J. A. McCASKELL.

HEAD MECHANISM FOR FILTER PRESSES.

APPLICATION FILED APR. 25, 1917.

1,371,634. **Patented Mar. 15, 1921.**

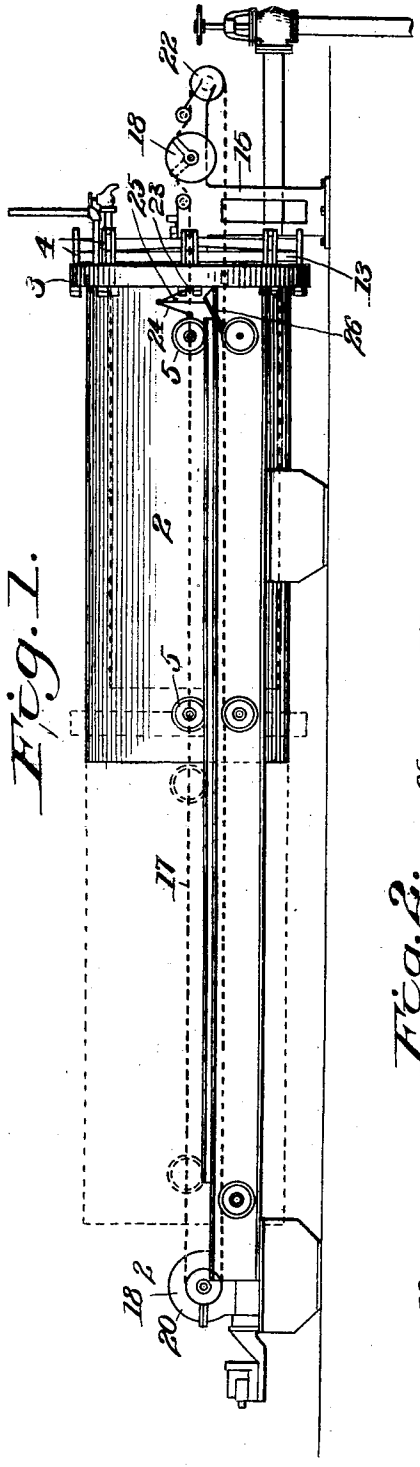

Fig. 1.

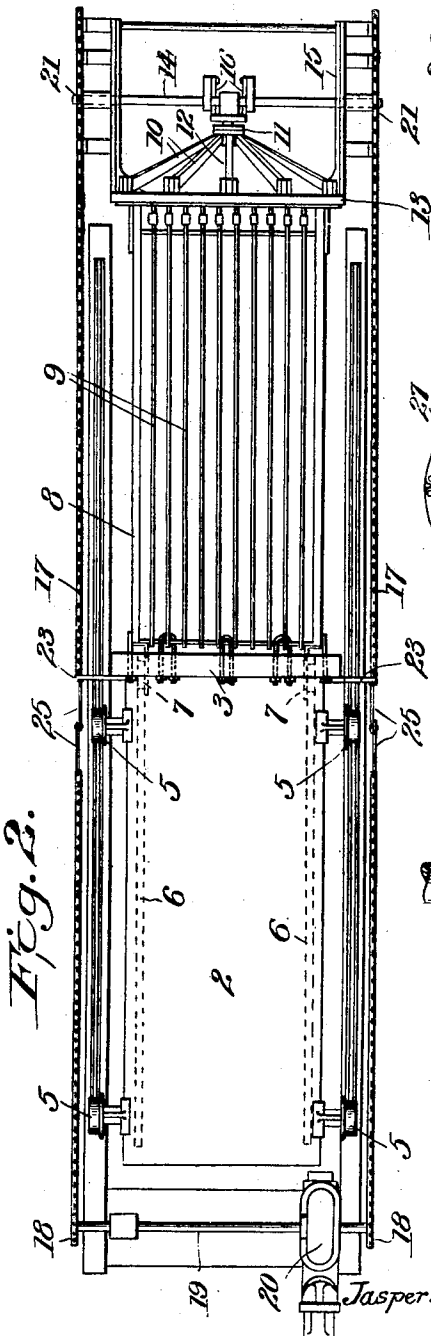

Fig. 2.

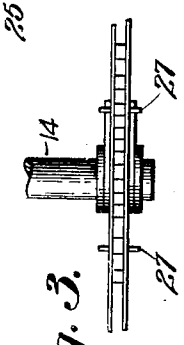

Fig. 3.

Fig. 4. Fig. 5.

Inventor

Jasper A. McCaskell

T. Walter Fowler

Attorney

UNITED STATES PATENT OFFICE.

JASPER A. McCASKELL, OF SALT LAKE CITY, UTAH, ASSIGNOR TO KELLY FILTER PRESS CO., OF SALT LAKE CITY, UTAH, A CORPORATION OF UTAH.

HEAD MECHANISM FOR FILTER-PRESSES.

1,371,634. Specification of Letters Patent. Patented Mar. 15, 1921.

Application filed April 25, 1917. Serial No. 164,382.

To all whom it may concern:

Be it known that I, JASPER A. McCASKELL, a citizen of the United States, residing at Salt Lake City, in the county of Salt Lake and State of Utah, have invented certain new and useful Improvements in Head Mechanism for Filter-Presses, of which the following is a specification.

My invention which relates to certain new and useful improvements in head-mechanisms for all kinds of tanks and receptacles, has been found of great value when used in connection with apparatus for separating and filtering solids of whatever nature from liquids. The present invention is distinctly related to the type of apparatus shown in my former Patent No. 1,244,222, dated Oct. 23, 1917, and it is an improvement on the head-locking devices disclosed in Patents Nos. 1,015,960, dated January 30, 1912, and 1,015,961, dated January 30, 1912, issued to David J. Kelly.

The present invention consists, essentially, of an improved quick-locking mechanism employing an automatic toggle-arrangement and other instrumentalities, whereby the motion used in unlocking the connection between the movable head and the casing is also employed to positively move said head and casing relatively for any desired distance, to enable the carrier and filter elements which are usually attached to the head, to be fully exposed for removal and for cleaning and other purposes; the arrangement is also such that the reverse motion of the actuating devices causes the head and casing to be again relatively moved so that the casing will inclose the filtering elements and at the completion of this movement and when the two parts are assembled substantially for operating purposes a continued movement of the actuating mechanism results in the head being tightly locked against the end of the casing to make a fluid tight joint therewith.

My invention also consists of the parts and the constructions, arrangements and combinations of parts which I will hereinafter describe and claim.

In the accompanying drawing forming part of this specification and in which similar reference characters indicate like parts in the several views—

Figure 1 is a side elevation of a filter press showing my improved actuating mechanism applied thereto.

Fig. 2 is a top plan view showing the position of the parts after the casing and head have been given relative movement to substantially their maximum extent.

Fig. 3 is an enlarged detail showing a portion of an actuating sprocket chain and its adjuncts and a fragment of the shaft, 14.

Fig. 4 is a side elevation of Fig. 3.

In the aforesaid prior patents will be found disclosures of mechanisms for hydraulically locking the head connection between the tank and head of a filter press, of a well known type; and in my prior Patent No. 1,244,222 hereinbefore mentioned, I have disclosed a mechanism for producing two distinct results; viz. the initial unlocking of the head from the corresponding open end of the casing and second, the imparting of a longitudinal motion to the head and its attached carrier and filtering agents whereby I combine in practically a single actuating mechanism a means for opening and closing the head locking mechanism and for moving the head and tank relatively to enable the filtering agents to be withdrawn entirely from the casing for such purposes as may be desired.

In the present instance I have provided a simple form of mechanism for giving relative movement to the casing and its head and attached parts, but in this instance, it is the shell itself which is moved relatively to the head, and a more simple mechanism is devised for effecting first the unlocking of the head mechanism and, second, the relative longitudinal movement of the shell and head.

In the aforesaid drawing a tank, 2, of substantially cylindrical form and of any desired capacity is closed at one end and open at the opposite end, the open end being surrounded by an annular ring or flange, 3, which is perforated at numerous points to receive the shanks of suitable U-bolts, 4, or the like for the engagement of appropriate locking levers, which I will hereinafter mention.

As in the aforesaid prior patents, the tank carries upon its exterior sides suitable wheels or rollers, 5, which are designed to travel on tracks supported on I-beams along the outer sides of said tank. On its interior, the tank is also provided with longitudinally extend-

ing rails, 6, which are engaged by wheels, 7, appropriately mounted on the filter carrier, 8, to which the head of the apparatus is rigidly attached, said carrier furnishing a support for filter frames, or agents, 9. This arrangement is common to the so-called Kelly filter press of the patents hereinbefore mentioned.

While I may use in connection with the present improvements, any suitable form of head-locking mechanism, I deem it sufficient for present purposes to disclose a mechanism for this purpose, which shall include the radiating levers, 10, whose outer ends are adapted to engage the U-bolts, 4, and whose inner ends are pivotally connected to a sleeve, 11, slidably mounted on a stud, or short shaft, 12, fixed to and projecting from the center of the head, 13, of the press, which head, as before described, is fixedly secured to the filter frame carrier, 8. A longitudinal movement is designed to be given the sleeve for the purpose of locking and unlocking the levers so as to release the head, in one instance, to allow the head and shell or casing of the press to be moved one relatively to the other, and in another instance, to tightly draw these parts into intimate contact to produce a leak-tight joint thereabout, when a transmission mechanism has first produced the relative movement and caused the two parts to be assembled one within the other. A mechanism for effecting these movements may comprise a shaft, 14, mounted in and extending transversely across an extension of a supporting frame or structure, 15, and suitable links, 16, or like elements on the shaft and appropriately connected to the sliding collar. These parts may not differ materially from similar parts of my former application and as they are not claimed herein, I have not thought it necessary to illustrate them in detail, and will only say that any suitable mechanism may be employed, both for the locking mechanism and a means for actuating the same to effect, first, the initial unlocking of the head from the tank and second, a final locking of the head to the tank after the tank and head have been assembled as in Fig. 1.

A leading feature of the present case is the employment of some simple form of transmission by which the relative movement of the shell or casing and head and its carrier may be produced, and the head-locking mechanism locked and unlocked at the beginning and completion of said movements in opposite directions. The mechanism which I have shown for this purpose consists of suitable endless chains, 17, one extending along each side of the press, said chains passing over sprocket wheels, 18, at the rear end of the press, said sprocket chains being carried by a transverse shaft, 19, on which is mounted an appropriate motor, 20; and suitable sprocket wheels, 21, on the outer ends of the transverse shaft, 14, at the head end of the machine, there being also shown at the head end of the machine suitable idler pulleys, 22, which are designed to take up slack in the chains, and to more or less rigidly hold the chains in proper place on the sprocket wheels, 21.

The chains, 17, are designed to be connected in some appropriate manner, to the shell or casing and in the drawings I have shown the connection as being to suitable arms, 23, projecting laterally from the ring or flange, 3, which surrounds the open end of the casing, but this is immaterial as the connection could otherwise be made; in fact it might be made at other points on the shell, the purpose being to so connect the chains that they will exert a direct pull on the shell according to the direction in which the chains are moved. While a leading object of the present invention is to impart a relative movement to the shell and its closure or head, I have in the present instance illustrated the head as being stationary and fixed to the aforesaid frame, 15, or its equivalent, and I have so connected the transmission to the tank that said tank is moved to and from the stationary head, but manifestly a similar result will be obtained by fixing the shell in place and moving the head and its carrier relatively thereto.

Interposed in the chain and appropriately connected thereto are suitable toggle levers, 24—25, and fixed to some stationary part of the structure, as for instance to the guide rails on which the pulley travels, is a cam or incline, 26, the purpose of which is to break the joints of the levers, in one instance, and to allow the levers to straighten out, in another instance, as I will hereinafter mention, this or a similar action, as more fully described in my prior patent heretofore mentioned, being desirable to provide for movement of the transmission chains in one direction to enable the head locking mechanism to be unlocked before travel is imparted to the shell or casing, and to allow the head-locking mechanism to be actuated after the front end of the casing has been brought into intimate contact with the stationary head to enable the joint between the meeting faces of the head and front end of the tank to be more tightly drawn together to form a leak-tight joint.

It will also be noted from Figs. 3 and 4, that the sprocket chains, 17, are provided with lateral projections which may be in the form of long pins, 27, and that on the shaft, 14, at opposite sides of the sprocket wheel, 18, there are fixed to said shaft the extending dogs or arms, 28—29, whose outer ends are notched or otherwise provided for engagement with the projecting portions of

the pins, the purpose of which construction will be readily understood from the following description of the operation of the several parts:

Assuming that the shell and head have been assembled in locked position, as shown in Fig. 1, in order to open the tank, the motor, 20, is started and through its shaft and the sprocket wheels, 18, the link-belt chains, 17, are set in motion. At the same time the shaft, 14, is caused to be actuated through the sprocket wheels, 21, by the link chains, the said chains engaging the arms or dogs, 28, thereby causing these dogs to move rearwardly and rotating the shaft, 14, to cause the links, 16, to actuate the sleeve, 11, and thus pull out the inner ends of the locking levers, 10, as shown in Fig. 2, and thereby releasing the head from its locked position against the open end of the shell or casing. As the chains 17, continue to move backward, a member, 25, of the toggle connection will ride down the incline, 26, to thereby permit the links, 24, to straighten out substantially in line with the chain and by the time this occurs, the head-locking devices before described will have been operated to their full extent and hence the continued pull on the chains due to the driving of the motor, will result in the pull of the chains being transmitted directly to the shell or casing, causing the latter to travel rearwardly away from the stationary head and for such distance that it will entirely clear the filter carrier and its contained frames, as shown in Fig. 2. In this position the filter frames are fully exposed and the solids which have accumulated on the sides of these frames during the filtering operation, may be readily removed or discharged in any suitable manner and when the frames have been cleaned and the press is ready for another cycle of operation, the motor, 20, may be started, this time in a direction opposite to its first described movement, and the chains, 17, are caused to reverse their former direction of movement, when the casing will be drawn toward and over the alined filter carrier and frames and toward the stationary head. Until just before the completion of this movement, the toggle-links, 24—25, remain in their straightened position, but when the member, 25, of this link connection contacts with and rides up the incline, 26, the joints of the toggle-links are broken and the links are caused to fold substantially in the position shown in Fig. 1, which operation occurs just about the time that the face of the ring or flange on the front or open end of the tank comes into contact with the inner face of the closing head. It is also just about this time that the arms, 29, on the shaft, 14, engage the laterally projecting pins, 27, on the link drive chains, 17, so that as the chain continues to move the shaft, 14, will be rotated in a direction opposite to that first described and the arms, 29, or their equivalents will actuate the sleeve, 11, and force it backwardly thereby rocking the levers, 10, about their fulcrums adjacent to or in the U-bolts, 4, and forcing the levers rearwardly to tightly clamp the head against the open end of the casing, the parts assuming the position shown in Fig. 1.

The operation of the motor is then stopped and the filtering and washing operations usually conducted in a press of this character are carried out and the press remains in its closed position until another cycle of operation has been completed, when the head-locking devices are again operated and the press and head move relatively to again expose the filter carrier and its frames to permit sedimentary matter or cake material on the frames to be discharged.

Such accessories as may be necessary to effect the foregoing operations are of minor importance and will be readily understood and supplied by those skilled in the art.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:—

1. The combination with a shell or casing, a head or closure therefor, a head-locking mechanism, and endless chains extending along the sides of the shell and connected thereto, of a tranverse shaft adjacent the head and head locking mechanism and connected to the latter, sprocket wheels on said shaft over which the chains pass, said chains having laterally projecting pins and said sprocket wheels having projections disposed in the path of said pins and engaged by the latter to rock said shaft and thereby actuate the head locking mechanism.

2. In apparatus of the character described the combination of a shell or casing having an open end, a head adapted as a closure for the open end of the shell or casing, means including endless transmission elements for imparting relative movement to the shell and head, said elements being connected to one of said parts, a head-locking mechanism for intimately connecting the head to the shell when one of said parts is closed against the other, a transverse shaft journaled at one end of the apparatus and connected to the head locking mechanism, said shaft carrying arms or dogs which project into the path of travel of the transmission elements, and said elements having projections to engage said arms or dogs to rock the shaft and actuate the head locking mechanism.

In testimony whereof I affix my signature.

J. A. McCASKELL.