No. 890,112. PATENTED JUNE 9, 1908.

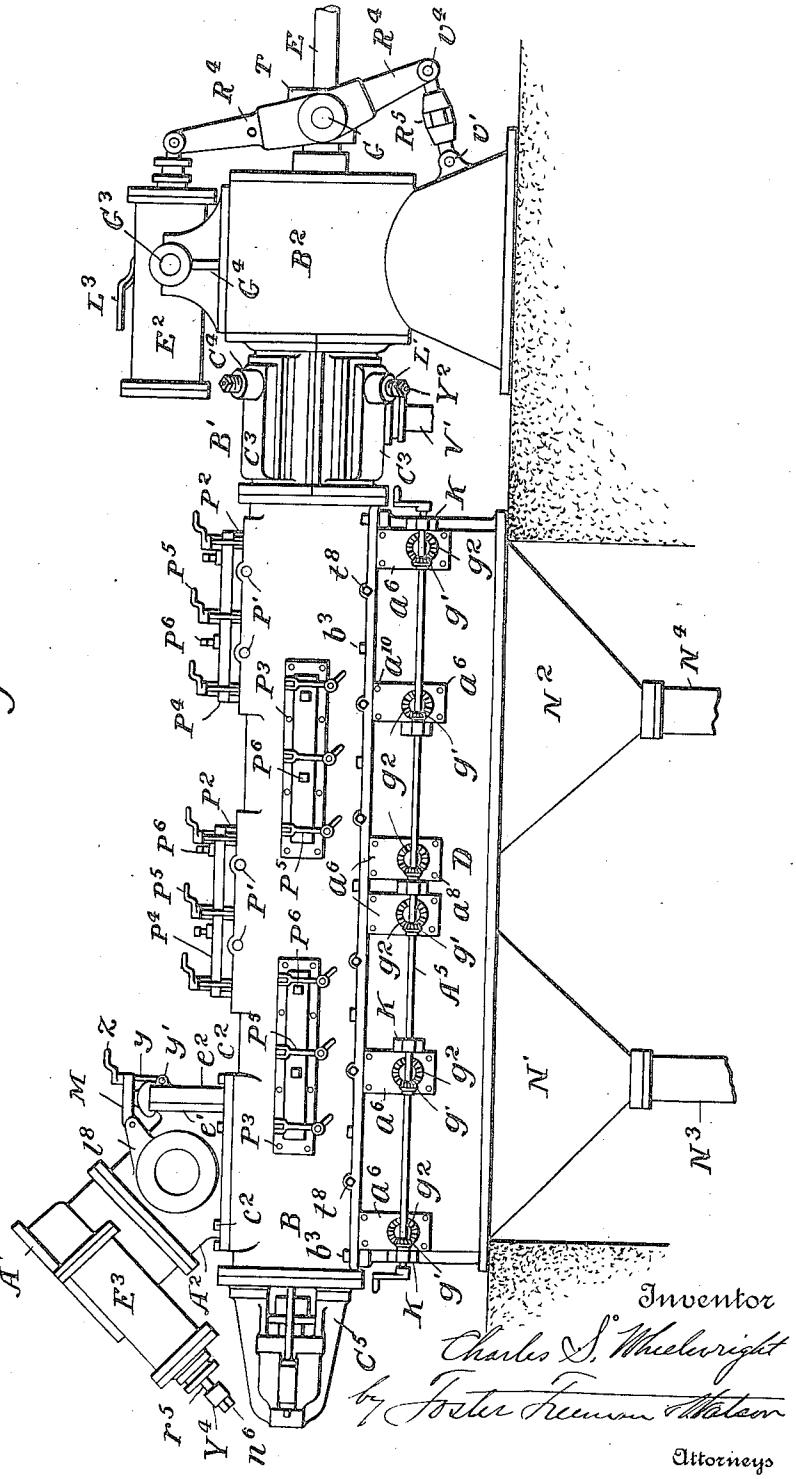
C. S. WHEELWRIGHT.

CARRYING AND PRESSING APPARATUS.

APPLICATION FILED FEB. 8, 1907.

5 SHEETS—SHEET 1.

Fig. 1



Witnesses
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5 SHEETS—SHEET 2.

Fig. 2.

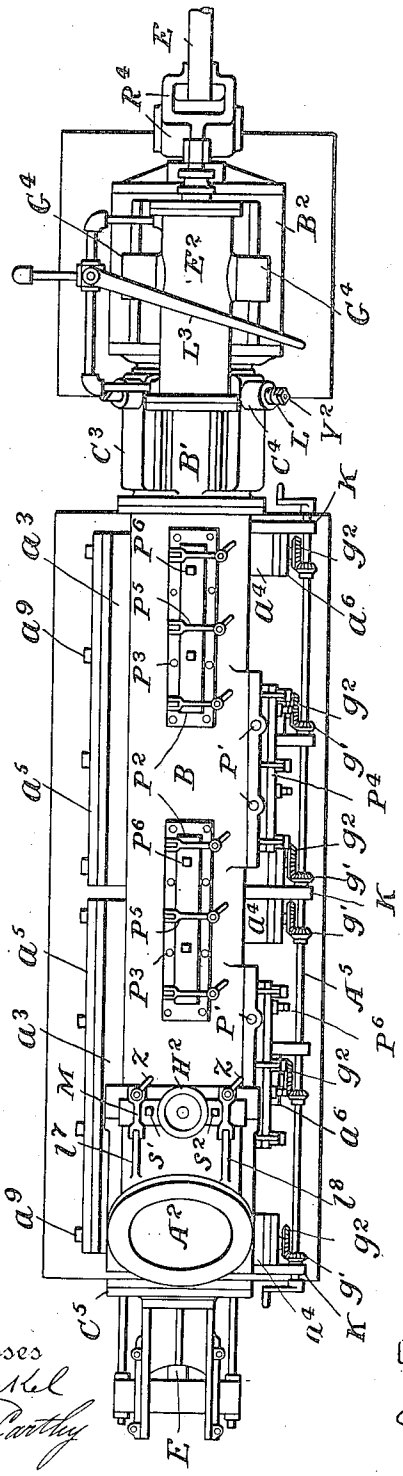
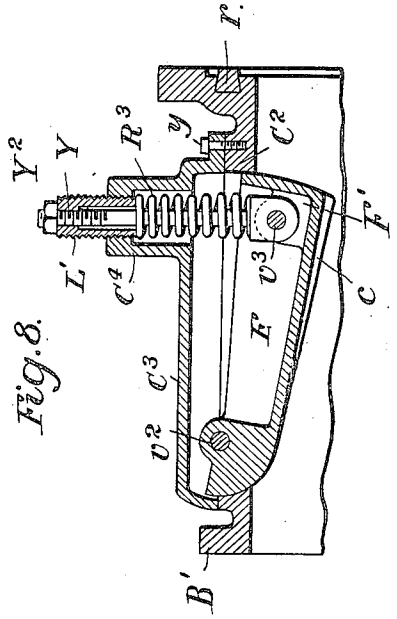


Fig. 8.



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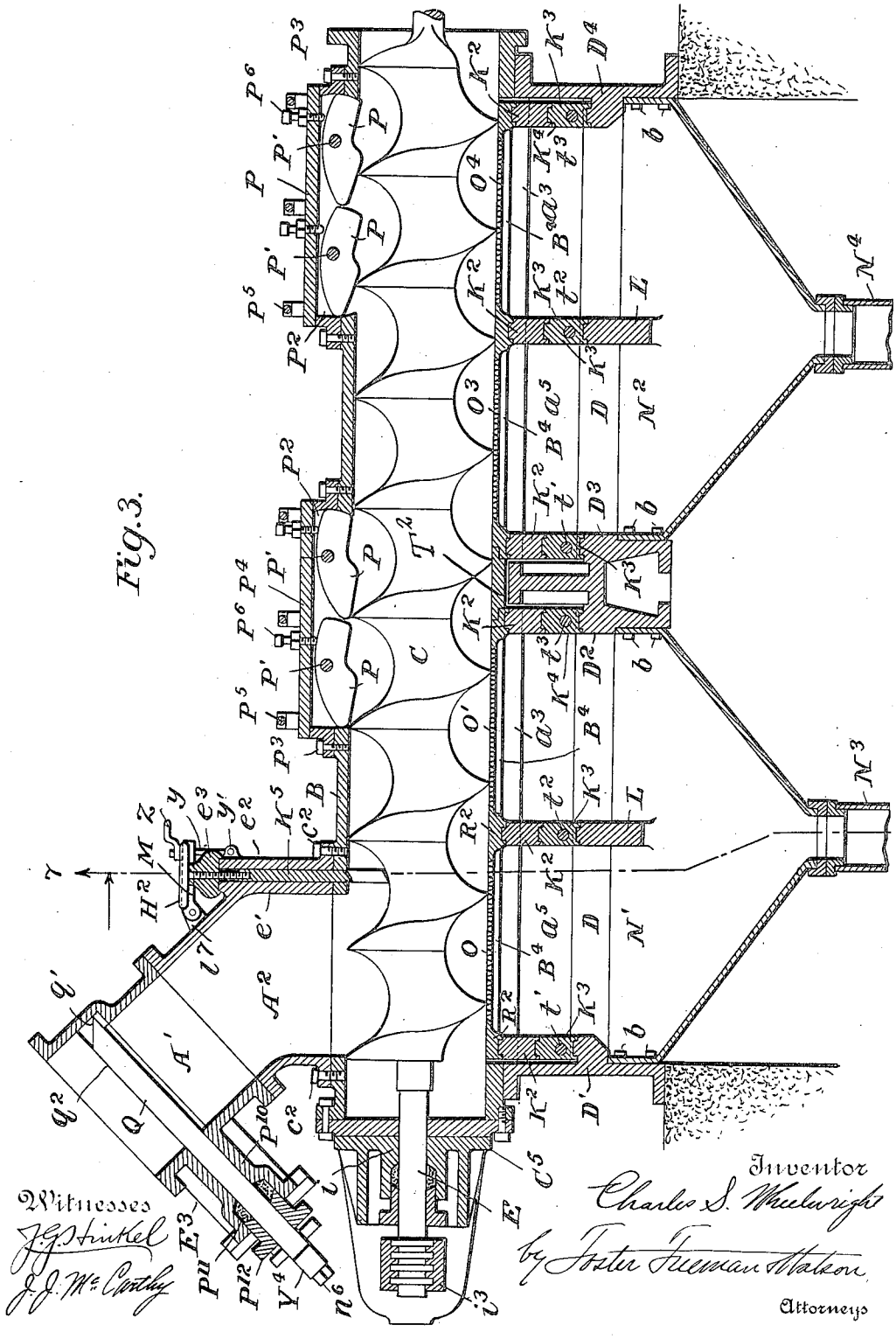
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5 SHEETS—SHEET 3.

Fig. 3.



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5 SHEETS—SHEET 4.

Fig. 5.

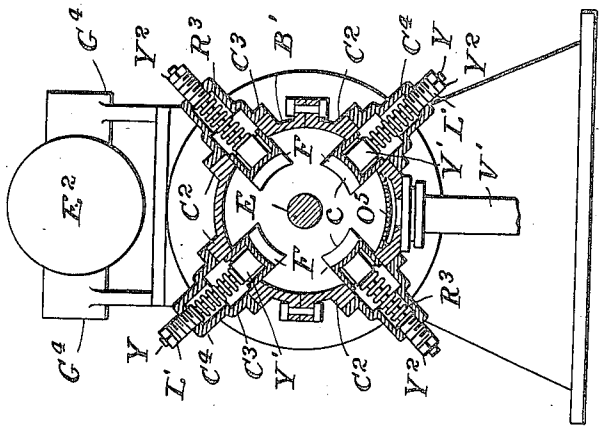
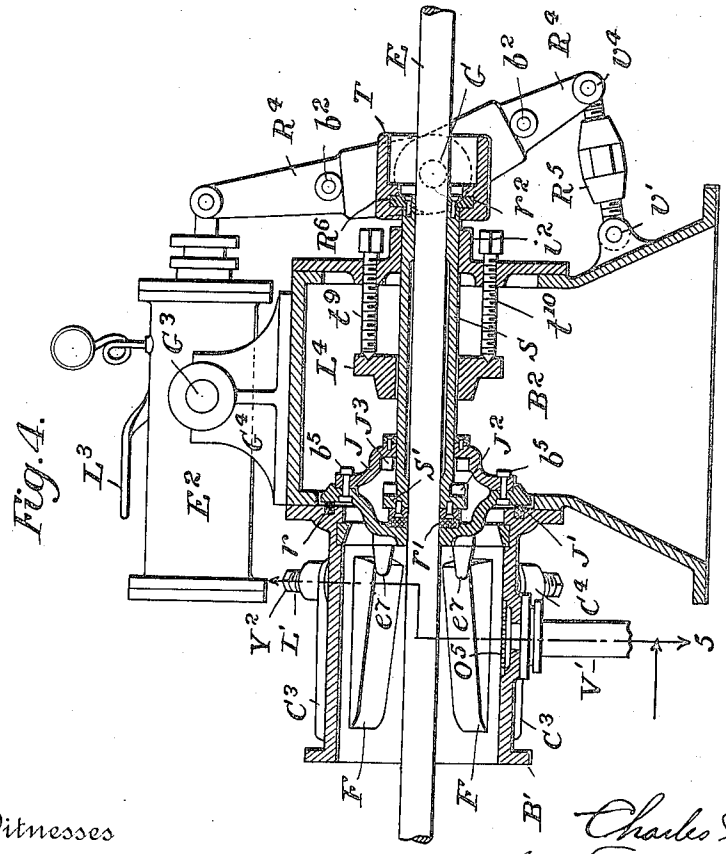


Fig. 4.



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5 SHEETS—SHEET 5.

Fig. 7.

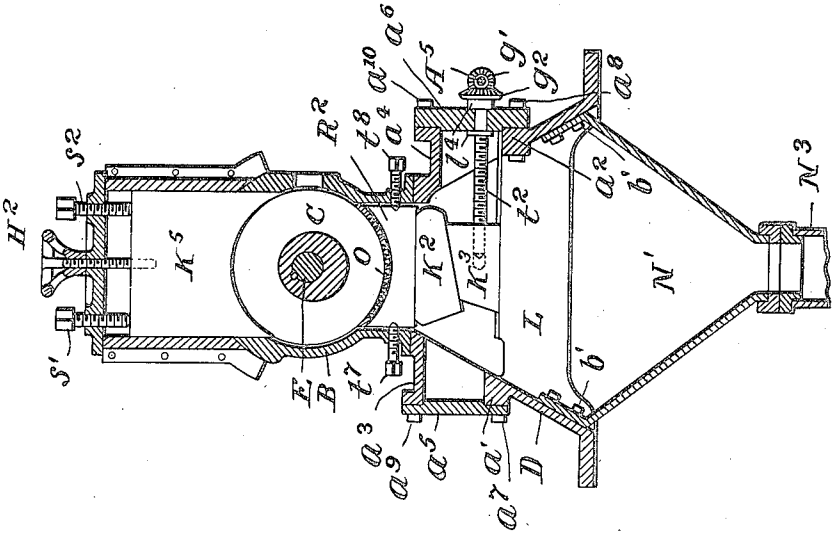
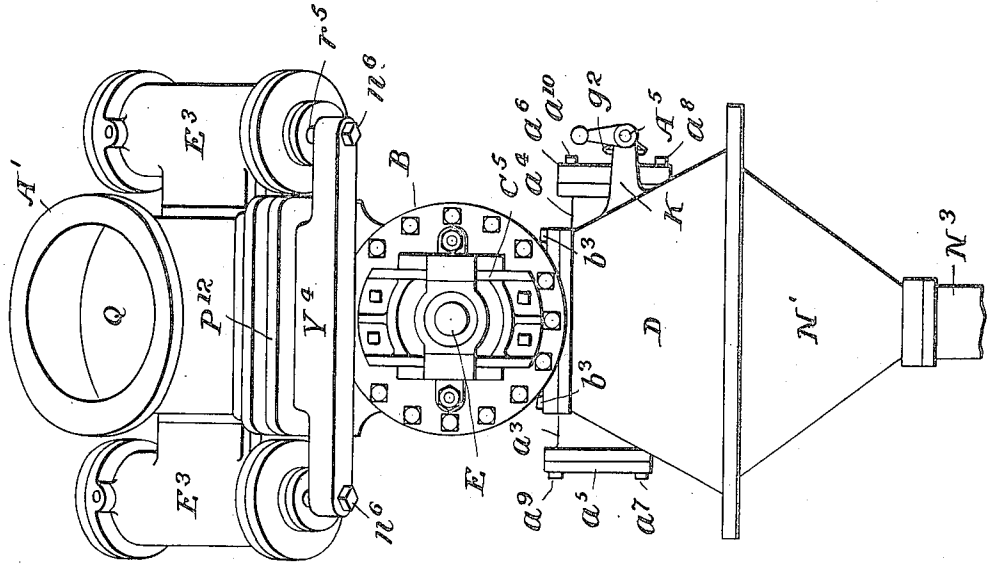


Fig. 6.



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UNITED STATES PATENT OFFICE.

CHARLES STOREY WHEELWRIGHT, OF BRISTOL, RHODE ISLAND.

CARRYING AND PRESSING APPARATUS.

No. 890,112. Specification of Letters Patent. Patented June 9, 1908.

Application filed February 8, 1907. Serial No. 356,484.

To all whom it may concern:

Be it known that I, CHARLES STOREY WHEELWRIGHT, of Bristol, in the State of Rhode Island, have invented a new and useful Improvement in Carrying and Pressing Apparatus, of which the following is a specification.

The invention is an improvement upon the apparatus shown in several patents heretofore granted to me, more especially the Patent No. 783,602, and has for its object the better working and the preservation of details of the former mechanism. Like the former mechanism it has been designed for use with a rendering plant in which garbage or offal is subjected to the hot water process for the extraction therefrom of oil or melted grease; and it consists in the employment beyond the carrying screw in the conveying cylinder of the said former patent, of pressing fingers working automatically to squeeze the tankage which has passed beyond said carrying screw together with a perforated plate or perforated plates in said cylinder to carry out therefrom more oil and water extracted from said tankage.

It consists further in the employment of a knife working in combination with the screw thread edge of said conveying screw to cut and subdivide the tankage in its passage through the conveyer and in a substantially water-tight and air-tight frame for said knife.

It consists further in a modification of the regulating valve of said conveyer against which the tankage operated upon in the cylinder packs and on the opening of which the tankage passes out of the cylinder.

It consists further in means whereby to maintain unobstructed the perforations through which water or water and oil, are discharged from the conveyer.

It consists further in an improved bed in which the main portion of the conveying cylinder lies and in means attached to said bed for the adjustment of said perforated plates to and from the conveying screw and the removal of said plates from the cylinder; and further in details of construction.

In the drawings Figure 1 is a lengthwise elevation of apparatus embodying my invention as seen from what is herein termed the front side. Fig. 2 is a plan of apparatus shown at Fig. 1. Fig. 3 is a central longitudinal section on an enlarged scale of that portion of the conveying cylinder which contains the carrying screw, showing also fins, adjustable perforated plates, and certain knives. Fig. 4 is a continuation of Fig. 3, showing on the same scale sections B^1 and B^2, and mechanism therein, together with a power engine and the lever operated thereby. Fig. 5 is a cross-section, as indicated on a line drawn through section B of Fig. 4. Fig. 6 is a rear elevation of the conveyer. Fig. 7 is a cross-section, as indicated on a line drawn through Fig. 3. Fig. 8 is a longitudinal section of a portion of section B^1, illustrative of the construction of one of the presser fingers.

A', A^2 are lower sections of a large pipe leading from a digester (not shown) to the conveying cylinder B, also formed in sections, through which closely fitting its inner periphery works a long screw C feathered to a main shaft E, which has suitable bearings, *i*, in a rear-end piece, C^5, at one end of said cylinder; other bearings i^2 near the other end of the cylinder including the additional sections, and still further bearings, (not shown), beyond the cylinder, near the operating mechanism. It has also an end thrust bearing i^3 in said rear end piece C^5.

P, P, P, etc., termed in the old patent "fins", are pieces of composition metal, cam-shaped, very numerous, following with an up-and-down or in-and-out vibrating-motion the convolutions of screw C as the latter revolves, and imparting frictional resistance to the garbage. They are pivoted at P^1 between the long guides P^2 held in place on said cylinder by screw-bolts P^3. A cap or cover P forms a protection for the slot about which the guides P^2 are placed and in which the fins work. The cap is held in place by screws P^5. The rocking motion of the fins is limited by set screws P^6.

The present conveying cylinder like that of the old patent has sections B^1 and B^2 beyond the carrying screw, and like the old patent it has a regulating valve which later will be described in detail both as to its construction and mode of operation, since improvements relating to said valve are important features of the present invention.

The oil and water given up by the tankage as the latter passes along the screw C is drained from the cylinder B by perforated plates in the shell of the cylinder B. These plates which in the present drawings are

shown as double plates O, O¹ and O³, O⁴, also, in connection with suction boxes or substitutes for suction boxes, herein described, impart a frictional resistance to the slippery garbage to insure its being carried forward by the screw; but unlike the plates for similar purposes in the old patent they are made adjustable to and from the screw C. The purpose of the adjustment is that the edge of the screw shall travel in shearing contact with the faces of the said perforated plates and thus keep the perforations in the plates open for the passage of water or water and oil. Provision is also made for the removal of the double plates and the insertion of others in their stead.

Heretofore where the perforated plates have not been maintained in contact with the edges of the screw the perforations have become clogged and it has been necessary to repeatedly remove the plates for the purpose of clearing the openings and this operation has to be repeated so often as to greatly diminish the value of the machine. We have found that by adjusting the perforated plates from time to time as the screw edges wear away so as to maintain the inner faces of the plates in shearing contact with the edges of the screw the traverse of the same upon the faces of the plates acts with a shearing action on the edges of the openings so as to shear off all the particles at the plane of said faces and the particles thereupon will readily pass through the openings and the latter remain clear without the necessity of any removal of the plates.

The bed D upon which the conveying cylinder rests, is a heavy casting, in the form of a long box of substantially the same length as the conveying cylinder, with a height about equal to the diameter of the cylinder. It has perpendicular ends, while the sides incline inwards from bottom to top. Both the bottom and the top are mostly open to afford a free passageway for water and oil drawn from the cylinder as will appear. The said top consists mostly of an outward flange cast with the bed, surrounding the sides and ends of the box, to which flange is bolted by bolts, b^3, a similar flange surrounding downward projections cast with the conveying cylinder. The top has two openings over which are the two before mentioned double perforated plates, O, O¹, and O³, O⁴, extending across the apparatus from the front side to the back side beneath the conveying cylinder, B, the front side being the side to the right when looking along the conveying cylinder from the rear end.

The bottom of the bed or box consists likewise, mainly, of a flange cast with the box at the bottom, around the sides and ends, designed to rest upon a floor of the building. There are two long openings in the bottom of the bed which are closed by two conical-shaped castings, N¹ and N², extending below said floor, which are bolted to strengthening pieces or "supports" D¹, D² and D³ and D⁴, (presently to be described) by bolts b and to the inner sides of the bed D by bolts b^1, (see Figs. 3 and 7). The said conical-shaped castings connect with suction pipes N³ and N⁴ which are connected with suction pumps, (not shown), and thus the said bed D, castings N¹ and N² and pipes are adapted to perform the well known office of suction boxes in paper machinery as set forth in the old patent. Four interior strengthenings, or supports as they are termed herein, D¹, D², D³, and D⁴, are cast with the casting forming the bed D, each support extending across the bed from front to back, and there are also two girders or bridges, L, L, cast with and forming a part of the bed, D, extending across the bed from front side to back side.

The two sides of the bed differ, as may be seen in Fig. 2, the front side being provided with a shaft A⁵, gears g^1, brackets K, the latter cast with and upon the bed D, for the support of said shaft and gears, and also with small openings normally closed by plates a^6, to be used in connection with the removal or adjustment of the double perforated plates, and the back side being provided with long openings normally closed by plates a^5, for the actual insertion and removal of the said perforated plates. The two openings on the back side of the bed are between the long shelves a^1 and a^3 cast with the bed and closed, as stated just above, each by a long plate a^5 bolted perpendicularly to said shelves, (see Figs. 2, 5, and 7,) which accordingly are of different widths, as shown, by bolts a^7 etc., and a^9, etc. These openings are large enough to permit the egress and ingress through the bed of one of the double perforated plates O, O¹ or O³, O⁴, as will be described. On the front side of the bed are similar projections or shelves a^2, a^4, but instead of being long, taken lengthwise with the bed and with their plates adapted to close long openings in the side, they are short, twelve in number, in six pairs, with short plates or covers, a^6, bolted to them by bolts a^8 and a^{10}, and adapted to close an opening only big enough to withdraw, as will be described, an inclined block K³. Upon the outer supports D¹ and D⁴, cast as aforesaid as a part of the bed D, rest inclined blocks K³ and K², presently to be described, intervening between said supports D¹ and D² and ends of the perforated plates O and O⁴, which it should be stated are let into the shell of said conveying cylinder, B, substantially as described in the old patent. Upon the middle supports D² and D³ rest similar inclined blocks K³ and K² upon which rest in turn the perforated plates O¹ and O³, as shown (Fig. 3), and also indirectly a deadplate, T², which, as will be seen (Fig. 3), actually rests by appropriate shoulders upon

the adjoining ends of said perforated plates O^1 and O^3, having corresponding shoulders, and like the said perforated plates is adjustable to and from the screw C by the same means, and is at all times flush with the perforated plates, thereby preventing the lodging of material passing through the cylinder. A further support is furnished at the middle of each pair of plates O, O^1, and O^3, O^4, by similar inclined blocks K^2 and K^3 resting upon the above-mentioned girders or bridges L, L.

Each double perforated plate is strengthened by ribs R^2, etc., extending downwards lengthwise of the plate or crosswise of the conveying cylinder, which ribs are grooved beneath, as shown, to embrace a strong metal block K^2, before mentioned, and has other strengthening ribs R^2, R^2, etc., grooved to embrace other inclined blocks K^2 along the middle of each double perforated plate. All these inclined blocks K^2 rest upon similar inclined blocks K^3, which have their inclines on their upper surfaces, face to face with the lower surface inclines of blocks K^2 before mentioned; and both the blocks K^2 and the blocks K^3 are grooved or flanged, as the case may be, at top and bottom, to fit each the other and also the ribs R^2 above, and the supports D^1, D^2, D^3, and D^4, and the girders or bridges L, L, below, as shown.

With or upon the bed or box casting, D, are cast, as stated above, upon the front side, several brackets K in which are bearings for a long shaft A^5 operated by cranks at either end as shown, (see Figs. 1 and 2). This shaft carries for each double perforated plate three bevel gears g^1 (as mentioned above) which take into other bevel gears g^2 on the outer end of three pins, t^1, t^2, t^3, which pass through the several plates a^6 having each a collar l^4, l^4, on each side of said plates a^6, and each said pin having a screw thread on its inner end passing through a female screw in one of the blocks K^3. It is obvious that turning the shaft A^5 in one direction will move all the blocks K^3 inwards and thus set the blocks K^2, and with them the perforated plates, up towards the carrying screw, and that turning the said shaft A^5 in the other direction will have the contrary effect. The perforated plates when finally adjusted are held in position by set screws t^7 and t^8.

To remove the perforated plate it is necessary to draw to the front of the cylinder the lower inclined blocks K^3 by turning the screws t^1, t^2, t^3, which is done by turning the crank on shaft A^5. Then draw out upon the back side of the cylinder the upper blocks K^2, the plates a^5 having been removed. Then restoring the lower blocks K^3 to their places, rest above them some strong planks (not shown). Now loosen the screws t^7 and t^8, (see Fig. 7), thus lowering the plate to a position on the planks from which it can be readily removed upon the back side of the cylinder upon again withdrawing the lower blocks by turning the screws as before. The perforated plates O, O^1, O^3, O^4, besides the strengthening ribs R^2 running across the machine, have other strengthening ribs B^4 running lengthwise with the machine.

The present conveying cylinder like the cylinder of the old patent, as stated above, has two sections, B^1 and B^2, beyond the conveying cylinder B and carrying screw C, but the former of these, B^1, instead of being a mere passageway for the tankage, as in the old mechanism, is provided with presser fingers to squeeze the tankage as it passes through the section, and with a perforated plate let into the bottom of the section for the passage out of the cylinder of oil and water squeezed from the tankage. This mechanism will now be described (see Figs 4, 5, and 8). The section B^1 is cast with four platforms, C^2, C^2, etc., surrounding long openings or slots in said section, to which are bolted at y^2 four water-tight casings, C^3, C^3, etc., having each an upward hollow projection C^4, in each of which casings is pivoted by a pivot v^2, a presser finger F, the same being a long metal arm with a concave inner surface c. Each of said fingers makes a close fit at its sides and ends with its casing C^3 and with parts of the section B^1, adjacent to said casing, the two ends of the finger and corresponding parts of the casing and section being struck in curves drawn on lines from the center of the pivot v^2, as radii (see Fig. 8). In order that these fingers F may work automatically, pressing inwards or yielding outwards according to the resistance of material passing through the cylinder, they are provided each with an eyebolt Y and a spring R^3 operating upon its free end, the said spring being coiled about said eyebolt and confined between an enlarged end, Y^1, thereof, and a screw-plug, L^1, working through the top of said hollow projection C^4. The said finger F has bosses F^1, F^1 at its free end, (one of them is shown at Fig. 8), to receive said enlarged end Y^1 of eyebolt Y. A pivot v^3 passes through said bosses F^1, F^1 and the enlargement Y^1 of the eyebolt. The eyebolt Y passes freely through a hole in said screw-plug L^1 and is threaded at its upper end to receive a screw nut Y^2, by turning which together with the screw-plug L^1 the operation of the presser finger F, as is obvious, may be regulated.

The perforated plate O^5, having strengthening flanges as shown at Figs. 4 and 5, is set in the bottom of section B^1 just above an exit hole in said bottom which is there thickened, as shown. The oil and water passing through said perforated plate is drained from the apparatus through the pipe V^1 properly secured underneath said section.

I proceed to describe the means by which

the regulating valve J in section B^2 or the housing at the exit end of the conveying cylinder may at will be closed upon its seat, J^1, which is the further end of section B^1, without revolving with the main shaft E, together with further improvements in said regulating valve, and its mode of operation. These means consist primarily of a clutch, J^2, J^3, one-half of which, J^2 is secured to a sleeve S working along main shaft E to which said sleeve is feathered, as shown, while the other half, J^3, is secured to the valve J made in two parts, bolted together by bolts b^5, b^5, the inner face of which valve carries teeth e^7, e^7. A rubber packing in said seat J^1 is marked r. The said sleeve S is moved forward and back upon the shaft E, to which it is keyed as aforesaid, by a lever R^4 formed in two parts or sides fastened together by bolts b^2, b^2, to straddle the said shaft and a trunnioned block T (sliding loosely on said shaft) which has a recess r^2 within which works a projection or collar R^6 on said sleeve S. The trunnions on trunnion block are marked G. The said lever R^4 has its fulcrum v^4 on one end of a link R^5 which is pivoted at the other end by pivot v^1 to the standard of the conveyer cylinder, as shown. The lever R^4 is operated by a power engine E^2 which in turn is governed by a hand lever L^3, as shown. The power engine E^2 is an oscillating engine supported on trunnions G^3 having bearings in supports G^4 bolted to a platform cast upon the support of the casting which forms section B^2.

The valve J is provided with an adjustable stop L^4 set up by set screws t^9, t^{10}, in the end of the cylinder, as shown, the office of the said stop being to limit the movement of the valve J. In the form shown it surrounds the sleeve S as a loose collar.

The operation of this part of the mechanism is as follows: The pressure gage of the power engine E^2 is set at a given pressure, say 40 lbs., more or less, with the steam or pressure fluid at the side of the piston in said engine E^2 to carry the valve J to its seat. When the pressure of the material in section B^1 exceeds this pressure upon the valve it will force the valve from its seat carrying it back and with it the sleeve S until the valve strikes the said stop L^4, when the workman operates the lever L^3 to throw steam upon the other side of piston of the power engine E^2, which thus draws still further back the sleeve S and sets the clutch J^2, J^3, thus causing the valve J to revolve and the teeth e^7, e^7, to operate upon the material passing through the cylinder. By shifting the lever the workman can, as is obvious, instantly close the valve J.

The sleeve S is enlarged at its inner end S^1, which immediately after the valve J reaches its seat and said packing ring r, the clutch becoming disconnected, strikes against a second packing ring r^1 set in the inner side of the head of the valve J, as shown.

The before mentioned knife referred to as working in combination with the screw-thread of the conveying cylinder B is marked K^5. (See Fig. 3.) It has an adjustment in a closed frame which when not opened for removal of the knife is substantially water-tight, and air-tight to prevent the escape of foul odors one side of which, e^1, is a part of the casting forming section A^2 of the pipe by which tankage enters said conveying cylinder, while the other part, e^2, of the frame is bolted to said first part on either side of said knife. A cap, e^3, also, connects the two parts or sides e^1 and e^2 of said frame, and the position of the knife to or from said screw thread is determined by a hand screw H^2 secured to the end of said knife and working in the said cap, e^3, which carries also two set screws s^1 and s^2 to assist in determining the position of the knife. (See Fig. 7.)

The cap e^3 is held upon the two sides e^1 and e^2 of the frames by clamps M pivoted at one end to lugs l^7 and l^8 on the casting A^2; (see Figs. 1 and 2), and shaped at the other end to embrace eyebolts y, y, pivoted at y^1, y^1, where they are held in a locking position by swing levers z, z, on said pivoted eyebolts. By swinging said levers z, z, from said locking position, it is obvious that the eyebolts y, y, may be swung on their pivots, and the clamps M may be swung back and the knife K^5 removed. The entrance sections A^1 and A^2 bolted together, including the said knife frame, are bolted by bolts c^2, c^2, etc., to a platform about the entrance hole to the cylinder B. A^3 is a cover for an opening in the side of pipe A^2 to get at the interior of said pipe and the cylinder B.

The gate with the knife edge, mentioned in the early part of the specification, to form an absolute and instantaneous stop to the material entering the conveying cylinder, is an important part of the present improvements. It consists of a steel plate Q with a knife edge q^1 adapted to work instantaneously in a slot q^2 across the casting A^1 by means of a power engine having double cylinders E^3, E^3, the piston rods r^5, of which are secured by nuts n^6, n^6, to a yoke Y^4 to which the knife gate in turn is bolted. The said steel plate or knife gate Q is provided with a packing box P^{10}, packing P^{11}, and a packing gland P^{12}. It is unnecessary to describe the system of piping by which steam is admitted to one side or the other of the pistons in the piston cylinders. The bearing i in the rear end piece C^5, for the shaft E has also a suitable packing box, packing, and packing gland, as shown.

Although the invention, as stated above, has been especially designed for use in a garbage and offal plant, it is equally well adapted for use in a paper plant for drying or

draining pulp, and, by a mere enlargement of its parts, may be used as a sewage drainer.

I claim,—

1. In a carrying and pressing apparatus adapted to convey and press material saturated with and accompanied by water, the combination with a water-tight cylinder and carrying screw, of an adjustable knife set in a plane transverse to the axis of the screw and curved to conform to the transverse form of the screw and adapted to operate with the screw thread edge of said screw upon material fed forward by the screw, and a frame for said knife also water-tight and air-tight.

2. In carrying and pressing apparatus adapted to convey and press material saturated with and accompanied by water, the combination with a water tight cylinder and a carrying screw working within said cylinder, of an adjustable knife having its blade extending transversely to the axis of the screw and adapted to coöperate with the periphery of the latter upon the material moved through the cylinder by the screw.

3. In a conveying and pressing apparatus adapted to convey and press material saturated with and accompanied by water, the combination with a water-tight cylinder and carrying screw, and an entrance pipe to said cylinder, of a knife adapted to operate with the screw-thread edge of said carrying screw upon material fed forward by said screw, and a frame for said knife, one side of which is a part of the casting forming said entrance pipe, while the other side is bolted to said first side and to said conveying cylinder, the two sides being surmounted by a cap which is provided with a hand-screw rigidly secured to said knife.

4. In a carrying and pressing apparatus adapted to convey and press material saturated with and accompanied by water, the combination with a water-tight cylinder provided with a carrying screw filling the inner periphery of said cylinder, and perforated plates let into said cylinder and adjustable to and from said screw, of means for adjusting said plates, consisting of blocks with inclined faces, screws adapted to draw back or push forward the lower of said blocks, bevel gears on the outer ends of said screws, and other bevel gears upon a crank-shaft at right angles to said screws.

5. In a conveying and pressing apparatus adapted to convey and press material saturated with and accompanied by water, the combination with a water-tight cylinder provided with a carrying screw filling the inner periphery of said cylinder, of perforated plates furnished at each end with a strengthening and supporting rib lengthwise of the plates and crosswise of the cylinder and adapted to be let into the periphery of said cylinder, and blocks with inclined faces, each said rib resting upon one of said blocks the inclined face of which rests upon the inclined face of a similarly inclined block.

6. In a carrying and pressing apparatus adapted to convey and press material saturated with and accompanied by water, the combination with a water tight cylinder provided with a carrying screw filling the inner periphery of said cylinder, of removable perforated plates forming part of the wall of the cylinder, a water tight hollow bed supporting the cylinder and having openings beneath said perforated plates, such bed also having openings in a side wall through which said perforated plates may be removed, and suction pipes communicating with openings in the bottom of the bed.

7. In a carrying and pressing apparatus adapted to convey and press material saturated with and accompanied by water, the combination with a water-tight cylinder and a carrying screw filling the internal periphery of the cylinder, of perforated plates let into said cylinder and forming a part of the wall thereof, means for adjusting said plates to maintain them in shearing contact with the edges of the screw, and a dead plate arranged between and supported by two longitudinally separated perforated plates whereby the same means for adjusting the perforated plates may be employed for simultaneously adjusting the dead plates so as to prevent any obstruction of the passage of material over said perforated and dead plates.

8. In a carrying and pressing apparatus of the character described, the combination of a cylinder having a portion of its wall formed by removable perforated plates, a carrying screw filling the interior of a portion of said cylinder and bearing on said perforated plates, a dead plate arranged between and supported by two longitudinally separated perforated plates, and means for adjusting all of said plates to maintain dead plates so as to prevent any obstruction of the passage of the material over the same and the perforated plates in shearing contact with the screw.

9. In a conveying and pressing apparatus adapted to convey and press material saturated with and accompanied by water, the combination with a water-tight cylinder and a carrying screw filling the inner periphery of said cylinder and adapted to revolve therein and perforated plates let into said cylinder, of presser-fingers in said cylinder beyond said carrying screws adapted to squeeze material passing from said screw.

10. In a conveying and pressing apparatus adapted to convey and press material saturated with and accompanied by water, the combination with a water-tight cylinder and carrying screw and perforated plates let into said cylinder, of automatic presser fingers in said cyinder beyond said screw, boxes or

guides let into said cylinder in which said fingers are pivoted, eyebolts pivoted to the outer or free end of said fingers, radial extensions from said boxes within which said eyebolts are confined, and springs coiled upon the shanks of said eyebolts in said radial extensions.

11. In mechanism of the class described, the regulating valve and valve seat, the main shaft and sleeve thereon, a clutch adapted to connect and disconnect said valve and said sleeve, and an adjustable stop to limit the backward movement of said valve, in combination with a trunnioned block having a recess therein, a collar on said sleeve connecting said sleeve with said recess, a lever adapted to control the position of said trunnioned block, and an oscillating power engine whose piston is connected with said lever.

CHARLES STOREY WHEELWRIGHT.

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