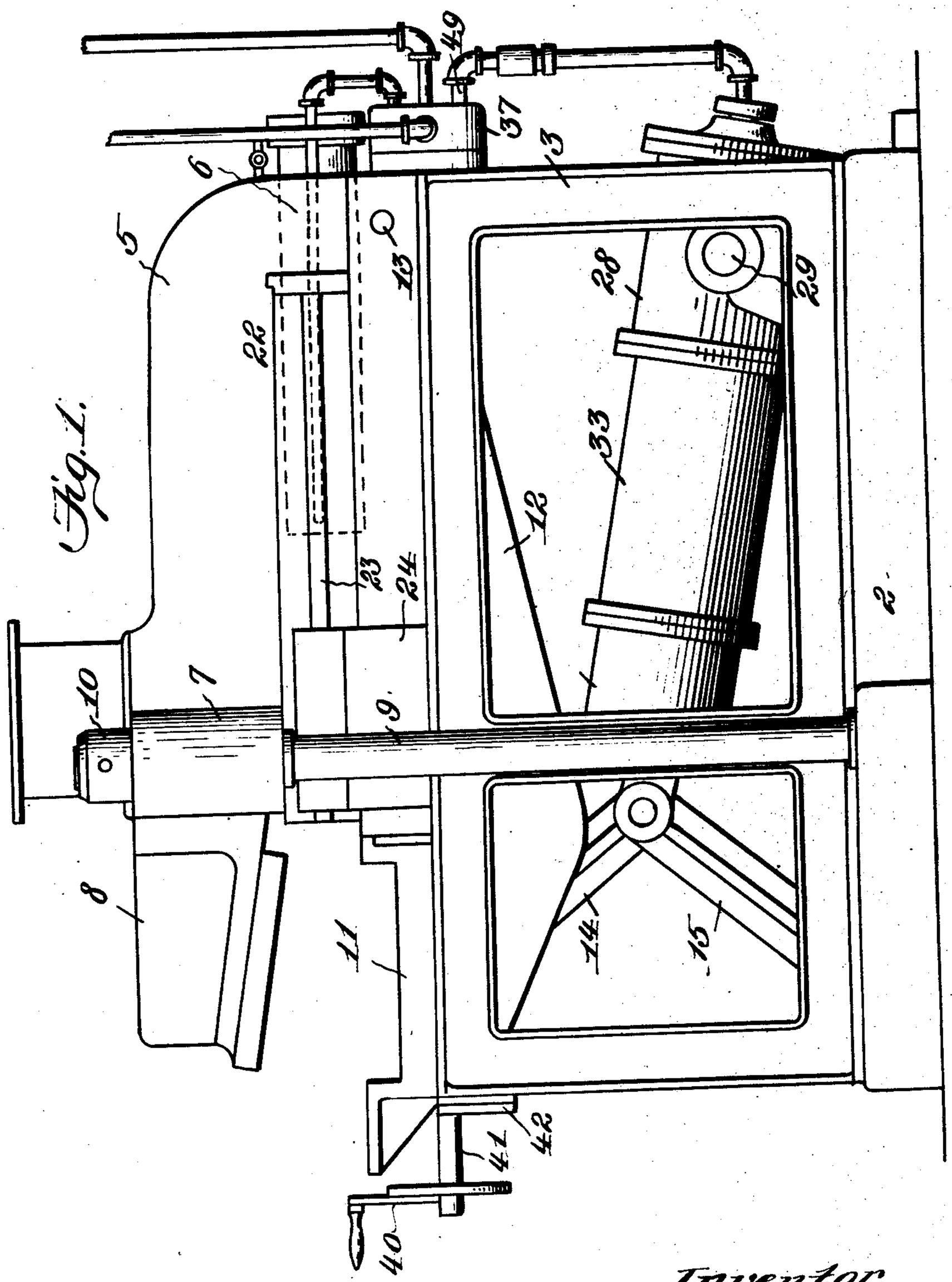

Fig. 1.

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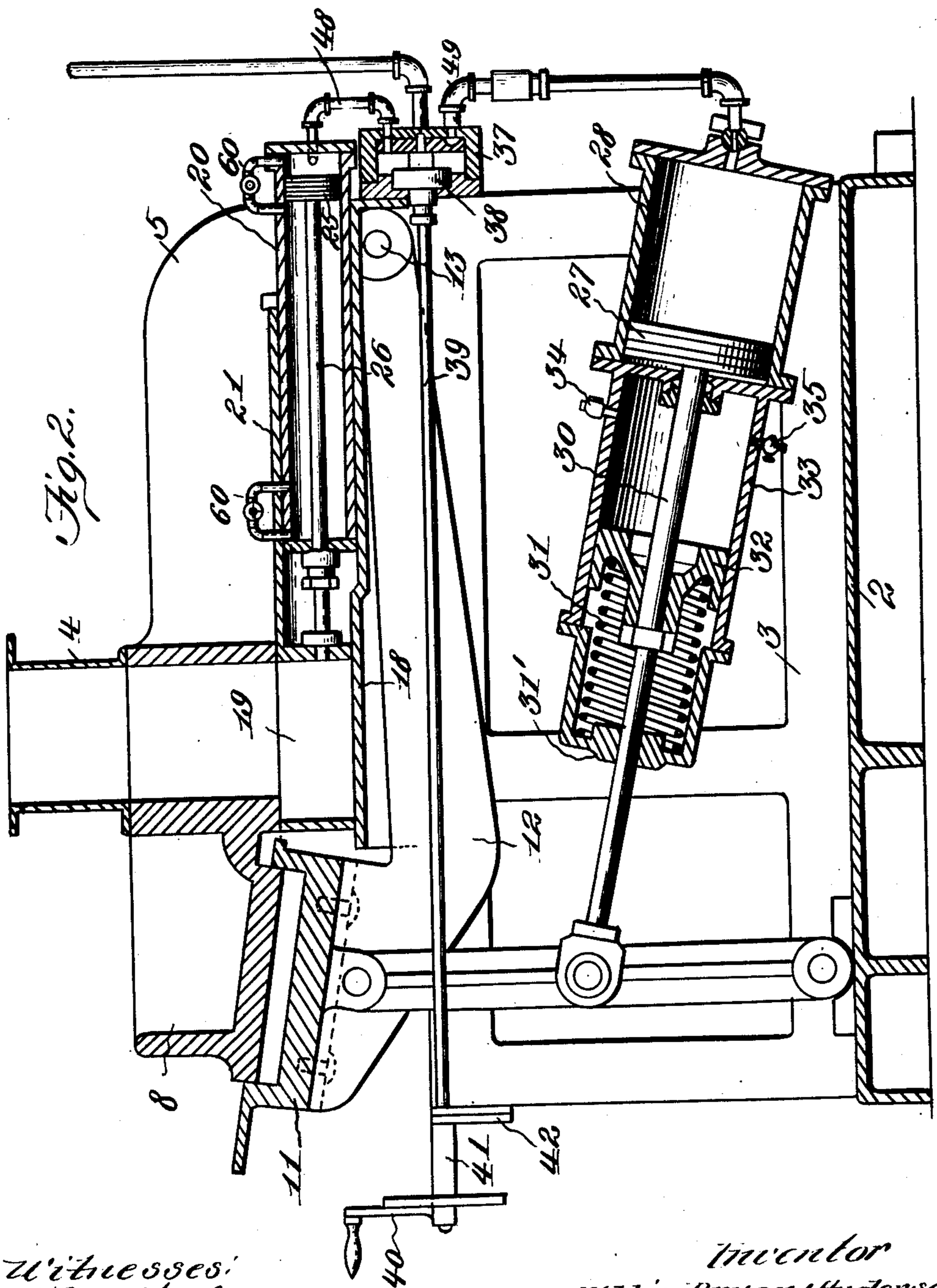
4 SHEETS—SHEET 2.

Fig. 2.



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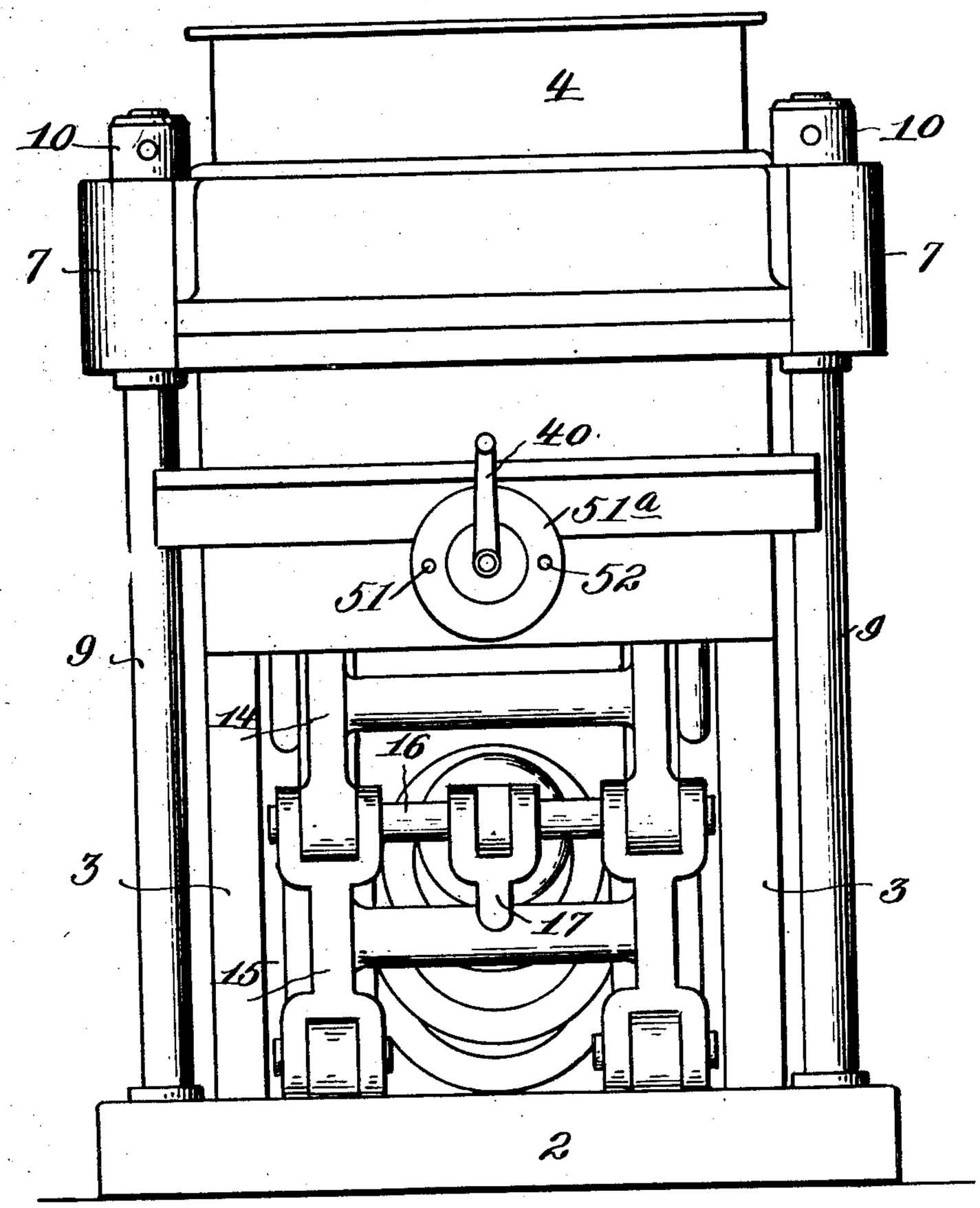
4 SHEETS—SHEET 3.

Fig. 3.



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4 SHEETS—SHEET 4.

Fig. 4.

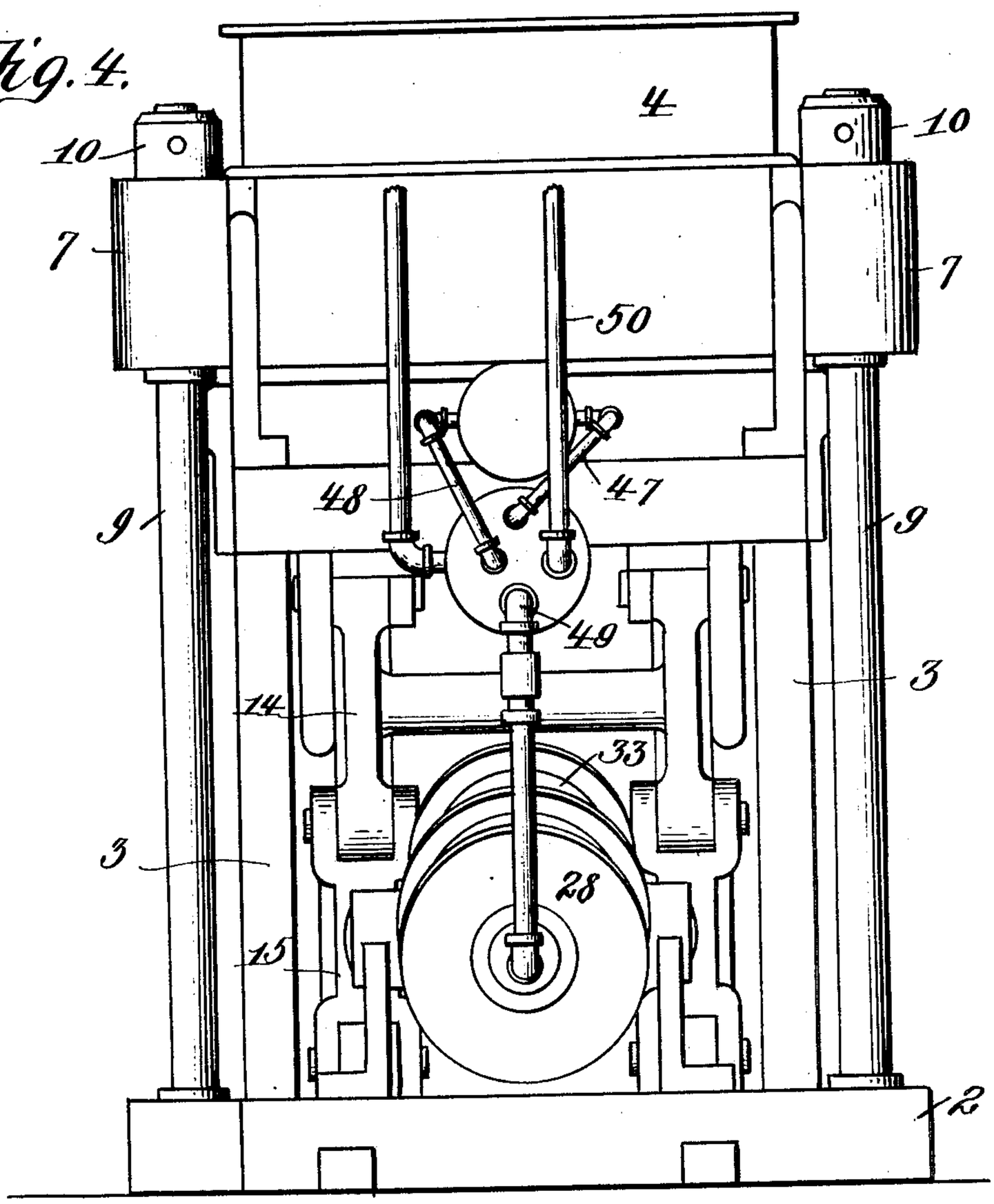


Fig. 5.

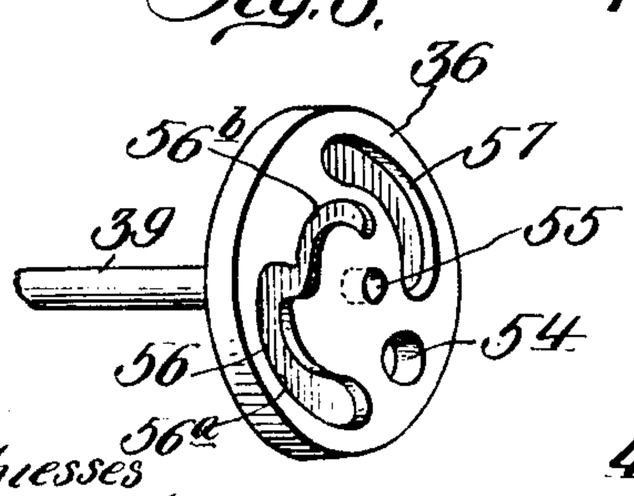
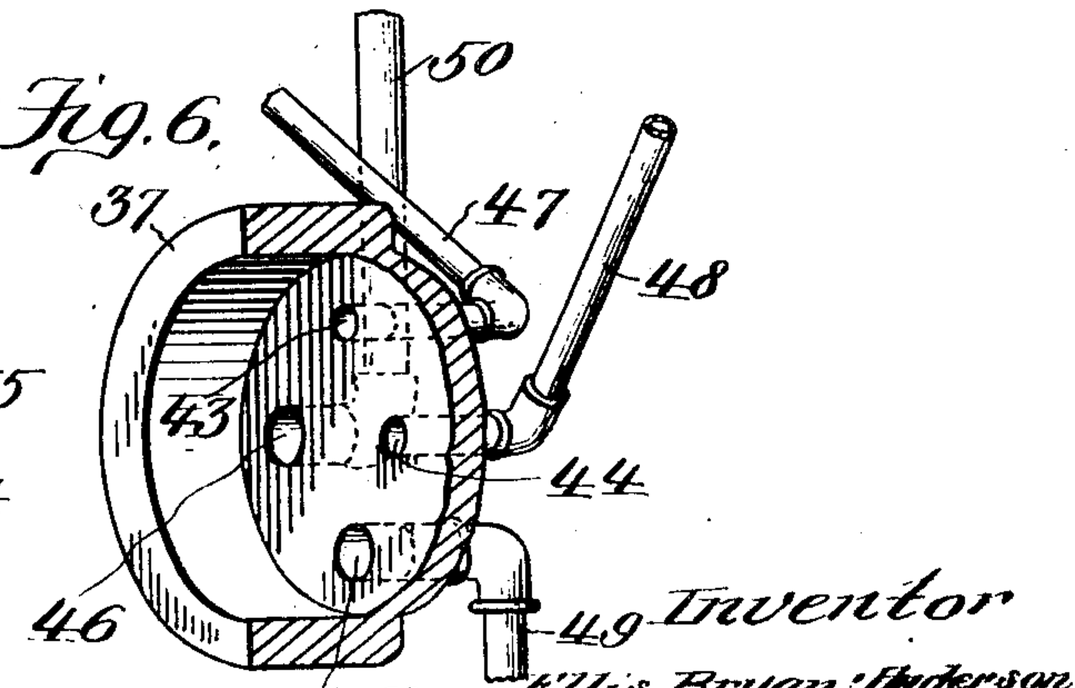


Fig. 6.



Witnesses
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By James L. Norris
Atty.

UNITED STATES PATENT OFFICE.

ELLIS B. ANDERSON, OF DEMOPOLIS, ALABAMA.

CAKE-FORMING MACHINE.

No. 822,568. Specification of Letters Patent. Patented June 5, 1906.

Application filed August 4, 1905. Serial No. 272,749.

To all whom it may concern:

Be it known that I, ELLIS BRYAN ANDERSON, a citizen of the United States, residing at Demopolis, in the county of Marengo and State of Alabama, have invented new and useful Improvements in Cake-Forming Machines, of which the following is a specification.

This invention relates to cake-forming machines.

The invention may be advantageously used in several connections, one of which is for molding cotton-seed meal into cakes preparatory to expressing oil therefrom. By the machine I can form these cakes with rapidity and uniformity.

The invention includes other objects and advantages which, with the foregoing, will be set forth at length in the following description, while the novelty of said invention will be included in the claims succeeding said description.

In the drawings accompanying and forming a part of this specification I illustrate a form of embodiment of the invention which I will set forth in detail in the description to enable those skilled in the art to practice the invention.

In the drawings, Figure 1 is a side elevation. Fig. 2 is a longitudinal sectional elevation. Fig. 3 is a front elevation. Fig. 4 is a rear elevation of a machine including my invention: Fig. 5 is a detail perspective view of the valve. Fig. 6 is a sectional detail perspective view of the valve-casing.

Like characters refer to like parts throughout all the figures of the drawings.

The framework involves in its make-up a base or bed, as 2, and side members, as 3, rising therefrom. These parts may be united together in any desirable manner—for example, by bolts.

To supply the cotton-seed meal to a charging or feed device for the cake-forming mechanism, any suitable means may be provided. For this purpose I have shown a hopper 4. The hopper 4 is represented as being in two suitably-connected sections, the lower of which may, as shown, be made integral with the plates 5, which extend rearward therefrom and which are provided at their rear ends with downwardly-offset portions, as 6, resting upon a table, hereinafter described, extending between and supported by the members 3. The two offset portions may be fastened to the table in any desirable way, as by bolts. Extending laterally from the plates 5 are shown partial sleeves 7, the parts being ordinarily made integral. In fact I may cast with said plates the platen 8, hereinafter more particularly described. In order to more securely uphold the hopper, the two plates 5, and the parts associated therewith, I represent columns, as 9, rising from the base. The feet of these columns are stepped in bearings upon the base and they extend near their heads through the partial sleeves 7, the latter resting upon annular shoulders upon the columns. Surrounding the columns above the partial sleeves 7 and threaded thereon are nuts, as 10, the said nuts bearing against said partial sleeves.

The platen 8, to which I have briefly alluded, constitutes part of the cake-forming mechanism, the other part thereof consisting of a box or tray, as 11, movable with respect to the platen and the sides of which are open, so that the end portions of the press-cloth can hang down from said sides. The box or tray in which the cake is really formed is supported upon an oscillatory swinging carrier consisting in the present case of complemental levers 12, arranged in parallelism and for up-and-down motion. The fulcrum for these levers is denoted by 13 and consists of a shaft extending transversely of the machine and supported by the frame members 3 near their upper rear corners. The box or tray 11 is fastened, as by bolts, to upwardly-extending portions at the free or forward ends of the two levers, bolts serving as a simple means to unite the box and levers. The box and the two levers present a structure of substantially yoke form.

To impart the working or up stroke to the box or tray 11, whereby it will be caused to approach the platen 8 to form the mass of meal in the box into the necessary compact state, I show a toggle, the upper member being denoted by 14 and the lower by 15. The upper toggle member is practically of **H** form, its side branches being suitably jointed to the under surface of the box or tray near the opposite sides thereof. The lower toggle member is substantially of **H** form, its side branches being connected to the side branches of the upper toggle member by a shaft, as 16, which shaft also extends through an arm, as 17, extending upward from the lower toggle member. The latter is jointed to bearings in some suitable way upon the upper side of the base. As the toggle is

straightened, as will hereinafter more particularly appear, the box or tray 11 is elevated, and by reason of the toggle described I apply equal pressure thereto throughout its entire extent. I produce, in effect, a double toggle operatively connected, the result being that the cake formed is of absolutely uniform thickness, which is a feature of considerable importance. In addition to this the toggle described possesses unusual strength.

The platen 8 has its under side or working face upon a slant or angle, by virtue of which it can secure proper uniform compression of the mass in the box as the latter approaches upon an angle the platen, the latter entering the box when the upper working stroke of the latter is completed. In view of the fact that the box is upon an oscillatory carrier I can secure a high degree of compression without undue power, although by a toggle mechanism such as that described I can secure a high degree of compression, the compression by virtue of the mechanism hereinafter described for straightening the toggle progressively increasing as the box or tray 11 rises. When the box or tray 11 is in its charge-receiving or ineffective position, the toggle composed of the members 14 and 15 will be flexed, as indicated in Fig. 1, said box or tray 11 at this time resting upon the upper forward side of the framework or side members 3 thereof. When the actuating agent for the toggle mechanism is thrown into action, the toggle will be at once straightened, so that the box or tray will be elevated upon an arc struck from the center of the two levers 12, the latter being of course swung upward. When the toggle members are nearly straight, the platen will enter the upper open side of the box or tray, and as the final movement of the toggles toward their straightened relation is continued the mass in the box will be given a powerful and uniform pressure, so as to properly compact the cake into the desired density for subsequent advantageous handling.

Extending between the tops of and suitably associated with the side members 3 of the framework is a stationary table, as 18, the forward side of which (and upon which forward side a charging device, as 19, reciprocates) constitutes the effective portion, a cylinder, as 20, being set into a longitudinal groove located to the rear of the hopper 4. The cylinder is fastened in place in any desirable way. The charging device is shown as consisting of a rectangular box open at its top and bottom and which when in its rearward position, as indicated in Fig. 2, has its opening registering with the outlet of the hopper 4, so that material can descend from the hopper into the charging device and onto the effective portion of the table, which effective portion, as will be understood, is horizontally disposed.

In Fig. 1 the parts are represented as being in their normal positions, the cake box or tray 11 resting upon the framework and the charging device 19 being in its backward position, in which position it is also represented in Fig. 2. In said Figs. 1 and 2 it will be understood that the charging device is full of meal and that the tray is in its normal position, as shown in said Fig. 1. It should be stated at this point that when the tray or box 11 is in its normal position its upper edge is in the plane of the upper edge of the table. It therefore follows that when the charging device is advanced with the box or tray in its normal position the contents of said charging device will be pushed along the forward side of the table and into the tray, so that when the charging device has completed its working stroke it will have supplied to the box or tray 11 a mass of material sufficient to form a cake of the requisite size. As the charging device is moved rearward it sweeps off surplus material and smooths off the top of the mass in the box or tray 11. Extending rearward from the upper rear side of the charging device and of equal width therewith is a cut-off 21, horizontally disposed. When the charging device is moved forward, the cut-off is carried under the delivery end of the hopper 4, so as to prevent material therein dropping therefrom onto the table 18 when the charging device is forward of its normal position. The cut-off 21 is operative throughout the entire movement of the charging device. Extending downward from the opposite sides of the cut-off 21 are flanges, as 22, provided with ribs, as 23, adapted to traverse grooves in the guide-plates 24, fastened to and rising from the side members 3 between their front and rear ends. The ribs and grooves may be of dovetailed form, if desired.

It will be remembered that I have mentioned briefly a cylinder 20. In this cylinder is mounted for reciprocatory movement a piston 25, the rod 26 of which is shown as connected with the charging device 19. The piston 25 is shown as being at the end of its rear stroke in Fig. 2. When it is propelled forward to the limit of its movement, the charging device through the intermediate rod is advanced so as to carry a mass of meal into the cake-box or tray 11. When the piston is returned to its primary position, in which it is shown in Fig. 2, it returns the charging device to a place under the hopper, so as to receive a fresh supply of meal. I will describe hereinafter means for supplying steam to the cylinder to cause the back-and-forth motion of the piston therein. I might state at this point that the agent for operating the piston 25 back and forth may be of any suitable kind. I find steam to be a satisfactory medium for such purpose and for also operating in a forward direction a second piston, as 27, movable back and forth in a

second cylinder, as 28, shown located below the first-mentioned cylinder. The cylinder 28, however, is mounted for rocking motion, it having at its opposite sides trunnions or stub-shafts, as 29, supported for rocking motion by bearings upon the base 2 of the machine. The rod for the second piston is designated by 30, and it is connected with the toggle hereinbefore described at the joint of the two members 14 and 15 thereof. The shaft 16, which connects said toggle members, is shown as extending through the outer end of the piston-rod 30 for such purpose. By virtue of the mounting of the lower cylinder in a swinging manner the same can be bodily elevated as the toggle composed of the members 14 and 15 is being straightened by the power of the advancing piston 27, so that in this way the progressively-increasing pressure upon the mass in the box or tray is assured as the said toggle straightens. The piston 27 in the present case is moved only in a forward direction by steam or an equivalent fluid, while the piston 25 is moved in opposite directions by such agent, be it steam or its equivalent.

The piston 27 is shown as retracted by spring means, a single spring 31 being shown for the purpose. This spring encircles the rod 30 and bears at one end against the cap 31′ and at its opposite end against a collar 32, fastened to the rod 30. The cap 31′ is represented as fastened to a tube or cylinder 33, having a closed inner end, which is fastened to one end of the cylinder 28. The closed end of the tube or cylinder 33 constitutes really the inner or forward head of the cylinder 28, and the rod 30 extends through a central perforation in it and also through an alined perforation in the cap 31′. When the piston 27 is moved forward and it is shown as occupying its extreme forward position in Fig. 2, it, as will be understood, straightens the toggle, composed of the two members 14 and 15, so as to secure the elevation of the box or tray 11. As the piston is moved forward it places the spring 31 under compression, the maximum compression being reached when the piston is at its extreme forward position. When, therefore, steam is exhausted from back of the piston 27 the spring by relaxing returns the piston to its original position, the toggle being flexed by the power of the spring. As soon as the toggle is flexed the box or tray can fall by its weight, augmented by the weight of the levers against the frame, thereby aiding the spring. The downward movement, however, of the box or tray is checked, and I will describe the means illustrated for securing this advantageous result. The collar 32, in addition to serving as such, also serves as an auxiliary piston, for it will be seen that it traverses the inner surface of the auxiliary cylinder or tube 33 as the piston 27 moves back and forth. The said auxiliary cylinder or tube 33 has an opening controlled by an inwardly-opening check-valve 34, said cylinder or tube 33 also having an air-vent 35, serving its customary purpose. As the piston 27 is moved forward the collar or piston 32 will be simultaneously advanced, and when said collar or piston has uncovered the opening controlled by the check-valve said collar or piston draws into the auxiliary cylinder or tube 33 air, which air is utilized to check the return movement of the piston or collar 32 and necessarily of the parts which move therewith, one of which is the box or tray, as will be evident. The vent 35 provides for the discharge of air from the auxiliary cylinder 33 in a slow manner, so that the checking action indicated is assured.

In the form of the device illustrated I show a single valve for controlling the supply of steam to and the exhaust thereof from both cylinders 20 and 28. The valve represented for the purpose is designated by 36, it being of the disk form, and being mounted for turning movement in a casing, as 37, mounted in some fixed manner upon a flange depending from the rear of the table 18. The valve is shown provided with a head 38, connected therewith by a neck, and arranged to turn in a recess in the inner wall of the casing. By the construction described the valve is balanced, for steam fills the casing in the space between the valve and its head 38. I have shown a stem 39 as extending forward from the head the entire length of the machine and as having at its extreme forward end an operating device, such as a hand-crank or lever 40, fastened thereto in any desirable way. The said stem near its extreme forward end is supported by a bearing-sleeve 41 extending outward from a plate 42, fastened to the forward side of the framework or to a cross-plate connecting the upper forward sides of the frame members 3, as clearly shown in Figs. 1, 2, and 3.

In the outer wall of the valve-casing 37 are four ports 43, 44, 45, and 46. From the port 43 a pipe 47 extends and leads to the outer end of the cylinder 20. From the port 44 a pipe 48 leads to the forward or inner end of said cylinder. From the port 45 a pipe 49 leads to the front end of the cylinder 28. From the port 46 the pipe 50 extends and opens into the atmosphere. The valve moves through half of a circle, its limits of motion being indicated when the hand-crank 40 strikes diametrically opposite pins, as 51 and 52, on the disk 51^a rigid with the bearing-sleeve 41. The disk and sleeve may be readily made integral. The crank is shown in Fig. 3 as being in its normal position. When it is swung down to the left in said figure and strikes the stop 51 and then returned, the charging device 19 will during such motion be first moved forward and then back-

ward. When the crank is swung downward to the right and onto the stop-pin 52, the piston 27 is operated so as to secure the formation of a cake from the mass of meal in the box or tray 11, as previously indicated. The three ports 43, 45, and 46 are equal distances from the center of motion of the valve. The port 44 is nearer said center, however, and the reason for this will hereinafter appear.

Extending through the valve are two ports 54 and 55, the port 54 being the same distance from said center as the ports 43, 45, and 46 and the port 55 being the same distance from said center as said port 44. The reason for this will hereinafter appear. In the inner face of the valve are formed two exhaust-channels 56 and 57. The exhaust-channel or passage 56 consists of two concentric portions 56^a and 56^b, connected by a substantially radial neck. The portion 56^a is upon a greater radius than the portion 56^b, but is of the same radius as the channel 57 and is also the same distance from the center of motion of the valve as the ports 43, 45, and 46. The portion 56^b is the same distance from the center of motion of said valve as the port 44.

It will be assumed that the tray or box 11 is resting upon the framework, that both cylinders 20 and 28 are free of steam, and that the charging device 19 is in its backward position full of meal and under the supply-hopper 4. To charge the box or tray with a supply of material, the hand-crank 40 will be swung down to the left, in Fig. 1, until it strikes the stop-pin 51. This will bring the port 54 in the valve 36 into register with the port 43, whereby steam from the valve-casing can flow into the pipe 47 to be supplied to the rear or outer end of the upper cylinder 20. When steam enters said cylinder, the piston 25 therein is advanced to its extreme forward position, so as to through the rod 26 move the charging device to a position over the box or tray in order to supply the latter with a mass of material from which a cake may be subsequently formed. When the crank 40 is upon said stop-pin 51 and when the ports 54 and 43 are in register, one end of the portion 56^b of the compound exhaust channel or passage 56 will be in communication with the port 44, while the portion 56^a of said channel will extend across the port 46, so that the cylinder 20, forward of the piston 25, will be in uninterrupted communication with the atmosphere to permit the free advance motion of the piston therein. When the crank reaches a point midway between the stop-pin 51 and its vertical position, the port 55 will be put into register with the port 44, so that steam can pass from the valve-casing into the pipe 48 and enter the inner or forward end of the cylinder 20 and forward of the piston 25 therein. Simultaneously the greater radial portion 56^a of the compound exhaust-channel will bridge the ports 43 and 46, so as to permit the piston to be driven rearward by the live steam entering the cylinder by way of the pipe 48. The exhaust-steam to the rear of said cylinder will enter the pipe 47, then the portion 56^a of the compound channel 56, then the port 46, and finally the exhaust-pipe 50. It will therefore be evident that as the crank swings down and is returned the piston 25 is moved forward and then backward in its cylinder 20 and that the exhaust is properly taken care of, what is one supply-pipe at one time being at the next period an exhaust-pipe.

It will be assumed that the piston 25 has been moved forward and then back to charge the box or tray 11 with a supply of meal. To form the meal into a cake, it is necessary, as previously indicated, to elevate the box or tray so that the mass of material therein will be carried against the platen 8. To secure the elevation of the tray or box 11, the crank 40 is swung down toward the right in Fig. 3 until it strikes the pin 52. This will put the port 54 in register with the port 45, so that steam can flow from the valve-casing 37 into the pipe 49 and can enter the forward side of the lower cylinder 28 to drive the piston 27 therein forward. When the crank is moved to its vertical position from off the pin 52 and when it has moved half the distance, the exhaust-channel 57 will be caused to bridge the ports 45 and 46, so as to permit the steam back of the piston 27 to flow out of the pipe 49 into the channel 57 into port 46, and finally into the pipe 50, where it can reach the atmosphere. It will be understood that as soon as either one of the ports 54 or 55 is moved out of register with any of the ports 43, 44, and 45 the supply of steam to said ports is at once cut off. Ordinarily a cloth is laid in the tray or box 11 with equal lengths of the ends hanging down, the meal being fed onto this cloth by the charging device.

As previously stated, I have set forth in detail the construction of the machine illustrated in the drawings for the purpose of enabling those skilled in the art to practice the invention. It will be obvious that material variations as to a number of features may be made within the scope of my claims. At opposite ends of the cylinder 20 I show by-pass pipes, as 60, each equipped with a check-valve. This construction provides for the cushioning of the piston 25 when the same is substantially at the opposite ends of its stroke, whereby injury to the part 19 will be prevented.

Having thus described the invention, what I claim is—

1. In a machine of the class described, cake-forming mechanism involving a movable member, an oscillatory carrier for said movable member, and means for actuating

the latter said carrier being supported independently of said actuating means.

2. In a machine of the class described, cake-forming mechanism involving a movably-mounted member, a pivotally-mounted swinging device for carrying said movable member, and means for actuating the latter said carrier being supported independently of said actuating means.

3. In a machine of the class described, cake-forming mechanism involving a movably-mounted member, a pair of levers supported by the framework of the machine, for carrying said movably-mounted member and connected by it, and means for actuating said movably-mounted member.

4. In a machine of the class described, cake-forming mechanism involving a movably-mounted member, a carrier for said movably-mounted member supported for oscillation by the framework of the machine, and a toggle for actuating said movably-mounted member to form a cake.

5. In a machine of the class described, cake-forming mechanism involving a movably-mounted member, an oscillatory carrier for the said movably-mounted member, and an actuating-toggle for said movably-mounted member, comprising two elements, each laterally separated and operatively connected, one of the toggle elements being connected with the under face of the movably-mounted member near the opposite sides thereof.

6. In a machine of the class described, cake-forming mechanism involving a platen and a tray, adapted to move toward and from the platen, an upper toggle member of substantially H shape, the branches of which are jointed to the under side of the tray near the opposite ends thereof, and a lower substantially H-shaped toggle member connected with the upper one, a shaft constituting a connection between the toggle members, the transverse portion of the lower toggle member having an upwardly-extending arm through which said shaft passes, and means for operating the toggle.

7. In a machine of the class described, cake-forming mechanism involving a movably-mounted member, a carrier for the movably-mounted member supported for oscillation by the framework of the machine, a toggle, one member of which is connected with the movably-mounted member, a cylinder supported for oscillation by the framework of the machine, and a piston in the cylinder adapted to actuate the toggle and thereby the movably-mounted member to form a cake.

8. In a machine of the class described, cake-forming mechanism comprising a stationary platen and a movably-mounted tray, the working face of the platen being upon a slant, a carrier for the tray mounted to present the tray angularly to the platen, a toggle connected with the tray and for actuating the tray to form a cake, a swinging cylinder, and a piston in the cylinder to operate the toggle to cause the latter to actuate the tray in a direction to form a cake.

9. In a machine of the class described, cake-forming mechanism, charging mechanism therefor, fluid-actuated means for operating the cake forming and charging mechanisms in sequence, means for supplying a fluid to said fluid-actuated means, and a single valve for controlling the supply of fluid to and the exhaust of such fluid from the said fluid-actuated means.

10. In a machine of the class described, cake-forming mechanism involving a tray, a toggle coöperative with the tray, mechanism for actuating the toggle to straighten it, a hopper, a charging device located normally under the hopper and capable of advancing movement from said normal position to supply the tray with material, a cut-off device for the hopper, connected with the charging device, and mechanism for actuating the charging device.

11. In a machine of the class described, cake-forming mechanism involving a relatively stationary platen, and a movably-mounted tray, the working face of the platen being upon a slant, an oscillatory carrier for the tray, adapted to present the tray angularly to the platen, and mechanism for moving the tray toward and from the platen.

12. In a machine of the class described, cake-forming mechanism involving a relatively stationary platen and a movably-mounted tray, the working face of the platen being upon a slant, an oscillatory carrier for the tray, adapted to present the tray angularly to the platen, a toggle connected with the tray, and mechanism for actuating the toggle to move the tray toward and from the platen.

13. In a machine of the class described, cake-forming mechanism involving a platen, the working surface of which is upon a slant, and a tray, a pair of parallel levers connected by the tray and constituting a carrier therefor, a toggle connected with the tray, and mechanism for actuating the toggle to move the tray toward and from the platen.

14. In a machine of the class described, cake-forming mechanism involving a relatively stationary platen and a tray or box, means for charging the box with material, a toggle connected with the box, a swinging cylinder, a piston in the cylinder, a rod connected to the piston and to the toggle at the joint of the members thereof, means for admitting a fluid agent into the cylinder to advance the piston and cause the straightening of a toggle, a collar on the rod, and a spring acting against the collar, said spring being adapted to be placed under compression on the working movement of the piston,

whereby when the latter is freed of steam, the piston will be returned to its retracted position by the power of the spring.

15. In a machine of the class described, cake-forming mechanism involving a platen and a tray, the latter normally resting upon the framework, a hopper to contain material, a table under the platen, an open charging device adapted to be moved back and forth upon the table, and when in its backward position, to be supplied with material from the hopper, and when moved forward to carry the material within it over the table into the tray, means for actuating the charging device, a cut-off for the hopper, movable into its operative position as the charging device is advanced, a toggle for operating the tray, a swinging cylinder, a piston in the cylinder, coöperative with and adapted, on its advancing movement, to straighten the toggle and move the tray from its normal position, and means for admitting a fluid agent into the cylinder to cause the advance of said piston.

16. In a machine of the class described, cake-forming mechanism involving two members, one movable relatively to the other, a charging device for the said movably-mounted member, mechanism for actuating the movably-mounted member and charging device, involving separate cylinders, pistons in the cylinders, a casing having four ports, pipes leading from two of the ports to the opposite ends of one of the cylinders, pipes leading from the third port to one end of the other cylinder, a pipe leading from the fourth port to the atmosphere, a disk valve adapted to move against that face of the casing in which said ports are formed and having two ports through it, adapted to register with the other ports, and also having on one of its faces two concentric exhaust-channels adapted to coöperate with said first-mentioned ports, one of the channels being composed of two portions of different radii and a neck connecting the same, and manually-controlled means for actuating the valve.

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

ELLIS B. ANDERSON.

Witnesses:
W. S. PROUT,
L. C. LOWE.