

C. S. WHEELWRIGHT.
CARRYING AND PRESSING APPARATUS.
APPLICATION FILED DEC. 14, 1908.

939,576.

Patented Nov. 9, 1909.
6 SHEETS—SHEET 1.

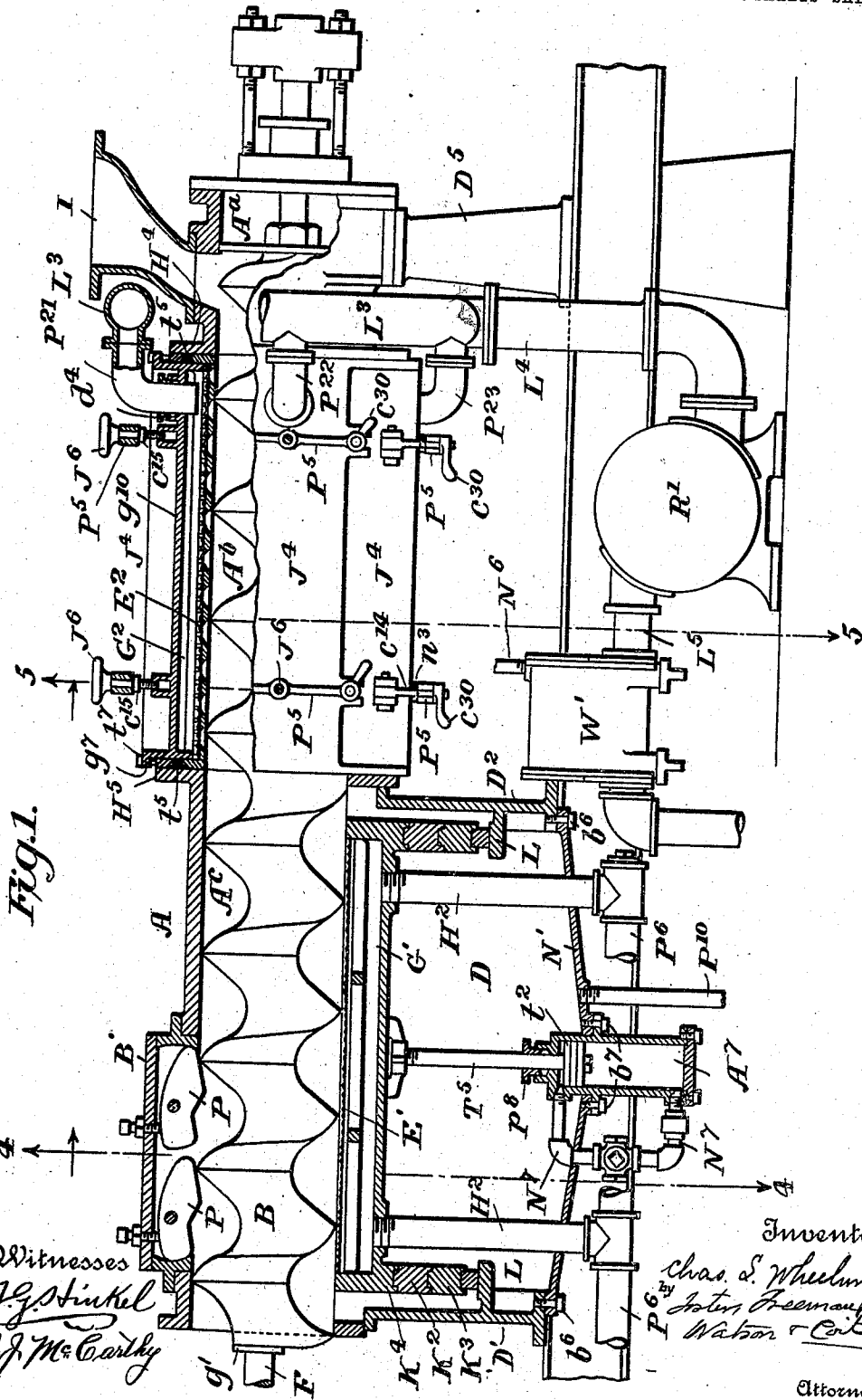


Fig. 1.

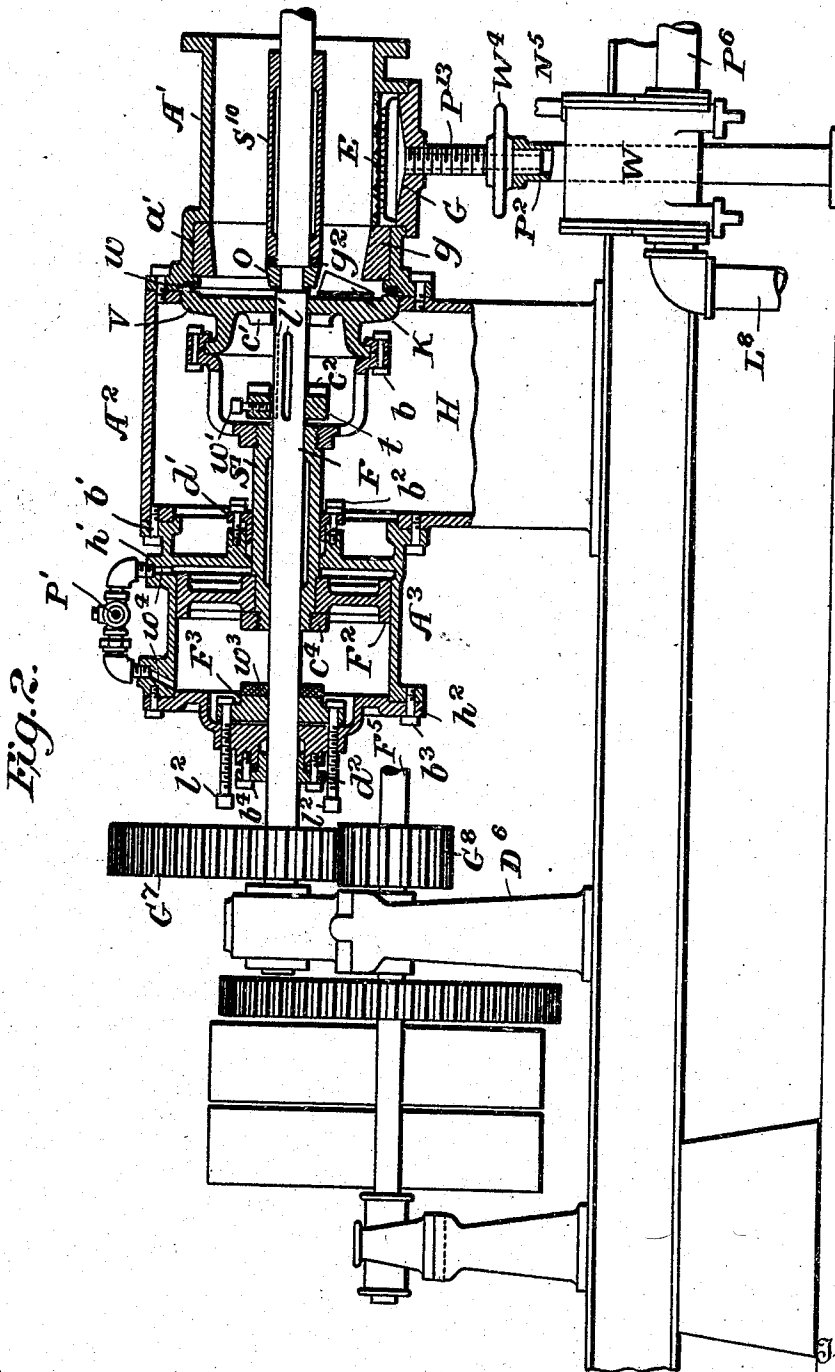
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 6 SHEETS—SHEET 2.



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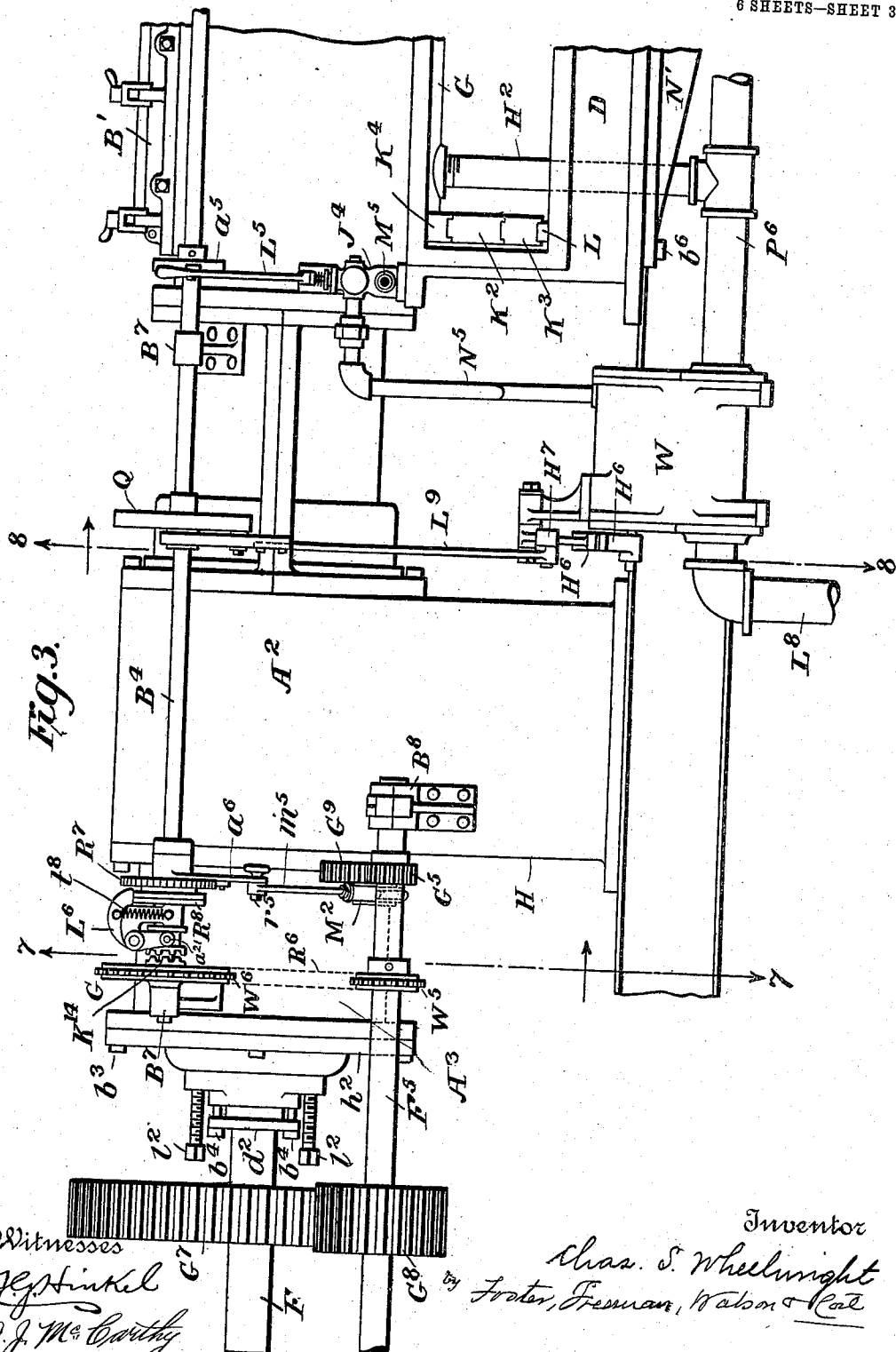
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6 SHEETS—SHEET 3.



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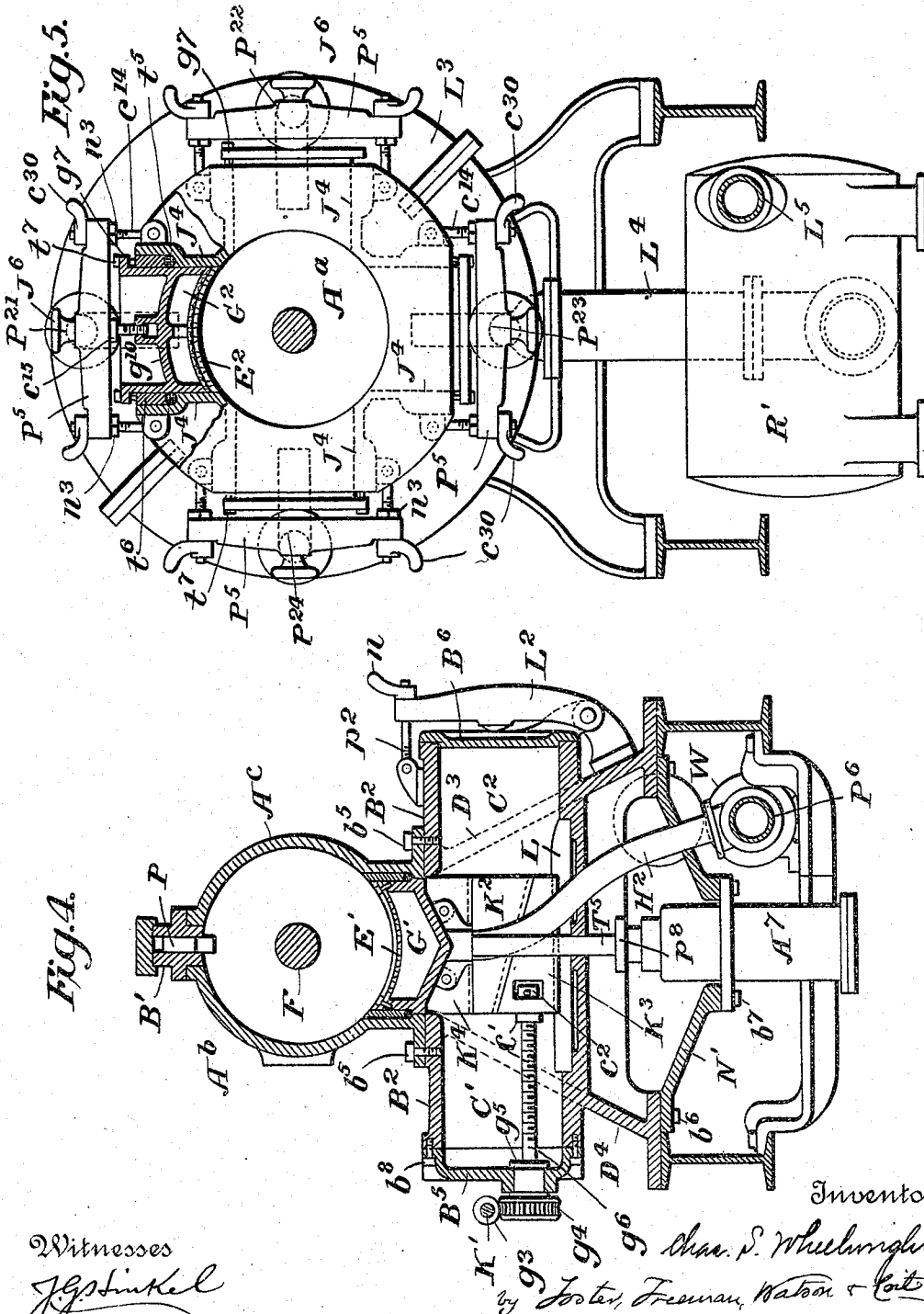
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 6 SHEETS—SHEET 4.



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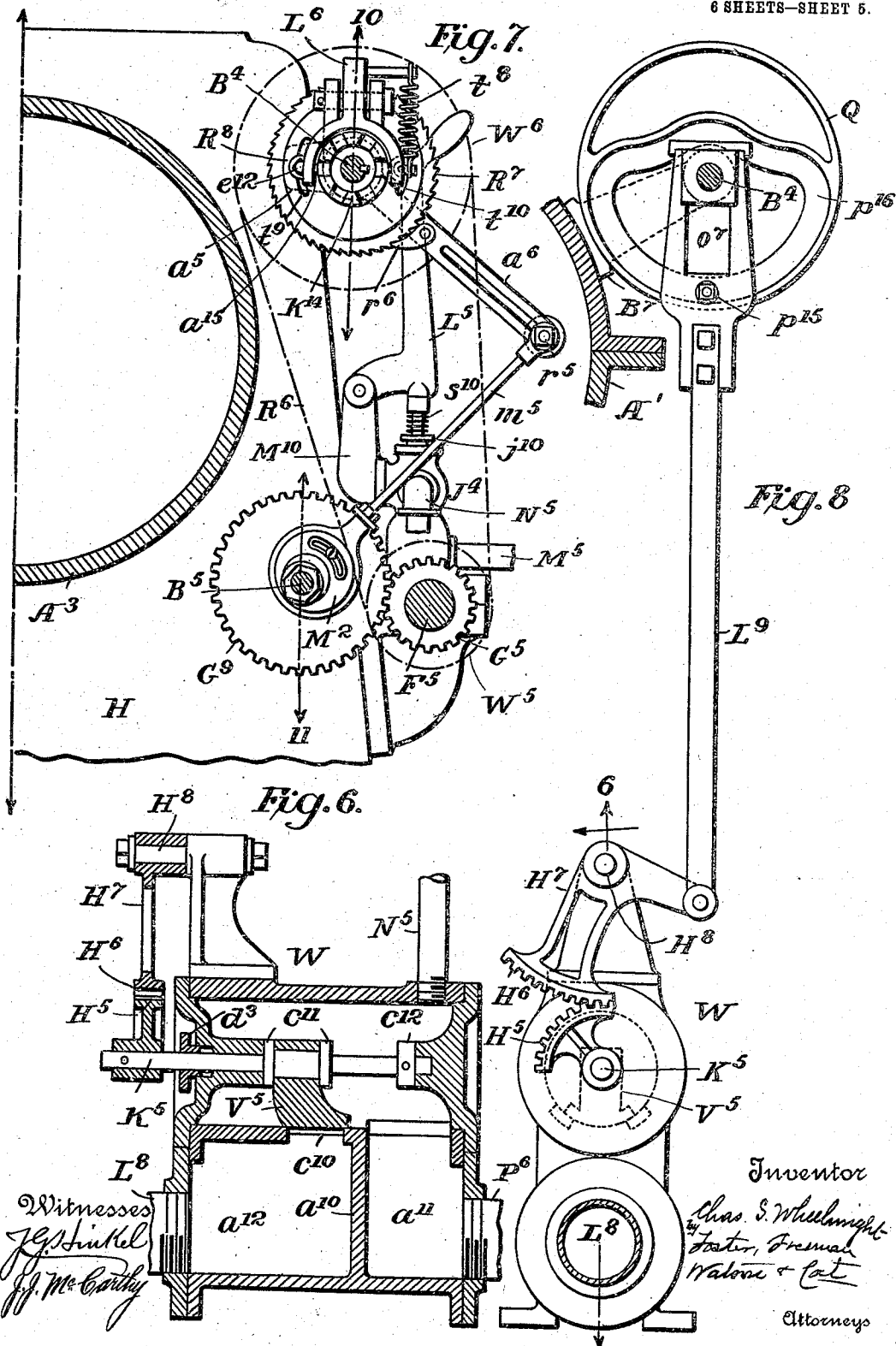
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6 SHEETS—SHEET 5.



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6 SHEETS—SHEET 6.

Fig. 9.

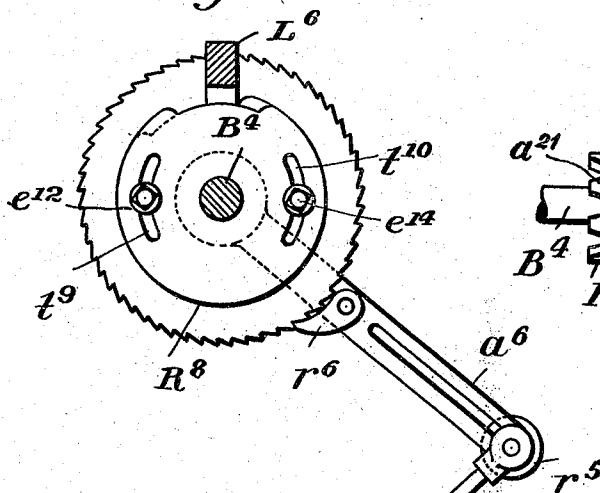


Fig. 10.

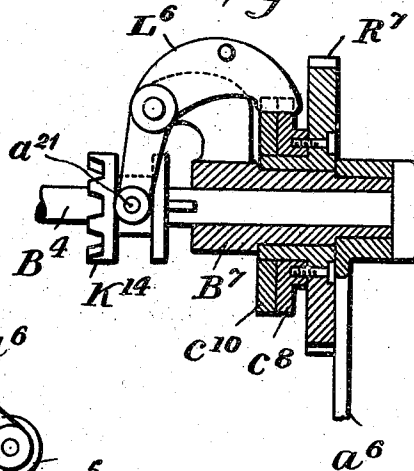


Fig. 11.

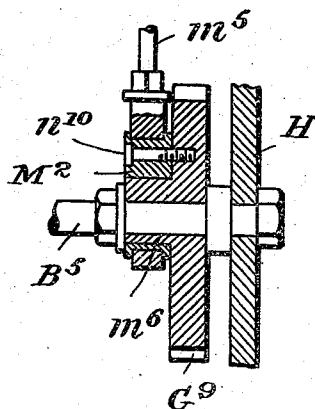
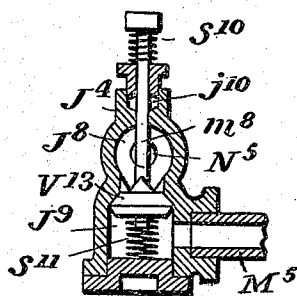


Fig. 12.



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UNITED STATES PATENT OFFICE.

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CARRYING AND PRESSING APPARATUS.

939,576.

Specification of Letters Patent.

Patented Nov. 9, 1909.

Application filed December 14, 1908. Serial No. 467,501.

To all whom it may concern:

Be it known that I, CHARLES S. WHEELWRIGHT, a citizen of the United States, and a resident of Bristol, in the State of Rhode Island, have invented new and useful Improvements in Carrying and Pressing Apparatus, of which the following is a specification.

The invention relates especially to apparatus designed for use in a garbage or rendering plant, but may be put to other uses. It is an improvement upon the inventions set forth in my Patents No. 783,602, dated February 28, 1905, and No. 890,112, dated June 9, 1908, to which reference is made for many of the details of apparatus in which the present invention is embodied.

The invention consists in the combination with a chamber provided with perforated plates for draining under pressure materials saturated with or accompanied by water, of means for blowing out or clearing the perforations in said plates while the pressure in said chamber is continued.

The invention consists further in the combination with the invention stated above, of means for the automatic operation of the same.

It consists further in means for determining the periods at and during which said means for blowing out or clearing the perforations shall act automatically.

The invention consists further in details of construction whereby the draining surface of the apparatus is greatly enlarged.

It consists further in improvements upon the original conveying and pressing apparatus of the former patents upon which the present invention is engrafted, more especially in an improved device for operating the regulating valve against which the "plug" of the former patents is formed, and in an improved guard for the main shaft to prevent its becoming clogged with rags and similar articles.

The invention consists further in other details of construction.

In the drawings: Figures 1 and 2 together constitute a longitudinal elevation mostly in section showing the apparatus, Fig. 1 being the entrance half of the appa-

ratus, and Fig. 2 showing the remainder of the apparatus including valve mechanism. Fig. 3 is a longitudinal elevation of the said second half of the apparatus, including valve mechanism. Fig. 4 is a cross-section on line 4—4 of Fig. 1. Fig. 5 is a cross-section on line 5—5 of Fig. 1. Fig. 6 is a longitudinal section of a cylinder containing a water trap, air chamber, and valve mechanism. Fig. 7 is a view partly in cross-section and partly in elevation on line 7—7 of Fig. 3. Fig. 8 is a view partly in cross-section and partly in elevation on line 8—8 of Fig. 3. Fig. 9 is a detached view of part of the devices shown in Fig. 7. Figs. 10 and 11 are sections on the line 10—11, in Fig. 7. Fig. 12 is a detail showing an air valve.

The invention has mostly to do with drain plates, as they have been termed, through which water and water and oil in the application of the invention to garbage or rendering plants, are forced from the conveying and pressing mechanism. The drain plates shown in the drawings are provided with a filter cloth, the actual construction being two perforated plates with a cloth between them, the same being known in the arts as a filter press, and this construction is included under the term drain plates wherever the latter is used in this specification, but not to the exclusion of the simple drain plate. In a garbage plant where water is used over and over again, and it is immaterial whether it is pure, the drain plate by itself will answer the purposes of the invention, but in the manufacture of paper, of starch, or of lard, etc., the filter press becomes necessary.

A is the conveying cylinder formed in sections A^a, A^b, and A^c, as in my former patent. B is the conveying screw, keyed to the main shaft F of the apparatus. P, P, are metal swing plates, in the said former patent termed fins, pivoted in boxes B' set in the periphery of said conveying cylinder to follow the revolutions of the screw B, and imparting frictional resistance to the more solid parts of materials passing through the conveying cylinder.

I is an inlet to the conveyer, leading from a digester or other source of supply.

E¹ and E² are perforated plates (or filter

presses) adjustable to and from the conveying cylinder through which plates water, or water and oil, given up by the tankage as the latter passes through the conveying cylinder, are forced from the cylinder. A' is an additional section being an extension of said conveying cylinder beyond the conveying screw B having in the same casting a chamber *a'* of a little larger diameter, internal and external, than said extension A'; and A² is a still further section forming a still further continuation of said conveying cylinder, containing the regulating valve V having the mode of operation of a similar valve in my said former patents. The said sections are properly bolted together. The said chamber *a'* is adapted to hold a choking ring *g*, which modifies the shape or consistency of the plug of material formed in and passing through the apparatus as it is presented to the regulating valve; but said choking ring may have a different form from the ring shown. In the extension A' is a loose sleeve S¹⁰ upon the main shaft, whose office is to prevent the rolling up of rags and similar articles about the main shaft as they pass through the apparatus. The said sleeve is best made in two parts and is held in place against the end of the conveying screw B by a tight collar O held in position in a recess on the shaft F, as shown. Chafing rings *g'* and *g''* are used at either end of the sleeve. The extension A² has attached thereto a branch containing the tankage exit H of the conveying cylinder. In this extension A², as stated above, is the said regulating valve V, sliding upon the main shaft F substantially as described in my said former patent and operating against a packing ring *w* set as a seat in the end of the extension A', to open or close the passage between A' and A², the operating face of said valve V being provided with knives K for a purpose described in my former patents. The regulating valve is of cage-form and is made in two parts bolted together by bolts *b*. A collar *t* on the main shaft within the cage turns with the main shaft being held in place for that purpose by screw-pins *w'* (but one is shown) working into slots *l'* upon the main shaft. The valve V turns with the main shaft only when it is drawn far enough back, by mechanism to be described, for clutch jaws *c'* on said valve to engage the other jaws *c''* on said collar *t*. The regulating valve is screwed upon the sleeve S', upon the main shaft, one end of which projects into a third extension A³ of the conveying cylinder. A head, *h'*, of the extension A³ is secured to extension A² by bolts *b'*. A suitable packing follower, *d'*, secured to head *h'* by bolts *b''* compresses a packing about the sleeve S', as shown.

F² is a piston fitting in the inner periphery of extension cylinder A³ and secured against a shoulder in sleeve S' by a collar *c'* screwed upon the said sleeve.

The extension A³ together with the conveying apparatus is closed at the farther end by a cylinder-head, *h''*, secured to flanges 70 upon the barrel of extension A³ by bolts *l''*. A suitable packing is provided about the main shaft F and held by a follower *d''* secured to the head *h''* by bolts *b''*, as shown. Ports *w''*, *w'''*, in the shell of the extension A³ admit compressed air to one side or the other of said piston F² from a pipe P' connecting with the compressed air system of the apparatus, there being a three-way valve in the connection of pipe P' with the pipe 80 leading to said compressed air system.

F³ is a stop adjustable by screws *l''*, *l'''* in head *h''* limiting the movement of the piston F² and regulating valve V in one direction, (the jar being taken up by a rubber ring *w''*,) while in the other the movement is limited by the packing ring *w*.

It is unnecessary to describe the mechanism shown in the drawings for taking up the end thrust of the main shaft F, or other mere details, the construction of which is obvious or has been set forth in other patents. Nor is it necessary to explain in full the mode of operation of the mechanism thus far described. It is sufficient to say 95 that material accompanied by an over abundance of water enters the machine at the inlet I, is taken by the conveying screw B and with the assistance of the fin-plates P, P, is carried through the machine forming a plug against the regulating valve V, which when that valve is opened finally drops at section A² through the branch, II, the excess of water being provided for as hereafter described.

The means employed for supporting the conveying cylinder and attachments differ somewhat from the means of the former patent 890,112. That is, while the third section A^c of the conveyer is supported on a bed D cast in the form of a long box with openings at the top and bottom and having perpendicular ends D', D'', and inclined sides D³, D⁴ substantially as both sections A^b and A^c are supported in my former patent (see Fig. 4 herein,) section A^b, including the entrance section A^a, is outside of the bed D and is supported at one end upon the frame of the bed D and at the other on the post D⁵. Section A', also outside of the bed D at the other end of the conveying screw, is supported by the frame of the bed D and the extension or casing A². The extension A², including the branch II, rests upon its own bottom. Section A³, as previously shown, is attached to section A². The main

shaft F is supported at the extreme ends by the post D⁵, previously mentioned, and a post D⁶. Much of the apparatus extends beneath the floor and is supported by sub-foundations, as shown. The said top of the bed D has inclined sides with flanges to which is bolted by bolts b⁵, b⁶ a coinciding flange on downward extending parts on the section A^c of the conveying cylinder (see Fig. 4). The bottom of the bed has also a flange around its sides and ends designed to rest upon the floor of the building, or upon I-beams especially constructed therefor. There is also a long opening in the said bottom of said bed which is closed by a dish-shaped casting N' bolted thereto by bolts b⁶, b⁶, and extending below said floor, there being at the center of said casting N' an opening through which extends a compressed air cylinder A⁷ secured thereto by bolts b⁷, b⁷ which pass through flanges of said cylinder A⁷, as shown. A drain pipe P¹⁰ is provided for the bed D, set near the bottom of the said casting N'. Girders or bridges L are employed within the box or bed D, as shown, and as more fully described in my said former patent. In the top of said bed is a long opening corresponding in size to the plate E' through and in which the said plate may be set up to the conveying cylinder. In the opposite inclined side of the section A^b, Fig. 4, are longitudinal openings, each of which is surrounded by a neck B², thus inclosing chambers C' and C², the chambers C' at the back (or left, Fig. 4) being closed by a cap B⁵ bolted in place by bolts b⁸, while the chamber C² is closed by a cap B⁶ hinged at the lower edge so as to swing outward to open the chamber, but held in place by a pivoted clamping lever L², the upper end of which is forked to receive a swinging threaded bolt p², on which is a hand nut n. There may be any desired number of these openings, necks and chambers C', there being, however, but a single chamber C².

K' is a shaft along the back of the bed D carrying worms g³, one of which is shown at Fig. 4. The worms engage and turn worm wheels g⁴, (but one is shown), each having a hub g⁵ which turns in bearings in the plate B⁵, and is provided with a collar whereby it cannot move horizontally. The interior of the hub g⁵ has a screw thread which takes into a corresponding thread on a shaft g⁶ one end of which is free while the other is rigidly secured to the block K³ by means of two collars c', c² pinned to the screw, as shown, the latter collar, c², being in a recess in said block K³. The shaft g⁶ is made fast in the block K³. The upper surface of block K³ is inclined, as shown, and, as the block is moved in one direction

or the other by the mechanism just described, it acts as a wedge upon the under surface of a similarly inclined block K² to set the said block K² up or lower it in the apparatus. The blocks K³, K², the bridge supports or girders L upon which the blocks move, and projections from the frames of the drain plate E', hereinafter described as water boxes G', against which they work to raise or lower the same, are dovetailed into one another as fully described in my Patent No. 890,112 and as shown in Figs. 1 and 4 in the present case. There are two of these sets of blocks K³ and K² and upon the blocks K² rests the said water box G', the top of which serves as a frame for a before mentioned drain plate E'.

The water box G' (Fig. 4) is of shallow depth having inclined sides at the bottom and extending beneath the conveying screw nearly the length of section A^c or about half the length of the conveying screw B, supported at its ends upon inclined blocks K³, K², downward projections K⁴ from said ends resting on block K², and at its middle portion by a piston rod T⁵ from the piston t² in the compressed air cylinder A⁷, bolted to the said piston working through a packing box p⁸ in the top of each cylinder A⁷. In the top of the water box G', as a frame, is fitted the filter press of the construction above described (or in some instances a single perforated plate) E'. The slanting sides of the bottom of the box G' insure that water in said box may drain off, or more properly be forced through two flexible pipes or pieces of hose H², one end of each of which is inserted in a suitable manner in a hole in the bottom of said box G' while the other is suitably connected to a fixed water pipe P⁶, the purpose of which will appear. To remove the water box G' from the apparatus, the blocks K³ are drawn successively into the chamber C' and the plate B⁶ having been swung down, and the piston-rod T⁵ having in meantime been lowered by admission of compressed air upon the upper side of piston t⁵ through pipes N⁷, N⁷, as determined by a three-way hand valve, not shown, in the connection of said pipes N⁷, N⁷ with a pipe leading from compressed air system, and the pieces of hose H² having been removed, the water box G' and the filter plate carried thereby are taken out through the front of the machine.

At section A^b near to the entrance section A^a of the apparatus, where there is an overabundance of water in the operation, four sets of the filter presses are used, the same being arranged about the conveying screw, two above and below and two at the sides. Such construction is best shown at Fig. 5 which is taken on line 5—5 of Fig. 1. It

will be sufficient to describe the construction and mode of operation of the set above the conveying screw, since the pressure from within is substantially the same in all directions.

Sections A^a and A^c are each cast with an end flange, H⁴ and H⁵, respectively between which flanges are inserted in sections A^b four water boxes G² substantially of the length of section A^b (but of less weight than the water box G¹) and mechanism for carrying off water as follows: Between the flanges H⁴, H⁵ extend four series of parallel flanges J⁴ (Fig. 5), constituting necks around openings communicating with the interior of the section A^b and receiving each a drain box G² and a filter plate E², each drain box having a transverse diaphragm g¹⁰, and being movable radially by turning a screw J⁶ which extends through a yoke P⁵ held in place by means of swinging bolts c¹⁴ pivoted to ears on the flanges and provided with hand nuts, c³⁰, the threaded end of each screw J⁶ extending into a threaded opening of the drain box. Suitable packing rings t⁵, t⁵ surrounding said boxes and lying on a shoulder in said flanges J⁴ and held in place by ring plates t⁶, are employed, as shown, screws t⁷, t⁷ passing through ears g⁷, g⁷ on the said box G² and entering the said ring plate t⁶, the whole forming a proper packing means. The swinging levers c¹⁴ swing into slots at either end of the yokes where they are made secure by the hand-nuts c³⁰. Set-nuts n³ upon the swinging lever are screwed up against the yoke for firmness. A set collar c¹⁵ and a shoulder on hand screw J⁶ confine said screw to its position in the yoke.

L³ is a water pipe surrounding the conveying cylinder at section A^a and communicating with each of the four drain boxes at section A^b by pipes P²¹, P²², P²³, P²⁴, bolted to a similar pipe-projection from L³, the said pipes P²¹, etc., being provided with suitable packing boxes d⁴. The pipe L³ communicates by a pipe L⁴ with a water reservoir R¹, somewhat large, as shown, but which must be large enough together with pipes connecting therewith to hold sufficient water to be forced back, under the pressure of compressed air admitted to the water system of section A^b, as will be described, to clear the perforations of the plates, for steam or compressed air acting upon the perforations without the intervention of the water is apt to clear one or two holes to the neglect of the remaining holes.

Section A^c is furnished with a similar filter press or plate E set in a water box G of substantially similar construction to the boxes above described, held in place between flanges in the casting forming the shell of section A^c by yokes, not shown, in the usual

manner. Water drained or forced through the plate E passes down through a pipe P¹³ which is telescoped in to a pipe P² leading out of the machine. It should be observed that this pipe and all others leading out of the machine lead to reservoirs and separators in the general plant embodying my inventions relating to garbage and similar uses as shown in many patents to me.

The entire apparatus herein described and shown is water tight and air tight.

W⁴ is a hand-wheel by which pipe P¹³ is telescoped in to pipe P² and the box G lowered from section A^c.

W is a water tight and air tight cylinder the lower part of the interior of which as the cylinder lies on its side, as shown, belongs to the water system of the apparatus while the upper part belongs to the compressed air system (see Fig. 6). A partition a¹⁰, establishes the level at which water shall remain in compartment a¹¹, of the cylinder as a trap, the main body of the water flowing over the said partition and through a port c¹⁰ into compartment a¹² and out through pipe L⁸. The port c¹⁰ is normally open but at times is closed by a rocking valve V⁵ rocking with a shaft K⁵ to which it is secured and which has bearings in the heads or ends of cylinder W. The valve V⁵ has collars c¹¹, c¹¹ upon either side on shaft K⁵, which has further collars c¹² on the inner end, as shown, and a packing box d³ near the other end. The said valve V⁵ is operated by a toothed sector, H⁵, rigidly attached to shaft K⁵ which projects beyond the head of cylinder W (see Fig. 6), a second toothed sector H⁶ upon one end of a bell crank lever H⁷ giving motion to H⁵. The bell crank lever H⁷ is pivoted to a stud H⁸ in a projection from cylinder W and in turn is operated by a connecting rod L⁹, to which its other arm is pivoted and which receives a slightly reciprocating movement to operate said bell crank lever from time to time from a cam upon a cam-shaft B¹, as will be explained.

N⁵ is a compressed air pipe leading from a source that will be mentioned, to the interior of cylinder W at the top, the purpose of the pipe being that when compressed air shall enter said cylinder W it shall force water in compartment a¹¹ and in pipe P⁶, flexible pipes H² and water box G, back through the filter press or plate E¹.

W¹ is a water and air tight cylinder in section A^b to perform a similar office to that performed by cylinder W in section A^c, being connected with reservoir R¹ by a pipe L⁵. The interior of cylinder W¹ is of the same construction as cylinder W, and the mechanism without the cylinder for operating the rocking valve is the same as that

used in section A^c but is not shown as unnecessary and to avoid confusion in the drawings. A deficiency of water in section A^c may be remedied by the use of a reservoir, such as R' in the water system of section A^b.

N⁶ is a compressed air pipe similar to N⁵.

The apparatus for compressing air used in the machine for forcing back water to clear the plates E' and the plates E² (as well as for other purposes) is not shown, but it is sufficient to say that compressed air enters from a compressor, not shown, through branches (but one is shown, M⁵) from a general supply pipe (not shown) appropriated respectively to perforated plates or filter presses E' and E², with a valve in each branch. A description of one valve, V¹³, will suffice for both. Each valve casing J⁴ (Figs. 3, 7, 12,) has the seat for a valve V¹³ pressed upward by a spring s¹¹, thereby dividing the casing into two chambers J⁸, J⁹, the valve stem m⁸ extending through a packing box j¹⁰ at the top of the casing, a spring s¹⁰ intervening between the follower on the packing box and a head or knob on the end of the valve stem. With the said chambers connect, respectively, pipes N⁵ leading to the cylinder W and pipe M⁵ leading from the compressor. In operation the valve is opened by an elbow lever L⁵ pivoted to an arm M¹ on the valve casing J⁴, the elbow of the lever pressing down upon the head of the valve stem therein. When valve V¹³ is open compressed air entering the casing J⁴ by the pipe M⁵, from the compressor, as before stated, goes out to the cylinder W by pipe N⁵. The said elbow lever, as is obvious, may be operated by hand, but means whereby it operates automatically will now be described.

B⁴ is a cam shaft arranged along the front side of the conveying cylinder A revolving in bearing boxes B⁷, B⁷ projecting from the conveying cylinder and provided with a cam a⁵ which acts upon the elbow lever L⁵ in section A^c (a similar cam acting on a similar lever in section A^b, is not shown,) to force the said lever at intervals, regulated by mechanism connected with the cam shaft, to open the valve V¹³ to let compressed air into the apparatus, *i. e.* into the upper part of cylinders W and W' over the water therein. Lower down also in front of section A³ supported at one end in a bearing B⁸ in turn supported by the casing A² and at the other at a bearing in the post supporting the main shaft, is an intermediate shaft F⁵ taking its motion from the main shaft F, by gears G⁷ and G⁸, and communicating motion to an idle sprocket wheel W⁶ on said cam shaft B⁴ by a sprocket wheel W⁵ on said intermediate shaft, sprocket chain R⁶ and the sprocket

wheel W⁶ on said cam shaft, carrying clutch-jaws 14 the other like jaws being on a sliding clutch section on the cam shaft.

B⁵ is a stud projecting from the branch H to the inside of which it is secured, and upon it is a loose running gear G⁹ taking motion from gear G⁵ on the intermediate shaft. Upon the hub of said gear G⁹ secured by mechanism which will be described, is an eccentric M² giving an eccentric rod m⁵ a to-and-fro motion, the farther end of said rod being adjustably attached to a pawl lever a⁶ by a hand screw r⁵ working in a slot in said pawl lever, which lever extends from the bearing B⁷. A pawl r⁶ carried by the said pawl lever takes into a ratchet wheel R⁷ on the cam shaft B⁴, as shown, there being attached to the face of said ratchet wheel so as to turn with it a double or variable sectional cam R⁸, acting upon the periphery of which is an elbow lever or dog, L⁶, pivoted at the elbow to a projection from B⁷, one end of which is held in contact with the variable cam by virtue of a spring t⁸, while the other end of the lever is forked to straddle the sliding section of the clutch K¹⁴ upon the cam shaft, each arm of the fork being furnished with a pin a²¹ which enters a groove in said second clutch-section K¹⁴. The cam R⁸ is termed variable, since the depression therein is capable of adjustment. Thus the said cam is divided into two sections c⁸ and c¹⁰, both fitting on the hub of the ratchet wheel R⁷, the operating surface of the one being identical with the operating surface of the other, but while one cam is fixed upon the said hub, being secured to one face of the ratchet wheel R⁷, the other is movable around the same hub, or in other words, the face of one cam is movable over the face of the other, a distance determined by the slots t⁹, t¹⁰, and pins e¹², e¹⁴, whereby the depression in the operating surface is increased or diminished. The throw of the eccentric rod m⁵ depends upon the position of the eccentric M² which is adjustable about an inner eccentric n⁶ on the hub of gear G⁹ by means of a slot n⁸ and a pin n¹⁰ passing through said slot and entering the face of gear G⁹.

The object of the mechanism herein so minutely described is not only that compressed air shall be admitted for the purpose of clearing the filter presses, at intervals, but that intervals of time between actions of the compressed air shall be sufficiently long for the conveying cylinder to do its work without substantial interruption. With mechanism substantially as shown, the said cam shaft B⁴ may be kept at rest for ten or even twenty minutes or more. The sprocket wheel W⁶ on shaft B⁴ has double the diameter of sprocket wheel W⁵ on shaft F⁵, and therefore the shaft B⁴ when

in motion, turns with only half the rapidity of shaft F⁵, the time of whose own movement is determined by the main shaft F, and the gears G⁷ and G⁸. But, as may be readily seen, the cam shaft B⁴ is only in motion while the clutch sections are engaged, when the dog L⁶ is in a depression in the double or variable cam R⁸, the step-by-step movement of which, (regulated by the sweep of the pawl p¹⁰ over the ratchet teeth, in turn regulated by the length of pawl lever a⁶ and the length of throw of eccentric rod m⁵ in turn regulated as will be described,) is exceedingly slow.

As just stated, the clutch K¹⁴ and the cam shaft B⁴ revolving with it are in operation only while the dog L⁶ is in the depression of the variable cam R⁸ but the time of the said clutch and said cam shaft in making a revolution when once started is independent of the means by which it is started and stopped, but depends, as already shown, upon the difference of the diameters of the sprocket wheels W⁵ and W⁶. It follows that the cams a⁵ upon the cam shaft B⁴ may be made to trip the valves operated by said cams once, twice, or three or four times quite rapidly and then will lie idle for a long period of time during which the apparatus described will continue to carry forward and subject to pressure garbage or other substances placed therein.

Q is a cam-wheel upon the cam shaft B⁴ and revolving therewith, having on one face a cam-groove p¹⁶ in which is a cam-roll p¹⁵ upon the connecting rod L⁹ operating the bell crank lever H⁷, as above described. The lever L⁹ at its upper end or in an attachment serving as its upper end, has a slot O⁷ within which fits a guide box surrounding the cam shaft B⁴. The revolution of the cam-wheel Q causes the cam-roll p¹⁵ to vary its position to and from the cam shaft according to the position it assumes in the cam groove, the travel of which about the roll on the connection rod gives a rocking motion to the sector crank H⁷.

The arrangement of the cams a⁵ and the cam wheel Q on the cam shaft B⁴ is such that the water valve movement leads the tripping of the air valves, so that while the air valves are open the water valves are closed and the traps are sealed, and the air acts upon the water to send the latter through the filter plates. Having done this the air valve quickly closes and thereafter the water valve gradually opens.

A description of the operation of the herein described mechanism in detail is not necessary. Previous patents have described in detail how material accompanied by water entering the conveying cylinder will be carried under pressure by the conveying screw and fins against the regulating valve

and to the hopper through which the material will be discharged. By the present improvements, while said material accompanied by water is carried through the conveying cylinder, water discharged therefrom or forced therefrom through the drain plates may momentarily without the stoppage of the machine automatically be sent back through the drain plates to clean the perforations thereof at predetermined intervals.

I claim:—

1. In a device of the class described the combination with a conveying and pressing cylinder adapted to receive and forward under pressure material saturated with and accompanied by water, drain plates for said cylinder, and means for pressing the material and forcing the water through said drain plates, of means for forcing said water or a part thereof back through said drain plates into said cylinder against the pressure therein.

2. In a device of the class described the combination with a conveying and pressing cylinder adapted to receive and forward under pressure material saturated with and accompanied by water, drain plates for said cylinder, and means for pressing the material and forcing the water through said drain plates, of means for automatically forcing said water or a part thereof back through said drain plates into said cylinder against the pressure therein.

3. In a device of the class described the combination with a conveying and pressing cylinder adapted to receive and forward under pressure material saturated with and accompanied by water, of drain plates for said cylinder, means for pressing the material and forcing the water through said drain plates, and means for automatically forcing said water or a part thereof back through said drain plates into said cylinder against the pressure therein at predetermined intervals.

4. In a device of the class described the combination with a conveying cylinder adapted to receive and forward under pressure material saturated with and accompanied by water, and provided with a drain plate for the passage of said water from said cylinder, of apparatus outside of said cylinder adapted to receive water through said drain plate and permit its passage through said outside apparatus, means for closing said outside apparatus to the passage of water and means for forcing the water back into the cylinder through the drain plate against the pressure in said cylinder.

5. The combination with a chamber adapted to receive and press material, a drain plate in the wall of said chamber for the passage of water from said chamber and

apparatus outside of said chamber adapted to receive water through said drain plate and permit its passage through said outside apparatus, of means for closing said outside apparatus to the passage of water and means for forcing said water back into the chamber through the drain plate against the pressure in said chamber.

6. The combination with a pressing chamber adapted to press material saturated with and accompanied by water, provided with perforated outlets for the passage of said water, and apparatus outside of said chamber adapted to receive said water and permit its passage therethrough, of means for closing said outside apparatus to the passage of said water and means for admitting compressed air upon said water remaining in said apparatus to force it back through the perforations in said outlets against the pressure in said chamber.

7. In a device of the class described the combination with a conveying and pressing cylinder adapted to receive and forward under pressure material saturated with and accompanied by water and provided with a drain plate for the passage of said water, of apparatus outside of said cylinder adapted to receive said water through said drain plate and permit its passage through said outside apparatus, means for closing said outside apparatus to the passage of water, and means for forcing said water or a portion thereof back through the perforations in said drain plate against the pressure in said cylinder.

8. In a device of the class described, the combination with a conveying cylinder adapted to receive and forward under pressure material saturated with and accompanied by water, a hollow bed supporting said cylinder and constituting a chamber communicating with said conveying cylinder through openings in the top and bottom of each respectively, a water-tight box fitting in and closing said openings, and a draining plate constituting a cover for said box and forming a continuation of the wall of said cylinder when said box is in position, of means for lowering said box and draining plate into said chamber, and means for removing the box and draining plate from the chamber through a wall thereof.

9. In a device of the class described, the combination with the conveying cylinder adapted to receive and forward material saturated with and accompanied by water, of a hollow bed supporting said cylinder and constituting a chamber communicating with said cylinder through openings in the top and bottom of each respectively, a water-tight box fitting in and closing said openings and movable downward into said chamber, a draining plate constituting a cover

for said box and forming a continuation of the wall of said cylinder when said box is in position, a receptacle adapted to receive and trap water passing through said draining plate and water-box, means for forcing the trapped water back into said conveying cylinder through said draining plate, and means for removing said box and draining plate from said chamber through a wall of said chamber.

10. The combination of the conveying cylinder, the conveying screw and mechanism for revolving said screw, the drain plate in the periphery of said conveying cylinder, the water box outside of said conveying cylinder and said drain plate, and a passage-way for water from said water box with an enlargement therein containing a water trap and a water valve beyond said trap, with means for stopping the flow of water thereof through said passageway and forcing it back through said water-box and drain plate into said conveying cylinder.

11. The combination with the conveying cylinder, the conveying screw and mechanism for revolving said screw, the drain plate in the periphery of said conveying cylinder, the water box outside of said conveying cylinder and said drain plate, and a passage-way for water from said water box with an enlargement therein containing a water trap and a water valve beyond said trap, and a compressed air pipe, with a valve therein leading from an extraneous source and opening into said enlargement above the water in said trap, of a cam shaft carrying two kinds of cams, one kind adapted to close and open said water valve and the other kind adapted to open and close said valve in said compressed air pipe, the arrangement being such that said water valve shall open shortly before said compressed air valve opens and close shortly after said compressed air valve closes.

12. The combination with the conveying cylinder, the conveying screw and mechanism for revolving said screw, the drain plate in the periphery of said conveying cylinder, the water box outside of said conveying cylinder and said drain plate, a passageway for water from said water box with an enlargement therein containing a water trap and a water valve beyond said trap, and a compressed air pipe leading from an extraneous source and provided with a valve, opening into said enlargement above the water in said trap, of a cam shaft carrying two kinds of cams, one kind adapted to close and open said water valve and the other kind adapted to open and close said valve in said compressed air pipe.

13. In a device of the class described, the combination with a conveying and pressing cylinder adapted to receive material satu-

rated with or accompanied by water and
provided with perforated outlets for the pas-
sage of said water, of apparatus outside of
said cylinder and perforated outlets adapted
5 to receive said water through said outlets
and permit its passage through said outside
apparatus, means for closing said outside
apparatus to the passage of water at pre-
determined intervals and means for admit-
10 ting compressed air from an extraneous
source upon said water remaining in said
outside apparatus and forcing it or a por-
tion thereof back through the perforations
in said outlets against the pressure in said
15 chamber also at predetermined intervals.

14. The combination of a conveying cyl-
inder and conveying screw and mechanism
for revolving said screw, with drain plates
arranged about the screw in the wall of the
cylinder, a water box for each drain plate 20
and a circular pipe with which each of
said water boxes connects, and an additional
pipe adapted to carry off water from said
circular pipe.

In testimony whereof I affix my signature 25
in presence of two witnesses.

CHARLES S. WHEELWRIGHT.

Witnesses:

WILLIAM W. SWAN,
IDA E. HANDREN.