W. BARTHOLOMEW & F. BALZER.

PNEUMATIC CONTROLLED LOCK FOR CENTRIFUGAL EXTRACTOR COVERS.

APPLICATION FILED FEB. 20, 1913.

1,111,001.

Patented Sept. 22, 1914.

3 SHEETS—SHEET 1.

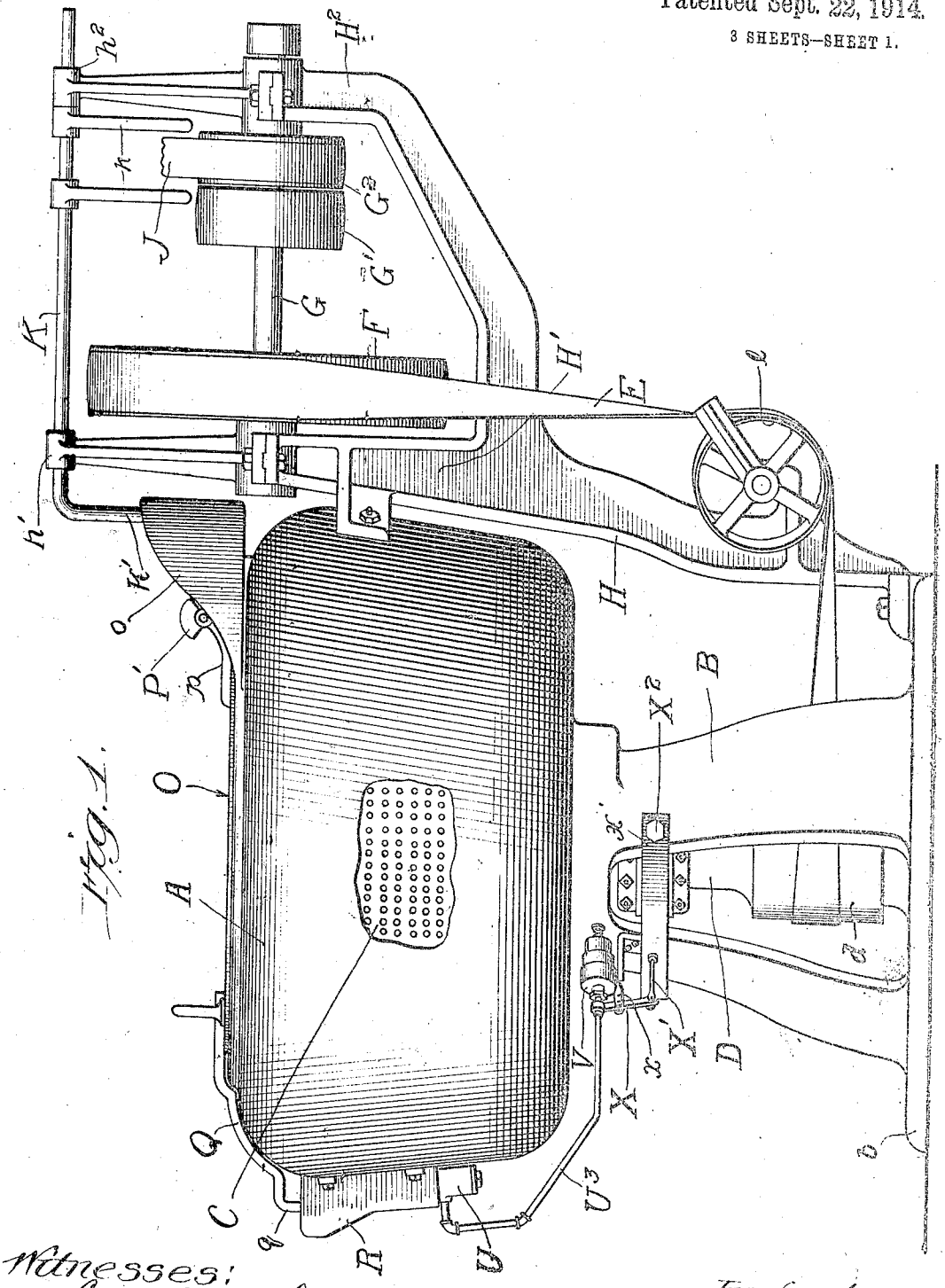


Fig. 1.

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3 SHEETS—SHEET 2.

Fig. 2.

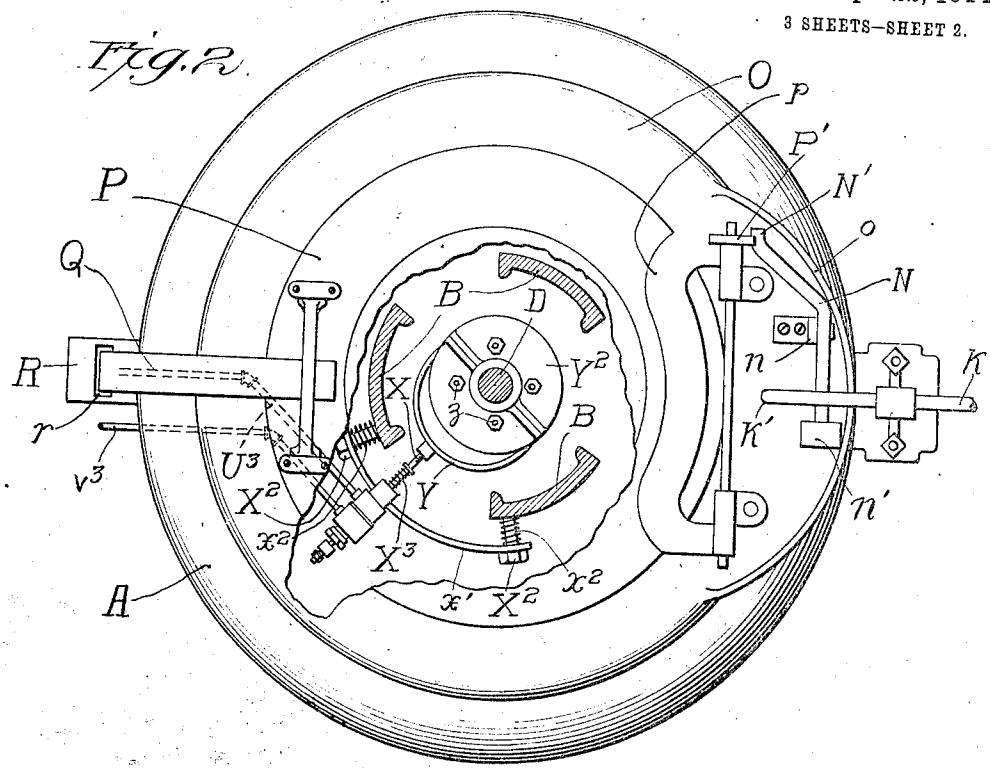


Fig. 3

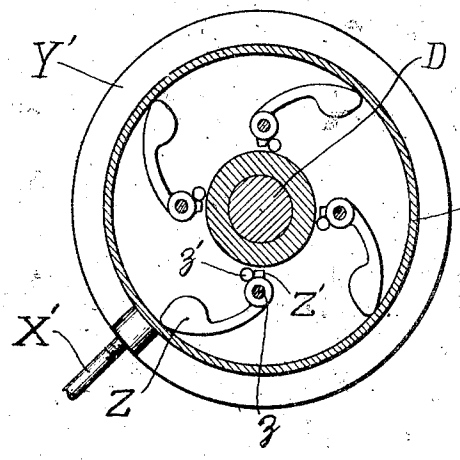
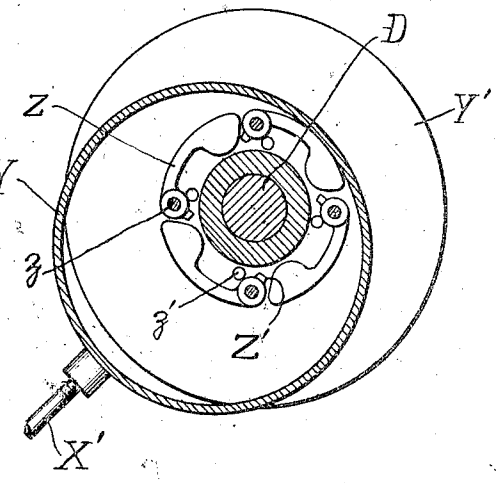


Fig. 4.



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3 SHEETS—SHEET 3.

Fig. 5.

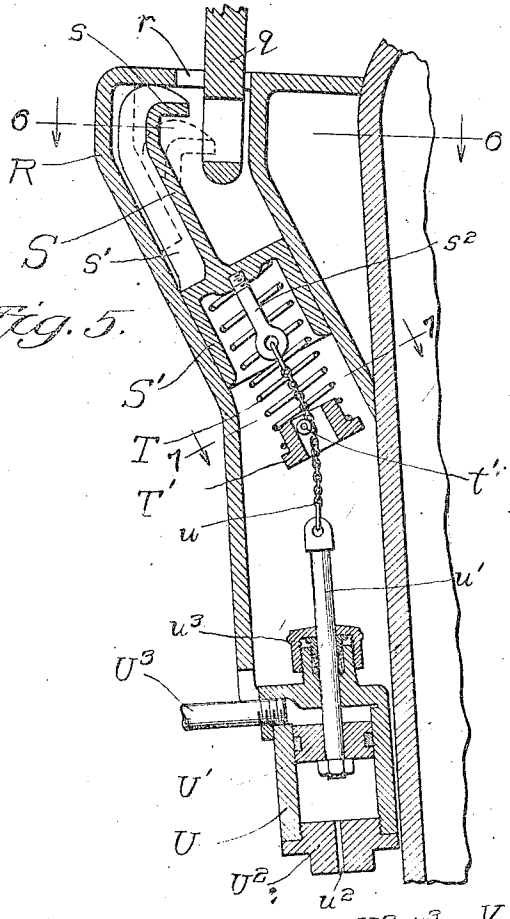


Fig. 6.

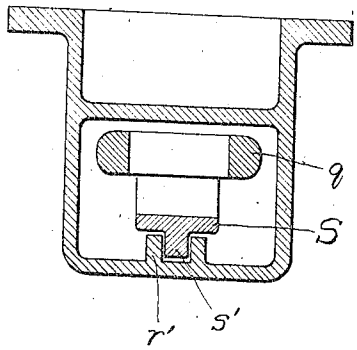


Fig. 7.

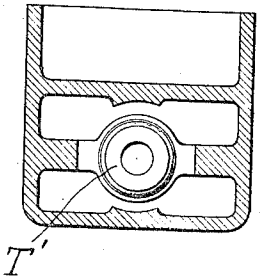
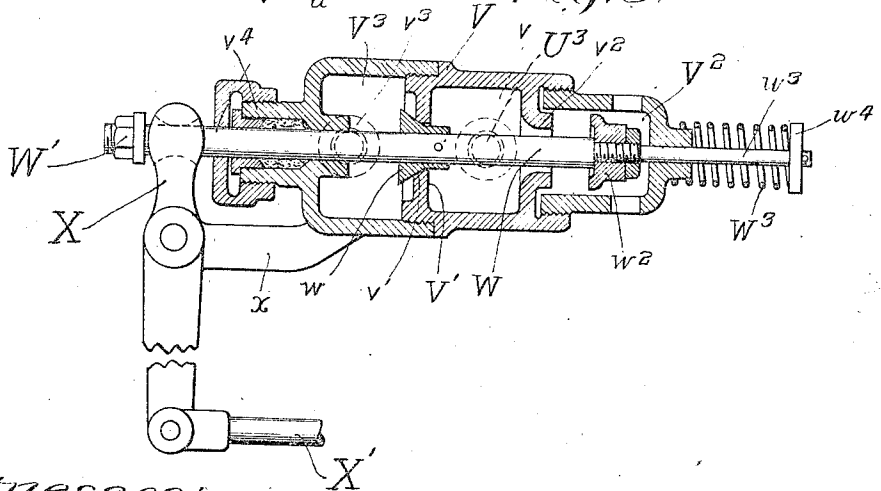


Fig. 8.



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UNITED STATES PATENT OFFICE.

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PNEUMATIC-CONTROLLED LOCK FOR CENTRIFUGAL-EXTRACTOR COVERS.

1,111,601. Specification of Letters Patent. Patented Sept. 22, 1914.

Application filed February 20, 1913. Serial No. 749,603.

To all whom it may concern:

Be it known that we, WILLIAM BARTHOLOMEW, a citizen of the United States, and FRITZ BALZER, a subject of the Emperor of Germany, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Pneumatically-Controlled Locks for Centrifugal-Extractor Covers, of which the following is a specification.

Our invention relates in general to laundry machinery, and more particularly to a pneumatically actuated lock for retaining the covers of centrifugal extractors in closed position during the rotation of the extractor baskets.

The high speed at which the baskets of centrifugal extractors are rotated renders their use dangerous to careless operators unless such extractors are provided with safety appliances for preventing access to the baskets while they are rotating. In order that such safety devices may fully protect the operators, it is necessary that access should be prevented to the baskets, not only while the power is applied to rotate them, but after the disconnection of the driving power and while the baskets continue to rotate by momentum at dangerous speeds.

The primary object of our invention is to provide centrifugal extractors, and similar machines, with a pneumatically actuated lock for automatically retaining the covers in closed position during the operation of the machines.

A further object of our invention is to provide centrifugal extractors, or similar machines, with a pneumatically operated lock for automatically retaining the covers closed, not only during the connection of the driving means with the rotating member of the machines, but also during the rotation of such member after the disconnection therefrom of the driving means.

A still further object of our invention is to provide a centrifugal extractor, or a similar machine, with safety mechanism for protecting the operator from injury, and which will be comparatively simple in construction and efficient in use.

Our invention will be more fully disclosed hereinafter with reference to the accompanying drawings, in which the same is illustrated as embodied in a convenient and practical form, and in which—

Figure 1 is a side elevational view; Fig. 2, a plan view, parts being broken away; Figs. 3 and 4, detail plan views of the means for automatically controlling the valve, the former figure showing the parts in the position they assume when the basket is rotating, and the latter the position of the parts when the basket has ceased to rotate; Fig. 5, an enlarged vertical section through the lock and air cylinder for actuating the same; Fig. 6, a horizontal section on line 6 6, Fig. 5; Fig. 7, a transverse section on line 7 7, Fig. 5; and Fig. 8, an enlarged longitudinal section through the valve mechanism for controlling the supply and exhaust of compressed air to and from the cylinder actuating the lock.

The same reference characters are used to designate the same parts in the several figures of the drawings.

A indicates the casing, or curb, of the extractor which is provided with a supporting base B having a platform *b* at the bottom thereof, which may be secured to the floor.

C designates the perforated basket within the casing A which is adapted to receive the articles from which the water is to be extracted.

D designates a shaft which is suitably connected to the basket C to rotate the same.

d indicates a pulley fixed upon the shaft D and around which passes a belt E. The belt E passes around idler pulleys *e* and thence around a large pulley F fixed upon a counter-shaft G. A bracket H is secured to the casing A and is provided with diverging arms H′ and H² in the ends of which the shaft G is journaled.

G′ indicates a pulley fixed upon the shaft G, while G² indicates a pulley loosely mounted upon the shaft G.

J indicates the power belt which is adapted to be shifted from the loose pulley to the tight pulley, or vice versa, by suitable belt shifting means. I have shown in the drawings a belt shifting means comprising a rod K which is mounted to reciprocate in bearings *h′* and *h²* projecting upwardly from the arms of the bracket H.

k designates a pair of curved rods secured

to the reciprocating rod K and engaging the opposite edges of the power belt J.

O designates a circular plate surrounding the opening through the top of the casing A which is provided with a water guard *o*.

P designates a cover which is pivoted by a hinge *p* to the plate O and when closed prevents access to the interior of the casing and the basket inclosed therein.

P′ designates a cam secured to, and preferably forming part of, the hinge portion *p* which is secured to the cover P, such cam being adapted to engage one end N′ of a lever N fulcrumed intermediate of its ends upon a bracket *n* secured to the casing A. The opposite end of the lever N is provided with a counterbalance *n′* so as to normally oscillate the lever N to a position below the lower end of a downwardly extending portion K′ of the belt shifting rod K. The position of the cam P′ is such that when the cover P is lifted, it will engage the end N′ of the lever N and oscillate the latter, so that it will be elevated into a position in the path of the lower end of the depending portion K′ of the belt shifting rod K in a manner which will be more fully hereinafter described.

Q designates a hasp fixed to the cover and having a depending portion *q* having an opening therein adapted when the cover is closed to be projected through an opening *r* in the upper end of a latch casing R. The latch casing R is secured in any suitable manner to the outer surface of the extractor casing A and contains a reciprocating latch S having a hook *s* at its upper end adapted to engage the opening in the lower end *q* of the hasp Q.

The latch S is provided with a rib *s′* which engages within a groove formed between parallel ribs *r′* on the inner surface of the front of the latch casing R. At the lower end of the latch S is a socket S′ suitably guided to reciprocate within the latch casing R and receiving the upper end of a spring T, the lower end of said spring being seated upon a bracket T′ fixed within the latch casing R.

t′ designates an anti-friction roller journaled in the bracket T′ and over which passes a flexible connection, such as a chain, *u*, connected at its upper end to an eye s^2 secured to the latch S within the chamber S′ thereof. The opposite end of the flexible connection *u* is pivotally connected to the outer end of a rod *u′* of a reciprocating piston U′. The piston rod *u′* extends through a suitable stuffing box u^3 in the upper end of a cylinder U in which the piston U′ is mounted to reciprocate.

U^2 designates the lower end of the cylinder which is provided with an opening u^2 communicating with the atmosphere.

U^3 designates a conduit communicating with the space within the cylinder U above the piston U′ and connected at its opposite end with a chamber *v* of a valve casing V. Extending axially through the valve casing V is a valve stem W upon which is fixed a valve *w* adapted to coöperate with a seat *v′* in the wall V′ of the chamber *v*. Also fixed to the valve stem W is a valve w^2 coöperating with a valve seat v^2 concentrically surrounding the stem W and controlling the connection between the chamber *v* and an exhaust chamber V^2 which communicates with the atmosphere.

V^3 designates a supply chamber with which communicates a conduit v^3 leading from a source of fluid pressure, preferably compressed air. One end of the valve stem W extends through a suitable stuffing box v^4 carried by the supply chamber V^3. The end of the stem W which projects through the stuffing box is engaged by the upper end of a lever X pivotally mounted upon a bracket *x* projecting from the supply chamber V^3. The upper end of the lever X is provided with an opening through which the valve stem W loosely extends, a nut, or other enlargement W′, being secured on the end of the valve stem against which the end of the lever X will engage when turned toward the left in Fig. 8. The opposite end of the valve stem W is provided with a rod w^3 extending through the end wall of the exhaust chamber V^2, and surrounded by a spring W^3 interposed between the outer surface of the exhaust chamber and a stop w^4 carried by the outer end of the rod w^3.

The end of the lever X oppositely to that which engages the valve stem W is pivotally connected to a rod X′ which extends through a supporting plate *x′* yieldingly supported upon adjacent legs of the casing base B, by means of bolts X^2 projecting outwardly from the adjacent legs and extending through holes in the ends of the plate *x′*, springs x^2 being interposed between the ends of the plates and the adjacent legs surrounding the respective bolts X^2. The end of the rod X′ opposite to that which is connected to the lever X is secured to a circular band Y, which is interposed between two disks Y′ and Y^2 rigidly secured to the spindle D of the basket.

Located within the circular band Y and interposed between the disks Y′ and Y^2 are a series of weighted arms Z, each of which is pivoted adjacent its inner end upon a vertical rod *z* supported at its ends by the disks Y′ and Y^2. Each of the weighted levers X is provided with a lug Z′ adapted to engage a stop *z′* carried by one of the disks Y′ or Y^2, when the lever is thrown outwardly by centrifugal force. A spring X^3 surrounds the rod X′ intermediate of the plate *x′* and

the ring Y and is connected at one end to the said plate and at its other end to the rod X′, the tension of such spring tending to draw ring Y to a position eccentric with relation to the spindle D.

The operation of our invention is as follows: Assuming that the belt shifter is in the position to locate the driving belt J on the loose pulley G²—as shown in Figs. 1 and 2—and that the cover P is raised, the articles from which the water is to be extracted are placed within the perforated basket C. When the cover is in its open position, the cam P′ retains the lever N in position to overlie the lower end of the depending portion K′ of the belt shifting rod, and hence prevents the belt from being shifted to the tight pulley. The cover P is then closed, which oscillates the cam P′ away from the end N′ of the lever N, and permits the weight n' to swing the lever downwardly below the lower end of the depending portion K′ of the belt shifting rod. The rod K is then reciprocated toward the left in any convenient manner, as by grasping the depending portion K′ thereof, thereby shifting the power belt J to the tight pulley G′ and rotating the basket C through the medium of the belt E and pulleys F and *d*. As the basket acquires speed the weighted levers X are thrown outwardly by centrifugal force, inasmuch as they are carried by the spindle D. The outward movement of the weighted levers moves the circular band Y into a position concentrically around the spindle D, thereby moving the rod X′ toward the spindle and oscillating the upper end of the lever X toward the left in Fig. 8. This movement of the lever X reciprocates the valve stem W toward the left so that the valve *w* thereon engages the seat v^2 and discontinues the connection of the chamber *v* with the exhaust chamber, so that the conduit V is no longer in communication with the atmosphere. This movement of the valve stem W also unseats the valve *w* so that the fluid pressure flows from the supply chamber V³ into the chamber *v*, and thence through the conduit V into the cylinder U above the piston. The piston U′ is thereby forced downwardly so as to draw downwardly the latch S against the tension of the spring T, and cause the same to engage the opening in the lower end of the hasp Q. As long as the basket continues to revolve, whether by the direct action of the driving power or by momentum after the driving belt has been disconnected through the belt shifter, the latch will be retained in engagement with the hasp, owing to the fact that the band Y will be maintained concentrically around the spindle D through the action of the weighted levers X and thereby maintain the valves in positions to connect the fluid pressure supply with the motor cylinder of the latch. When the basket ceases to rotate, the spring X³ moves the band Y to the position shown in Fig. 4 eccentric to the spindle D, and hence moves the rod X′ outwardly so that the spring W³ reciprocates the valve stem W to the position shown in Fig. 8, in which the valve *w* disconnects the fluid supply chamber V³ from the chamber *v*, and the valve w^2 connects the chamber *v* with the exhaust chamber B², thereby discontinuing the supply of pressure through the conduit V to the cylinder U and connecting the latter with the exhaust. The spring T then elevates the latch S so as to disengage the same from the hasp Q and permit the cover P to be opened.

From the foregoing description it will be observed that we have invented improvements in centrifugal extractors, and similar machines, by means of which the covers are pneumatically locked in closed position automatically upon the starting of the machines. It will be further observed that the covers will be retained positively locked in closed position as long as the machines continue in motion, even after the disconnection of the driving means therefrom. Actuation of the lock by fluid pressure renders the same extremely sensitive, inasmuch as it is only necessary for the rotating spindle to operate the valve for controlling the supply of fluid pressure to the latch operating cylinder.

While we have illustrated and described our invention as embodied in a centrifugal extractor and have defined the same in the following claims with reference to such embodiments thereof, yet we do not wish thereby to be understood as restricting the application of our invention to centrifugal extractors, but intend thereby to protect it for whatever uses it may be adapted and in whatever forms it may be capable of practical embodiment.

What we claim is:

1. In a centrifugal extractor, the combination with a rotating member, of a cover for inclosing said rotating member, a fluid pressure actuated latching mechanism for locking said cover closed, and automatic means for mechanically controlling the supply and exhaust of fluid pressure to and from said latching mechanism for actuating the same to lock the cover closed during the movement of said rotating member.

2. In a centrifugal extractor, the combination with a rotating member, of a cover for inclosing said rotating member, a fluid pressure actuated latching mechanism for locking said cover closed, valve mechanism for controlling the supply and exhaust of fluid pressure to and from said latching mechanism, and means automatically operating said valve mechanism to effect the locking of the cover during the operation of the ex-

tractor and the unlocking of the cover when the operation of the extractor is discontinued.

3. In a centrifugal extractor, the combination with a rotating member, of a cover for inclosing said member, latching mechanism for locking said cover closed, a cylinder having a reciprocating piston therein to which said latching mechanism is operatively connected, valve mechanism for controlling the supply and exhaust of fluid pressure to and from said cylinder, and means for automatically operating said valve mechanism to actuate said latching mechanism to lock the cover closed during the operation of the extractor and to unlock said cover when the operation of the extractor is discontinued.

4. In a centrifugal extractor, the combination with a rotating member, of a cover for inclosing said member, a spring for automatically unlocking said latching mechanism when the extractor is not in operation, fluid pressure actuated means for operating said latching mechanism against the tension of said spring to lock the cover closed and valve mechanism automatically operated to supply fluid pressure to said means during the operation of the extractor.

5. In a centrifugal extractor, the combination with a rotating member, of a cover for inclosing said member, a spring for automatically unlocking said latching mechanism when the extractor is not in operation, fluid pressure actuated means for operating said latching mechanism against the tension of said spring to lock the cover closed during the operation of the extractor, and valve mechanism automatically operated by a moving part of the extractor for controlling the supply of fluid pressure from a source thereof to said fluid pressure actuating means.

6. In a centrifugal extractor, the combination with a rotating member, of a cover for inclosing said rotating member, a fluid pressure actuated latching mechanism for locking said cover closed, and means mechanically actuated by a moving part of the extractor when in operation for controlling said fluid pressure actuated latching mechanism.

7. In a centrifugal extractor, the combination with a rotating member, of a cover for inclosing said member, latching mechanism for locking said cover closed, a cylinder having a reciprocating piston therein to which said latching mechanism is operatively connected, and valve mechanism actuated by a moving part of the extractor for controlling the supply and exhaust of fluid pressure to said cylinder to actuate said latching mechanism to lock the cover closed during the operation of the extractor and to unlock the said cover when the operation of the extractor is discontinued.

8. In a centrifugal extractor, the combination with a casing, of a cover for said casing, a rotating basket within said casing, means for rotating said basket, a latch mounted upon said casing for locking said cover closed, and fluid pressure actuated mechanism mechanically controlled by said rotating means for operating said latch to lock the cover closed during the operation of the extractor and to unlock the cover when the operation of the extractor is discontinued.

9. In a centrifugal extractor, the combination with a casing, of a cover for said casing, a rotating basket within said casing, means for rotating said basket, a latch mounted upon said casing for locking said cover closed, a spring for disengaging said latch from said cover, fluid pressure actuated mechanism mechanically controlled by said rotating means, and means operatively connecting said mechanism with said latch to reciprocate the same against the tension of said spring into locked engagement with said cover.

10. In a centrifugal extractor, the combination with a casing, of a cover for said casing, a movable member within said casing, driving means for operating said member, a latch for locking said cover closed, centrifugal weights rotated by said driving means, an element located in the radial path of said weights, and fluid pressure actuated means operatively connected with said latch controlled by said element to actuate said latch to lock the cover closed during the rotation of said driving means.

11. In a centrifugal extractor, the combination with a casing, of a cover for said casing, a movable member within said casing, driving means for operating said member, a latch for locking said cover closed, centrifugal weights rotated by said driving means, an element located in the radial path of said weights, fluid pressure operated mechanism operatively connected with said latch, valve mechanism for controlling the supply and exhaust of fluid pressure to and from said fluid pressure actuated mechanism, and means operatively connecting said valve mechanism and said element.

12. In a centrifugal extractor, the combination with a casing, of a cover for said casing, a rotary basket within said casing, a spindle upon which said basket is mounted and by which it is rotated, a latch for locking said cover closed, centrifugal weights carried by said spindle, a laterally moving ring concentrically surrounding said weights and in the radial path thereof, fluid pressure actuated mechanism operatively connected with said latch, valve mechanism control-

ling the supply and exhaust of fluid pressure to and from said fluid pressure actuated mechanism, and means operated by said ring for controlling said valve mechanism to effect the operation of said latch to lock the cover closed during the rotation of said spindle and to unlock the cover upon the discontinuance of the rotation of said spindle.

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