(No Model.) 2 Sheets—Sheet 1.

J. H. BAKER, G. F. SHEVLIN & F. H. BAKER.

PULP STRAINER.

No. 495,769. Patented Apr. 18, 1893.

Fig. 1.

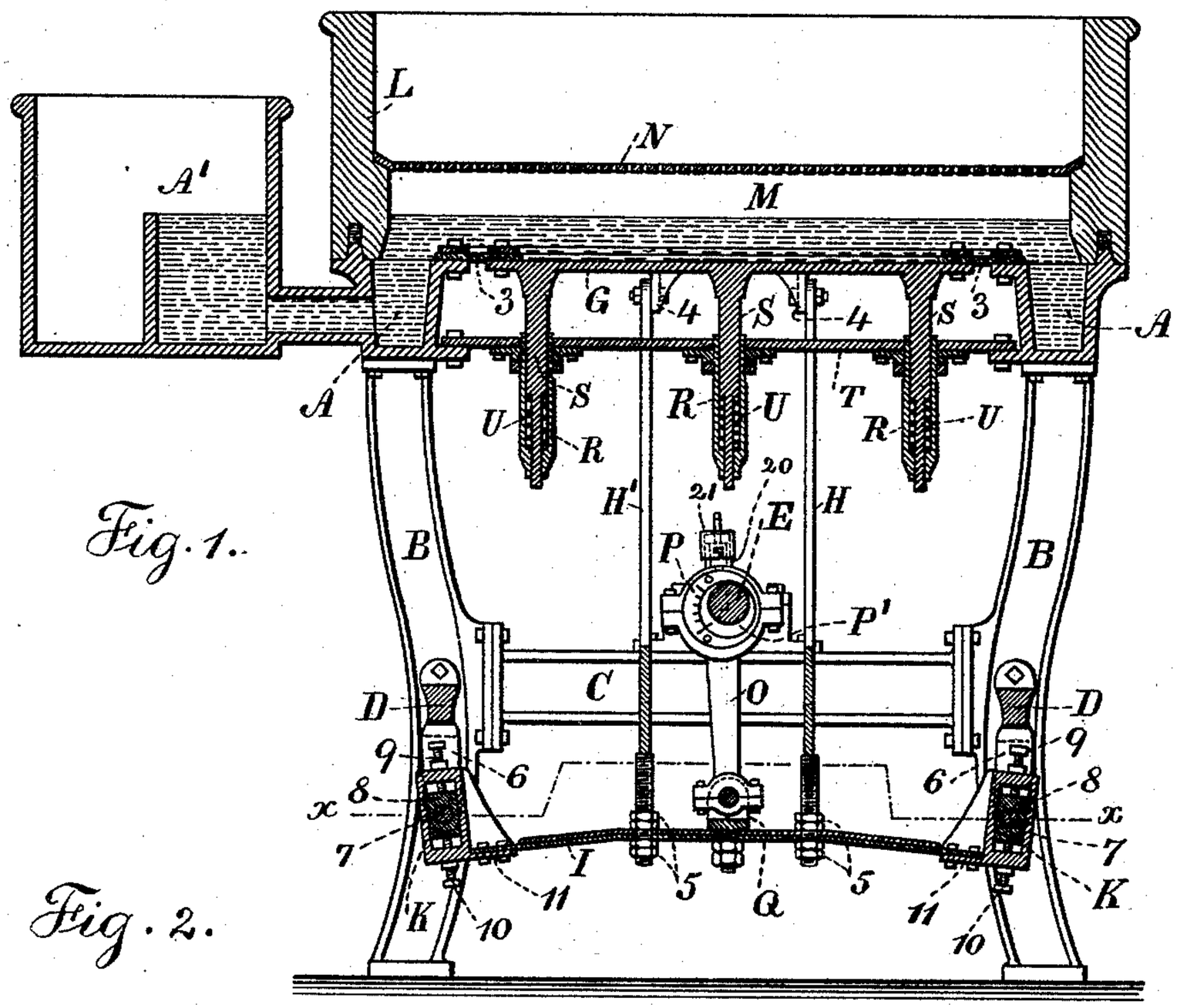

Fig. 2.

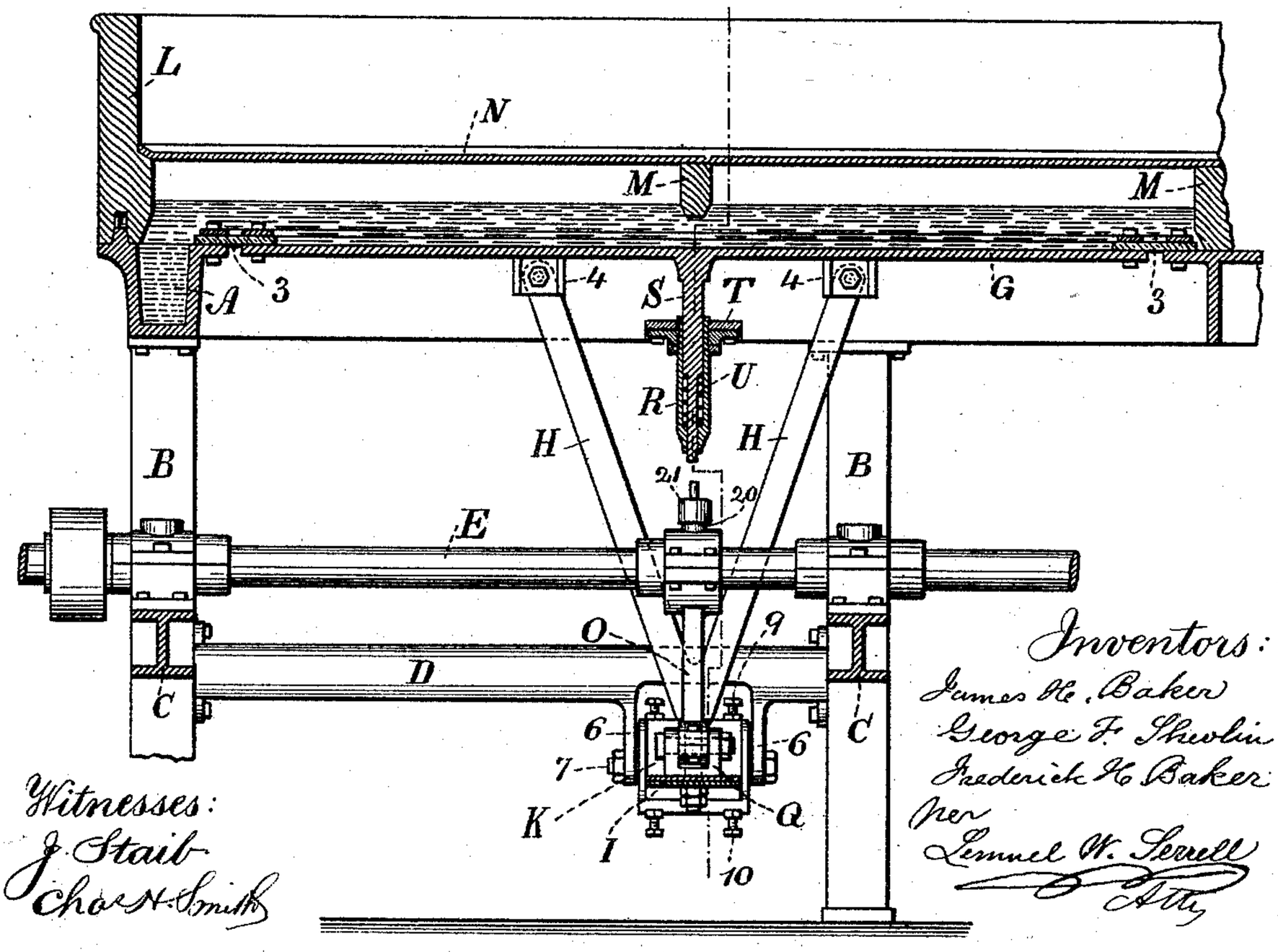

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Fig. 3.

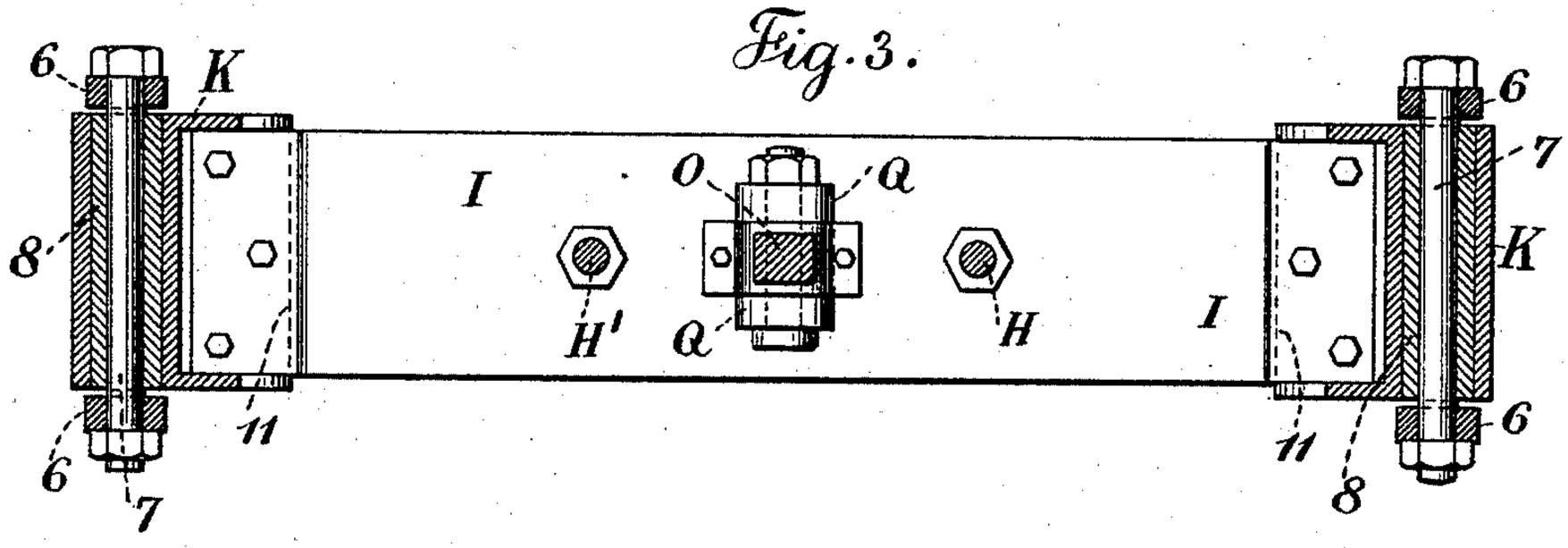
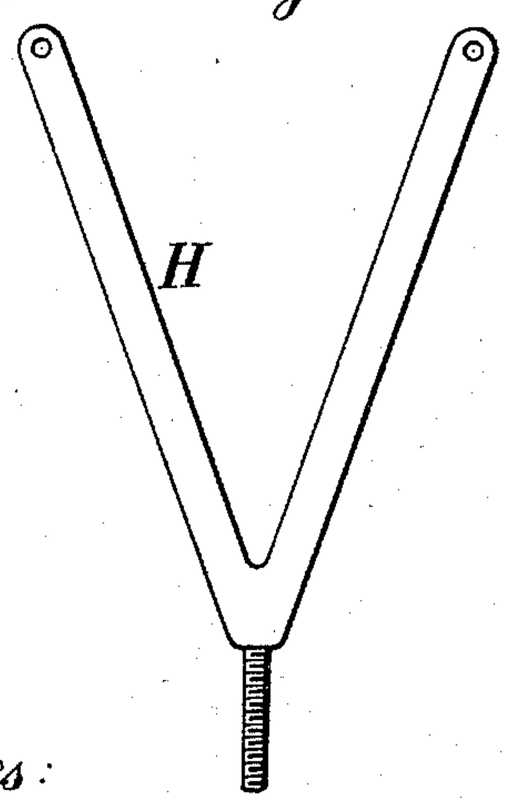


Fig. 4.



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UNITED STATES PATENT OFFICE.

JAMES H. BAKER, GEORGE F. SHEVLIN, AND FREDERICK H. BAKER, OF SARATOGA SPRINGS, NEW YORK.

PULP-STRAINER.

SPECIFICATION forming part of Letters Patent No. 495,769, dated April 18, 1893.

Application filed January 6, 1892. Serial No. 417,156. (No model.)

To all whom it may concern:

Be it known that we, JAMES H. BAKER, GEORGE F. SHEVLIN and FREDERICK H. BAKER, citizens of the United States, residing at Saratoga Springs in the county of Saratoga and State of New York, have invented an Improvement in Pulp-Strainers, of which the following is a specification.

In the manufacture of paper stock it is usual to flow the pulp upon a range of strainer plates which detain the knots and lumps, allowing the stock to pass through, and during this operation a diaphragm beneath the strainer plates is reciprocated to loosen up the material as it passes over the strainer plates. In machines of this kind we have found it extremely difficult to insure uniformity in the movement of the diaphragm, because this motion is comparatively little, and if there is an obstruction or looseness in the moving devices or greater rigidity of the parts in one direction than in the other, the diaphragm is liable to remain nearly quiescent at one part and to receive an undue movement at another part.

The object of the present invention is to provide for guiding the diaphragm in its movements and for communicating such movements in such a way that all portions of the diaphragm will be acted upon alike.

A machine corresponding generally, so far as strainer plates, frames and rectangular trough, with the present improvements, is represented in our application, Serial No. 397,042, filed June 22, 1891.

In the drawings Figure 1 is a cross section illustrating the present improvements. Fig. 2 is a section of the diaphragm, and elevation of the motor bars and the actuating shaft. Fig. 3 is a plan view in larger size sectionally at the line *x*—*x* of Fig. 1, and Fig. 4 is a detached view of one of the motor bars.

The strainer plates N are supported by cross bars M within the frame L, which frame is preferably rectangular and it contains devices for clearing the knots and lumps from above the strainer plates N in any usual manner. The rectangular trough A is adapted to receive upon its upper edges the lower edges of the frame L, and from this rectangular trough A a pipe leads to the discharge trough A′ of ordinary construction. The diaphragm G is connected at its edges by the flexible strips 3 to the inner edges of the rectangular trough A, and the trough A is supported upon suitable frames or legs B with cross pieces C substantially similar to those in our aforesaid application, and the driving shaft E is supported in bearings upon the cross pieces C and rotated by competent power.

The present improvements relate especially to the devices for giving motion from the driving shaft E to the diaphragm G, and which devices are next described. The motor bars H H′ are preferable Y-shaped, and their upper ends are connected to the flanges 4 on the under side of the diaphragm G, and their lower ends are screw threaded for the nuts 5, and these screw threaded lower ends pass through the cross spring I, which spring is preferably made similar to a carriage spring with two or more leaves, so as to obtain the necessary flexibility without risk of the spring breaking, and at the outer ends the cross springs I are connected to the adjusting boxes K, and upon the longitudinal frame pieces D between the legs B there are projections or ears 6 receiving through them the pivot bolts 7, which bolts 7 pass through the blocks 8 that are within the horizontal mortises of the adjusting boxes K, and there are screws 9 and 10 passing through these boxes above and below the blocks 8, and the outer ends of the springs I are received upon the flanges 11 of the adjusting boxes K and bolted thereto. By the construction thus far described it will be apparent that the motor bars H H′ being Y-shaped and connected at their upper ends to the diaphragm G and at their lower ends passing through and connected to the spring I, the diaphragm is compelled to move parallel as it is raised and lowered, because the spring I being a plate and in a horizontal position can only be sprung up and down, and the lower ends of the Y-shaped motor bars H H′ are guided thereby, and the upper ends of such motor bars rise and fall with uniformity; and by the adjustments of the nuts 5 and the screws 9 and 10 the spring I can be made to take more or less weight of the diaphragm, the material upon it and the parts connected

with it; and the adjustment should be such that the weight is sustained with the diaphragm in its normal or intermediate position, so that it may be raised above or moved below that position with the exercise of but little power; and as the motion is given to the diaphragm and the spring I yields, the adjusting boxes K rock more or less upon the pivot bolts 7 and in this manner a perfect uniformity in the movement of all parts of the diaphragm is insured, whenever the center of the spring I is raised or lowered. In order to give motion to this spring I any suitable means may be employed, such for instance as a cam acting directly upon it, but we prefer and use a connecting rod O from the eccentric P upon the driving shaft E; and this eccentric P is preferably formed in two parts, one portion being an eccentric projection upon the shaft itself at P′ and the other portion the eccentric P which surrounds such portion P′ and is of similar eccentricity, so that by rotating the eccentric P upon the eccentric P′ and clamping it in the position to which it may be placed, the eccentric gives more or less throw or motion to the connecting rod O and to the spring I with which such connecting rod O is united by the joint block Q at the lower end of such connecting rod O. Care should be taken to properly lubricate this eccentric and to construct it in such a manner that looseness from wear may be taken up or prevented, so that the parts will run noiselessly and the movement given to the diaphragm will be uniform. As an additional precaution for insuring uniformity in the movement of the diaphragm and to lessen the risk of the same bending or springing, we make use of the guide rods S attached to the under side of the diaphragm and projecting downwardly through the guide sockets R upon one or more cross frames or bearers T that are connected with the rectangular trough A, and these guide rods S are preferably made in the form represented in Fig. 1, that is to say, the guide rods are each of two diameters, the largest diameter fitting the upper portion of the guide socket, and the smaller diameter fitting the lower portion of such guide socket R, so that there may be an intervening space for the reception of helical springs U, the strength of which is only to be sufficient to aid in taking the weight of the diaphragm and the materials upon the same in the middle or toward the corners of such diaphragm so as to lessen the tendency of the metal to spring under the rapid vibration to which the diaphragm is subjected.

It is to be understood that in this machine two diaphragms are preferably employed, and that each diaphragm is to be fitted with the devices before described.

If only one Y-shaped motor is made use of centrally to the diaphragm, the actuating device may be applied below such Y-shaped motor bar and the operation of the parts will be similar, but we prefer to use two motor bars with the intermediate eccentric for each diaphragm.

It will be observed that the motor bars H H′ are advantageously made Y-shaped, so as to be light and strong and to form a reliable connection to the diaphragm, but if desired such motor bars may be T-shaped to be rigidly connected to the diaphragm.

I have shown the spring I as at right angles to the actuating shaft and transversely to the apparatus, the same however may be longitudinal to the machine and parallel with the shaft. In cases where the diaphragm is large, two springs may be used with two sets of connecting bars to the diaphragm. In this case the adjustable portions of the eccentrics may be properly marked so as to insure accuracy in adjustments.

We apply to the eccentric strap a grease cup 20, and removable cover 21, preferably connected by a bayonet slot and pin.

In consequence of the motor bars being kept in position at their lower ends by a spring with similar yielding connections at each end they are reliably guided without unnecessary friction; we however remark that we do not limit ourselves to this means for guiding the lower ends of the motor bars and keeping them in position.

When it is desired to avoid perforating the springs for the motor bars to pass through, there may be projections on the joint blocks Q for the lower ends of such motor bars.

We claim as our invention—

1. The combination with the diaphragm in a pulp strainer, of motor bars rigidly connected at their upper ends to the diaphragm, a plate spring with which the lower ends of the motor bars are connected, supporting and adjusting devices for the outer ends of the spring and mechanism for giving to the spring a movement for reciprocating the diaphragm through the connections thereto by the motor bars, substantially as set forth.

2. The combination with the diaphragm in a pulp strainer, of a motor bar rigidly connected at its upper end to the under side of the diaphragm, a spring with which the lower end of the motor bar is connected and by which it is guided without unnecessary friction, yielding connections at both ends of the spring, and mechanism for communicating to the motor bar a vertical reciprocation substantially as specified.

3. The combination with the diaphragm in a pulp strainer, of motor bars connected at their upper ends to the diaphragm, a plate spring across below the motor bars and to which such motor bars are adjustably connected, adjusting boxes at the outer ends of the spring, pivot bolts, blocks and adjusting screws for supporting and adjusting the outer ends of the springs, and an actuating shaft, eccentric and connecting rod for giving motion to the cross spring, motor bars and diaphragm, substantially as set forth.

4. The combination with the diaphragm in

a pulp strainer, of guide rods attached to the under side of the diaphragm, guide sockets receiving such guide rods, motor bars connected with the diaphragm, a spring at the lower end of the motor bars with which such motor bars are connected, and a driving shaft, eccentric and connecting rod for giving motion to the spring and the motor bars and diaphragm, substantially as set forth.

5. The combination with the diaphragm in a pulp strainer, of guide rods connected with the diaphragm, sockets for receiving the same, Y-shaped motor bars connected at their upper ends to the under side of the diaphragm and formed as screws at their lower ends, a cross spring through which such screws pass, adjusting nuts, adjusting boxes to which the outer ends of the cross springs are fastened, bolt pivots, blocks and adjusting screws for regulating the position of the adjusting boxes and the cross spring, a driving shaft, adjustable eccentric and connecting rod and a joint block between the cross spring and the connecting rod, substantially as set forth.

6. The combination with the diaphragm in a pulp strainer, of motor bars rigidly connected at their upper ends to the under side of the diaphragm, a spring with which the lower ends of the motor bars are connected and by which they are guided without unnecessary friction, yielding connections at both ends of the spring, a revolving shaft, adjustable eccentric and connection therefrom to the spring between the lower ends of the motor bars, for communicating to the motor bars a vertical reciprocation substantially as specified.

Signed by us this 31st day of December, 1891.

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