No. 786,608. PATENTED APR. 4, 1905.

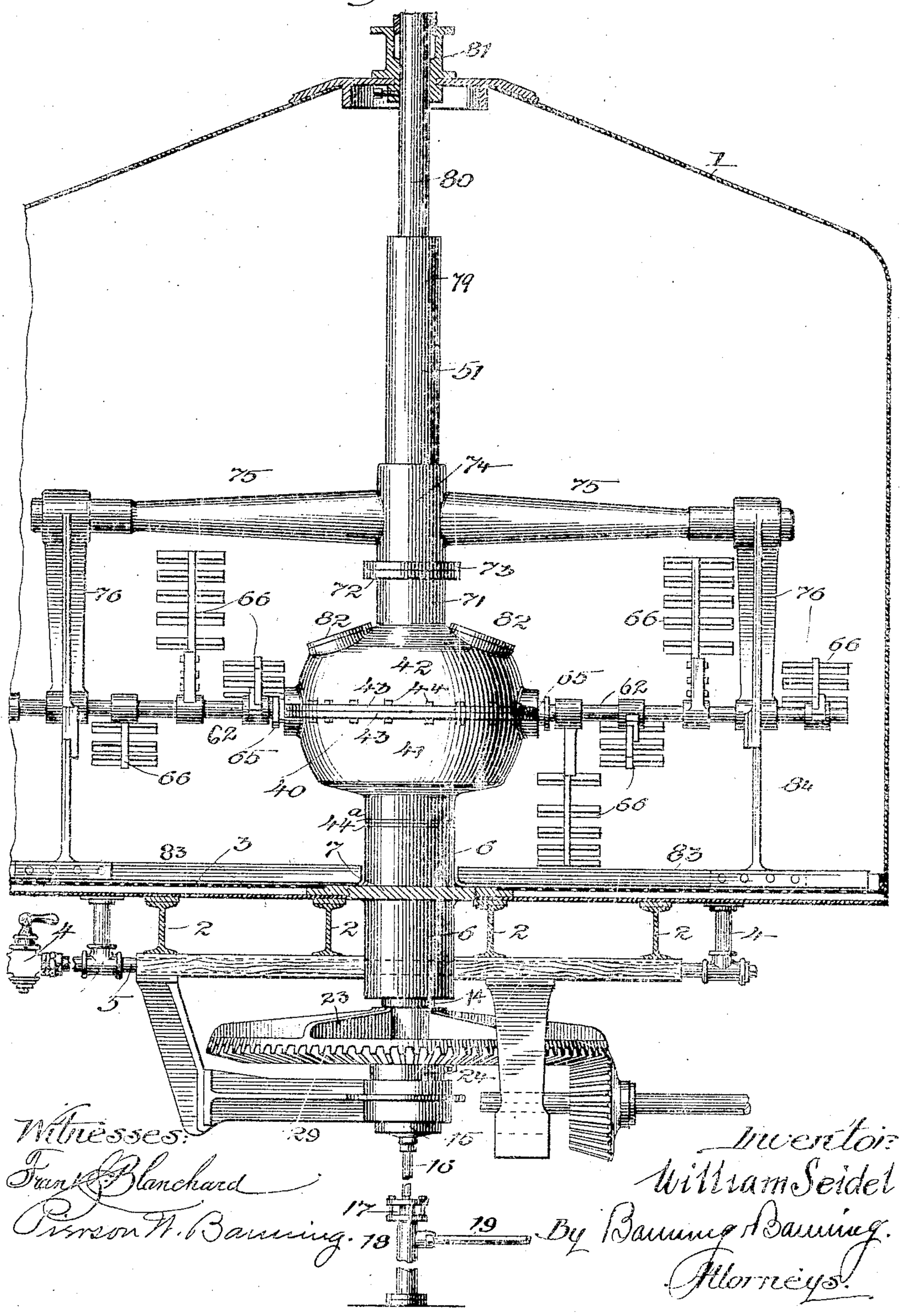
W. SEIDEL.

MASHING MACHINE.

APPLICATION FILED OCT. 27, 1904.

4 SHEETS—SHEET 1.

Fig. 1.



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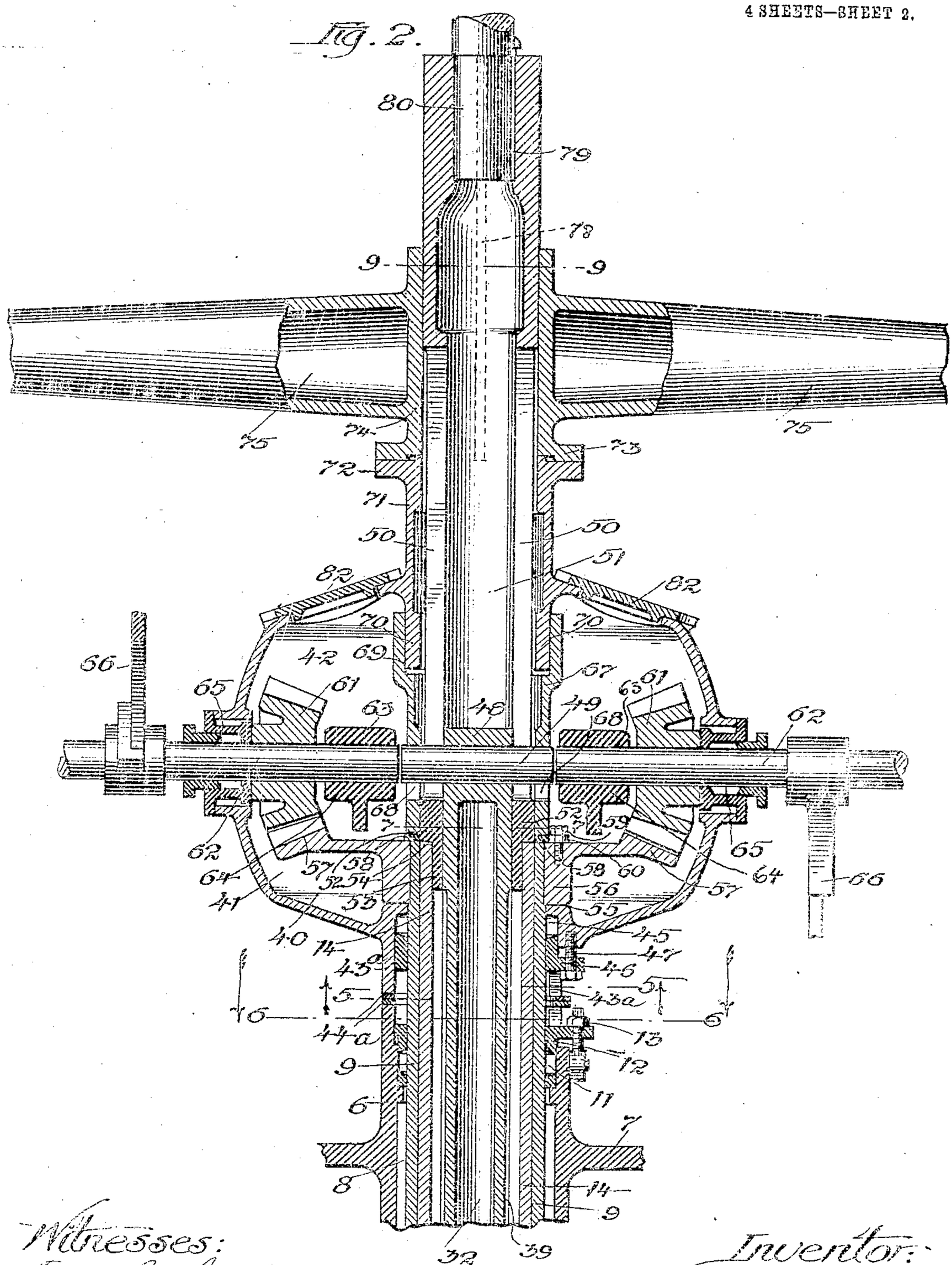
4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 3.

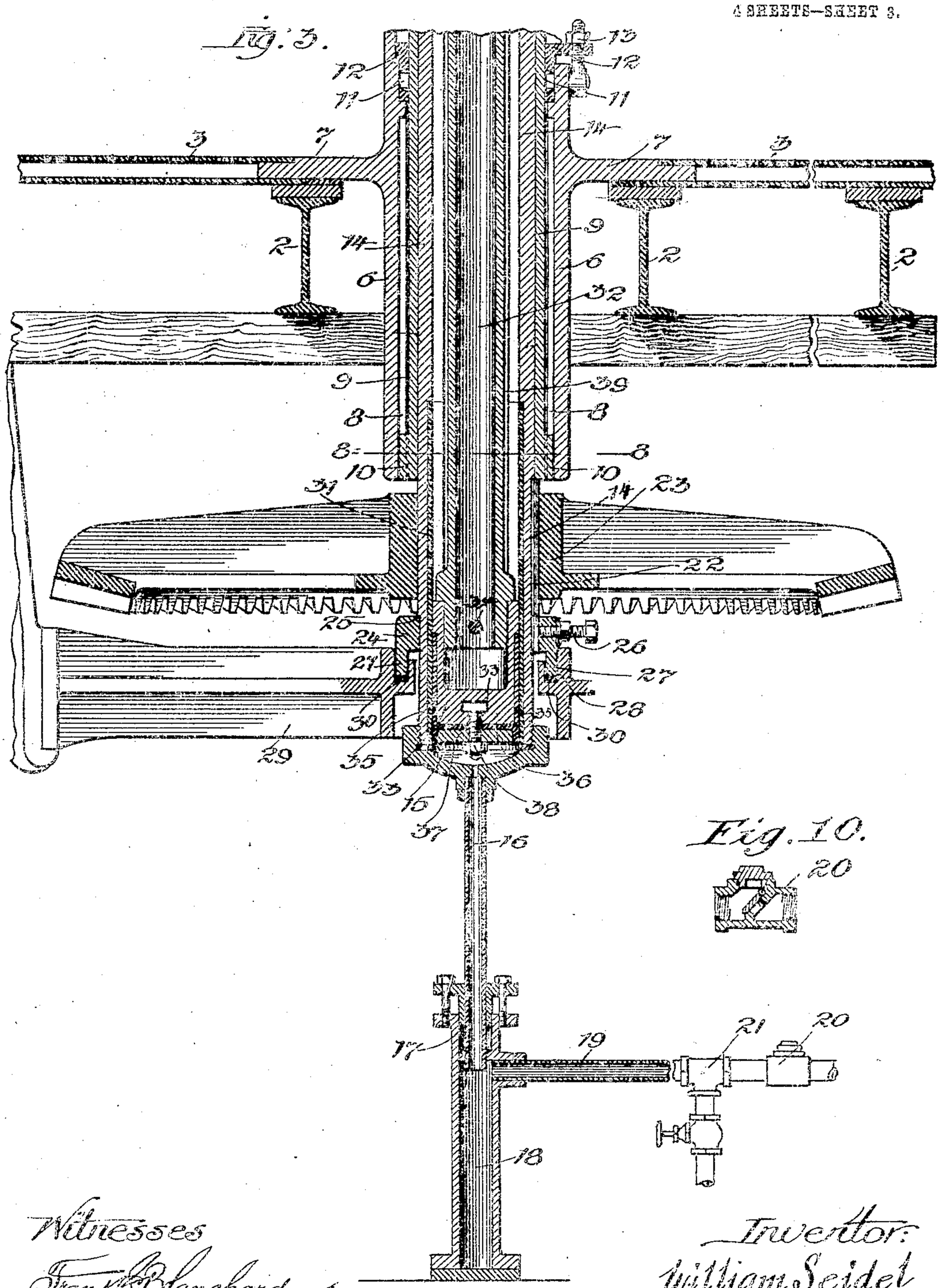

Fig. 10.

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4 SHEETS—SHEET 4.

Fig. 4.

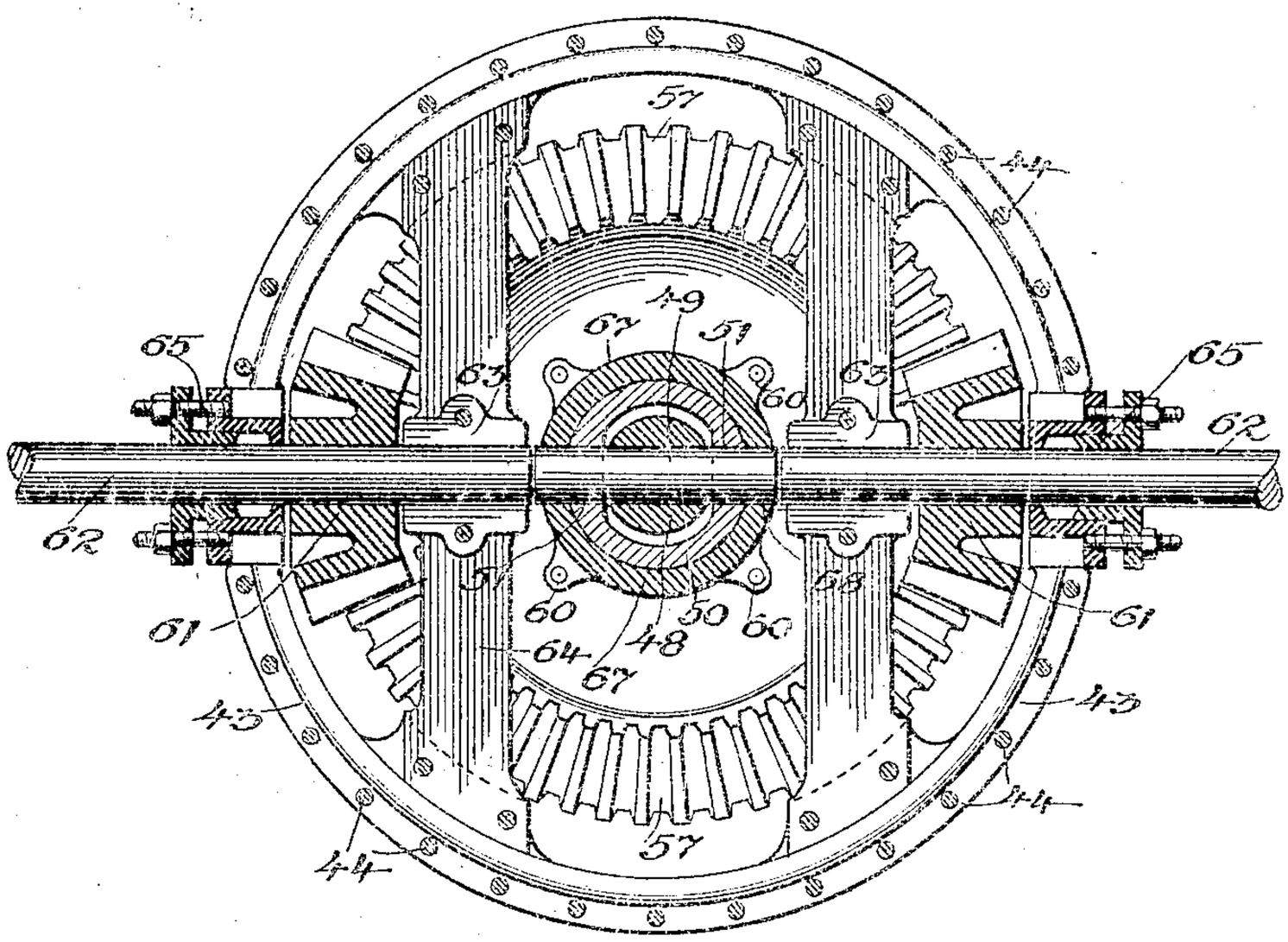


Fig. 5.

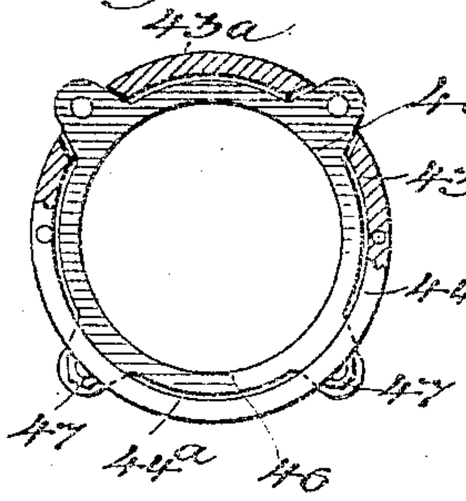


Fig. 6.

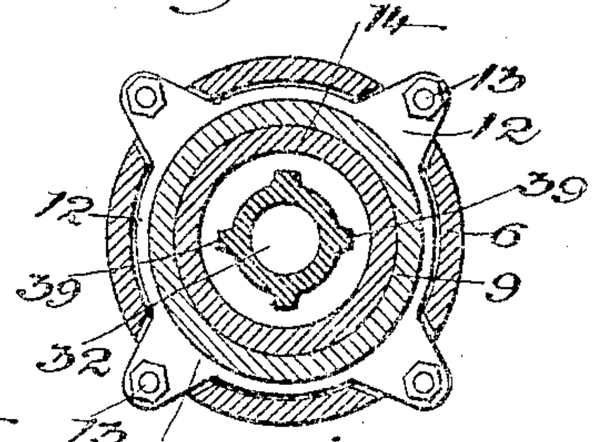


Fig. 7.

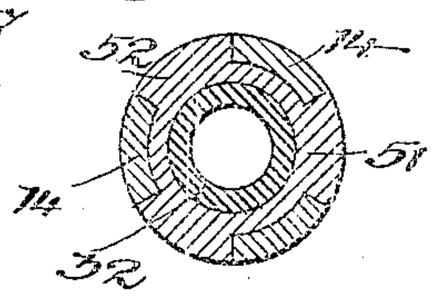


Fig. 9.

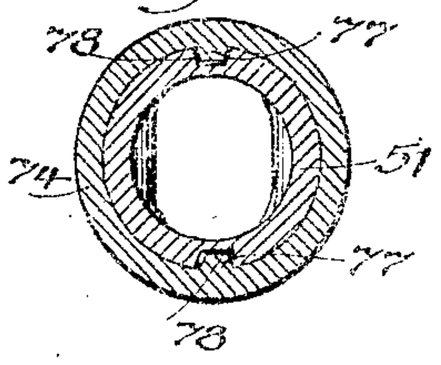
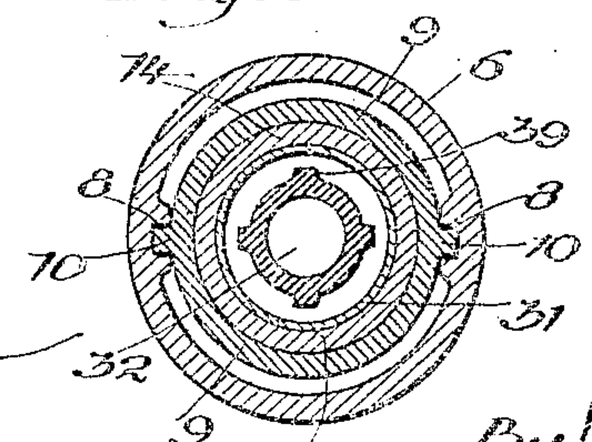


Fig. 8.



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UNITED STATES PATENT OFFICE.

WILLIAM SEIDEL, OF WHEELING, ILLINOIS.

MASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 786,608, dated April 4, 1905.

Application filed October 27, 1904. Serial No. 230,246.

To all whom it may concern:

Be it known that I, WILLIAM SEIDEL, a citizen of the United States, residing at Wheeling, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Mashing-Machines, of which the following is a specification.

The object of this invention is to improve the construction and operation of the operating mechanism of the mashing-machine as a whole, so that it may be operated easily and certainly by hydraulic or fluid pressure without the possibility of the operating fluid or liquid escaping into the mash-tank, thereby impairing the quality of the mash.

The invention relates more particularly to the means for raising and lowering the stirring mechanism and to the means employed for providing a complete seal at all times and at all degrees of vertical elevation.

Another object of the invention is to provide a tightly-sealed casing for closing the gear mechanism operating the paddle-shafts, so that it will be impossible for the mash to come into contact with the operative mechanism, which would tend to impair the quality of the mash and at the same time rust out or clog up the operative mechanism.

Another object of the invention is to so arrange the casing that it may be filled with oil or other lubricant, easing the operation of the parts.

Another object of the invention is to so construct and arrange the operative mechanism that the parts thereof may be easily formed and assembled, the arrangement being one which dispenses with the necessity for providing heavy or unwieldy castings without impairing the strength of the completed mechanism as a whole.

Another object of the invention is to so arrange the bearings that friction may be minimized and the apparatus operated by the expenditure of a small amount of power.

The invention consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawings illustrating the invention, Figure 1 is a side elevation of the operative mechanism, showing the mash-tank in section; Fig. 2, a sectional elevation of the operative mechanism; Fig. 3, a continuation of the section of Fig. 2; Fig. 4, a cross-section through the main operating-shaft, showing the lower section of the shell or casing; Fig. 5, a cross-section taken on line 5 5 of Fig. 2 looking in the direction of the arrow; Fig. 6, a similar view taken on line 6 6 of Fig. 2 looking in the direction of the arrow; Fig. 7, a similar view taken on line 7 7 of Fig. 2; Fig. 8, a similar view taken on line 8 8 of Fig. 3; Fig. 9, a similar view taken on line 9 9 of Fig. 2, and Fig. 10 an enlarged sectional detail of the check-valve in the pressure-supply pipe.

The mashing-machine of the present invention is constructed to have a mash-tank 1 of suitable form and dimensions, which tank, as shown, is supported upon I-beams 2 and is provided with a perforated false bottom 3 for straining the mash after the mashing operation. Connected with the bottom is a series of pipes 4, connecting with a header-pipe 5 for withdrawing the mash in the usual manner. Projecting through the bottom of the mash-tank is an outer fixed cylindrical casing 6, Figs. 3, 8, provided with a circumferential flange 7, to which the bottom and false bottom are secured, and said fixed outer casing is provided on opposite sides with vertically-extending grooves or channels 8, which extend from the lower open end of the casing to a point slightly above the circumferential flange 7. Within the fixed shell or casing is a slidable outer sleeve 9, provided near its lower end with outwardly-projecting fins 10, adapted to travel in the channels 8, which allows the outer sleeve to be moved vertically, but prevents its rotation. Between the fixed cylindrical casing and the outer sleeve is a lower annular stuffing-box 11, into which projects a lower gland 12, which is regulated by screw-bolts 13 for compressing a suitable packing around the sleeve. Within the outer slidable sleeve is a rotatable tubular shaft 14, Fig. 2, which downwardly projects from the end of the outer sleeve and fixed casing and is closed at its end by a cap 15, Fig. 3, which is screw-threaded onto the end of the tubular shaft, and said cap has entered thereinto a pressure-supply pipe 16, which is revoluble

with the tubular shaft and is adapted to supply water for hydraulic operation. The lower end of the pipe 16 is passed through a stuffing-box 17 into a tubular socket 18, which socket has entered thereinto a stationary supply-pipe 19, having a check-valve 20, and between the check-valve and the inner end of the pipe is a discharge-valve 21 for discharging water after the hydraulic operation. The tubular shaft has secured thereonto, by means of a key 22, an operating gear-wheel 23, and below the gear-wheel is a collar 24, which is likewise keyed to the tubular shaft, and the end of the tubular shaft is of suitable diameter to provide a small shoulder 25 for the abutment of the collar, so that the collar is rigidly held against rotary and longitudinal movement. The key 22 is firmly held in place by means of a set-screw 26, which passes through the collar, and the collar is provided with a depending flange 27, which enters an annular groove 28 in a suitable support 29 and bears against a suitable bearing 30. Within the tubular shaft, at the lower end thereof, is a bushing 31, and within the bushing is a tubular piston 32, preferably of less diameter than the cylinder formed within the tubular shaft, and said piston terminates at its lower end in a piston-head 33, secured to the piston by means of a cross-pin 34, and said piston-head is provided with a bushing 35, which contacts the bushing 31 of the tubular shaft. At the end of the piston-head is a flanged leather washer 36, held in place by means of a disk 37, which in turn is secured by a screw-threaded bolt 38. The tubular piston is preferably provided near its lower end with side flanges or ribs 39, Fig. 6.

The fixed cylindrical casing has supported thereon a casing 40, Fig. 2, of substantially spherical shape and consisting of a lower section 41 and an upper section 42, each provided with flanges 43, secured together by bolts 44. The lower section has a tubular neck 43^a of the same diameter as the fixed cylindrical casing and separated therefrom by means of a pair of bearing-rings 44^a, which allow the parts to revolve one upon the other. The lower section of the casing 40 has therein an annular stuffing-box 45, into which is entered a gland 46, adjustable by means of screw-bolts 47, to provide a tight seal between the revoluble casing and the outer sleeve, which latter is slidable, but not revoluble.

The tubular piston terminates in an inner head 48, through which passes a cross-pin 49, which latter outwardly projects through longitudinally-extending slots 50 in the upper section 51 of the tubular shaft, which upper section is locked to the lower section by means of a tenon-joint 52, so that the upper section will revolve with the lower section. The tubular shaft is revoluble, but not slidable, and allows the tubular piston to travel up and down its interior and the cross-pin to travel in the slot 50 simultaneously with the revolution of the shaft as a whole, and the projection of the cross-pin through the slot imparts revolution thereto regardless of its degree of elevation. The upper section 51 of the tubular shaft is cut down at its lower end 53, which end is inclosed by the lower section which fits thereonto and abuts against an irregular shoulder 54, which forms the tenon-joint heretofore mentioned.

The stuffing-box 45 in the lower section 40 of the rotatable casing provides a seating ledge or shoulder 55, against which abuts a hub 56, which is keyed to the outer sleeve and is slidably movable with said sleeve, but is held against rotation, and to the hub is secured a king gear-wheel 57, and the end of the outer sleeve abuts against a bearing-ring 58, which is secured to the upper face of the hub by means of screw-bolts 59, which pass through outwardly-projecting ears 60. This arrangement furnishes a firm rigid support and at the same time permits of easy revolution. The king gear-wheel meshes with a pair of bevel-pinions 61, keyed onto paddle-shafts 62, which are journaled at their inner ends in journal-boxes 63, mounted on cross beams or rails 64, which extend from side to side of the lower section of the rotatable casing on opposite sides of the tubular shaft. The paddle-shafts are disconnected with each other, and each passes through a stuffing-box 65 and is provided on its outer end with paddles or stirrers 66 of any suitable and useful construction and preferably arranged in angular relation to one another. Within the revoluble shell or casing and surrounding the upper section of the tubular shaft is a sleeve or collar 67, provided with slots or openings 68, for the passage therethrough of the cross-pin 49, and said sleeve or collar at its upper end is provided with a counterbore 69, into which fits an inwardly-extending annular flange 70, which is connected to and formed integral with the upper section 42 of the revoluble shell or casing, and exterior of the shell or casing is a neck 71, terminating in a flange 72, to which flange is secured a flange 73, connected with a hub 74, from which project a pair of supporting-arms 75, to which are connected depending journal-arms 76, which form a journal-support for the outer ends of the paddle-shafts, which operate the paddles or stirrers. The hub 74 for the cross-arms 75 is provided with a fin or flange 77, (shown in Fig. 9,) which enters a groove or channel 78 in the upper section of the tubular shaft and allows the hub, with its connected cross-arms, to be slid down onto the tubular shaft until the flanges 73 abut against the flanges 74, which holds the parts rigidly together. The upper end 79 of the tubular shaft projects above the supporting cross-arms and has keyed thereinto a solid shaft 80, which upwardly projects through a stuffing-box 81 in the top of the mash-tank and is

adapted to receive and transmit motion to the apparatus where it is desirable to impart the motion from above rather than from below the tank. In order to admit of access to the interior of the revoluble shell or casing, a pair of manholes 82 are provided, which fit into the upper section and are of suitable size to meet the requirements of use. The apparatus is provided with a scraping-bar 83, which is secured to the depending arms 76 by means of bars 84 at a sufficient distance to allow of the revolution of the paddles.

In operation the mash is introduced into the tank in any suitable way, and revolution is imparted to the gear-wheel 23, which revolves the tubular shaft within the outer sleeve and with it the casing and paddle-shafts and their connected gear-wheels. The king-wheel remains stationary against revolution, and as the gear-wheels are revolved around the king-wheel the paddle-shafts will be revolved in opposite directions, imparting motion to the stirrers and agitating the mash. When it is desirable to raise the stirrers, fluid or hydraulic pressure is admitted into the end of the tubular shaft, which forms, in effect, a cylinder, and the tubular piston therein is raised a suitable distance to bring the stirrers to a proper elevation, and the raising of the piston serves to raise the outer sleeve, the fins 10 of which travel in the guideways 8, and with the outer sleeve is raised the king-wheel and entire operative mechanism, so that the relative position of the operative parts remains at all times the same, and the gear-wheels are held in perfect mesh with the king-wheel. As the outer sleeve and connected parts are raised the cross-pin 49 will travel in the slots 50 of the upper section of the tubular shaft, and the collar 67 will be carried by the abutment of the ends of the cross-pin 49, and with it the casing 40 and the cross-arms supported thereon, thereby maintaining a constant relation between the parts of the operative mechanism. The upward travel of the above-specified mechanism will in no wise interfere with the revolution of the tubular shaft, which revolution will be imparted to the casing and gear-wheels through the medium of the cross-pin which is contacted by the walls of the slotted portion of the tubular shaft at all degrees of elevation. The stuffing-boxes provide a perfect and complete seal at all times and at all points, so that it will be impossible for the water which is used in the operation of the piston to escape into the mash and impair the same. At the same time the revoluble shell or casing which incloses the gear-wheels may be filled with suitable lubricant without danger that such lubricant will leak out and ruin the mash, and, furthermore, the operative parts will be protected against the steam or moisture of the mash which would tend to rust out or clog up the parts if exposed thereto. The check-valve 20 prevents the descent of the mechanism after pressure has been introduced under the piston when the valve 21 is closed; but by opening the valve 21 the liquid or fluid will escape behind the check-valve and allow the piston to descend. By making the tubular shaft in two sections the parts can be much more readily assembled and there will be no necessity for heavy or cumbersome castings, which would be the case if the tubular shaft were made in a single piece.

It will be seen from the foregoing description that the device as a whole is very compact and that all of the operative mechanism is so protected and concealed that all danger of leakage either from within out or from without in is obviated without in any way impairing the ease or perfection of operation of the machine.

Although the device has been described with considerable particularity as to mechanical details, it is plain that some of the parts may be changed or varied without departing in any way from the spirit of the invention.

What I regard as new, and desire to secure by Letters Patent, is—

1. In a mashing-machine, the combination of a sleeve slidably mounted, a tubular shaft rotatably mounted within the sleeve, a piston slidably mounted within the rotatable tubular shaft, a paddle-shaft connected with and movable with the piston, and means for imparting rotation from the rotatable tubular shaft to the paddle-shaft, substantially as described.

2. In a mashing-machine, the combination of a sleeve slidably mounted, a tubular shaft rotatably mounted within the sleeve, a piston slidably mounted within the rotatable tubular shaft, a paddle-shaft connected with and movable with the piston, means for imparting rotation from the rotatable tubular shaft to the paddle-shaft, and an inclosing casing movable with the piston and the slidable sleeve, substantially as described.

3. In a mashing-machine, the combination of a sleeve slidably mounted, a rotatably-mounted tubular shaft, a piston slidably mounted within the shaft, a king-wheel rigidly secured to the slidably-mounted sleeve and vertically movable therewith, a paddle-shaft, a journal for the paddle-shaft connected with the rotatably-mounted tubular shaft, and a gear-wheel on the paddle-shaft meshing with the king-wheel, substantially as described.

4. In a mashing-machine, the combination of a sleeve slidably mounted, a rotatably-mounted tubular shaft, a piston slidably mounted within the shaft, a king-wheel rigidly secured to the slidably-mounted sleeve and vertically movable therewith, a paddle-shaft, a journal for the paddle-shaft connected with the rotatably-mounted tubular shaft, a gear-wheel on the paddle-shaft meshing with the king-wheel, and an inclosing casing for the gear-wheel and king-wheel connected with and

rotatable with the tubular shaft, substantially as described.

5. In a mashing-machine, the combination of a sleeve slidably mounted, a tubular shaft rotatably mounted within the sleeve, a reciprocating piston within the tubular shaft and rotatable therewith, means for imparting rotation to the tubular shaft, said shaft being provided with elongated slots, a cross-pin outwardly projecting from the reciprocating piston through the elongated slots in the rotatable tubular shaft, an inclosing casing rotatably and slidably mounted and connected with the outwardly-projecting cross-pin for imparting a sliding and rotary movement to the casing, a king-wheel connected with and movable with the slidably-mounted sleeve, two independent paddle-shafts journaled within the inclosing casing, and gear-wheels on the independent paddle-shafts meshing with the king-wheel, substantially as described.

6. In a mashing-machine, the combination of a sleeve slidably mounted, a tubular shaft rotatably mounted within the sleeve, a reciprocating piston within the tubular shaft and rotatable therewith, means for imparting rotation to the tubular shaft, said shaft being provided with elongated slots, a cross-pin outwardly projecting from the reciprocating piston through the elongated slots in the rotatable tubular shaft, an inclosing casing rotatably and slidably mounted and connected with the outwardly-projecting cross-pin for imparting a sliding and rotary movement to the casing, a king-wheel connected with and movable with the slidably-mounted sleeve, two independent paddle-shafts journaled within the inclosing casing, gear-wheels on the independent paddle-shafts meshing with the king-wheel, stuffing-boxes for the paddle-shafts, a stuffing-box for the slidably-mounted sleeve, and a stuffing-box for the rotatable inclosing casing, substantially as described.

7. In a mashing-machine, the combination of a king-wheel vertically movable and held against rotation, a pair of independent paddle-shafts, a water-tight inclosing casing within which the shafts are journaled, said casing being revoluble around the king-wheel and vertically movable with the king-wheel, gear-wheels on the shafts meshing with the king-wheel, and means for imparting revolution to the casing and vertical movement thereto, substantially as described.

8. In a mashing-machine, the combination of a non-rotatable king-wheel, a vertically-adjustable mounting for the king-wheel held against rotation, a water-tight inclosing casing revoluble around the mounting for the king-wheel and vertically movable therewith, a paddle-shaft journaled in the inclosing casing and revoluble therewith, a gear-wheel on the shaft meshing with the king-wheel, and means for revolving the casing and imparting a vertical adjustment thereto, substantially as described.

9. In a mashing-machine, the combination of a water-tight inclosing casing revolubly mounted and vertically adjustable, paddle-shafts journaled at their ends within the inclosing casing, gear-wheels within the inclosing casing for imparting rotation to the paddle-shafts, and means for revolving and imparting a vertical movement to the inclosing casing, substantially as described.

10. In a mashing-machine, the combination of a water-tight inclosing casing revolubly mounted and vertically movable and held against revolution, two independent paddle-shafts having their ends journaled within the casing, stuffing-boxes through which the paddle-shafts pass, a gear-wheel on each of the paddle-shafts meshing with the king-wheel, and means for revolving the inclosing casing and paddle-shafts around the king-wheel and vertically moving the king-wheel, together with the inclosing casing, paddle-shafts and gear-wheels, substantially as described.

11. In a mashing-machine, the combination of a sleeve slidably mounted and held against revolution, a tubular shaft within the sleeve consisting of two sections secured together and provided in its upper section with oppositely-disposed elongated slots, a piston within the tubular shaft, slidably mounted and revoluble with the tubular shaft, having at its upper end a cross-pin outwardly projecting through the slots, a rotatably-mounted inclosing casing connected with the cross-pin and adapted to be revolved and vertically moved by the movement of the cross-pin, paddle-shafts outwardly projecting from and revoluble with the inclosing casing, and means for imparting revolution to the paddle-shafts, substantially as described.

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