

(No Model.)

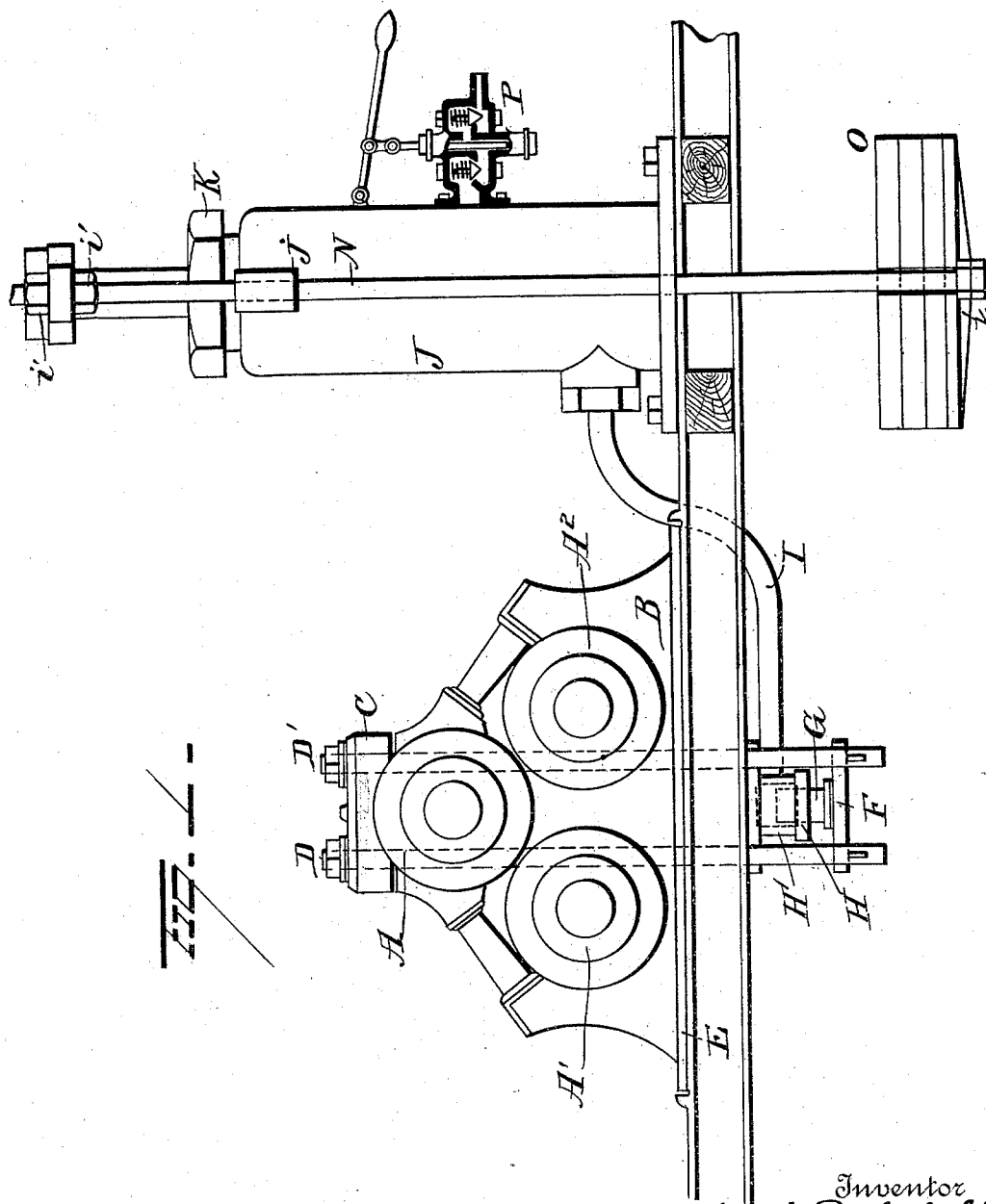
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W. W. SUTCLIFFE.

HYDRAULIC PRESSURE ACCUMULATOR OR REGULATOR.

No. 477,468.

Patented June 21, 1892.



Witnesses
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2 Sheets—Sheet 2.

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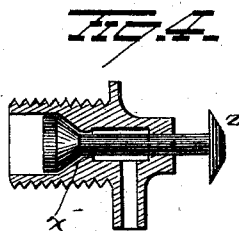
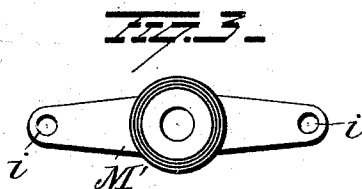
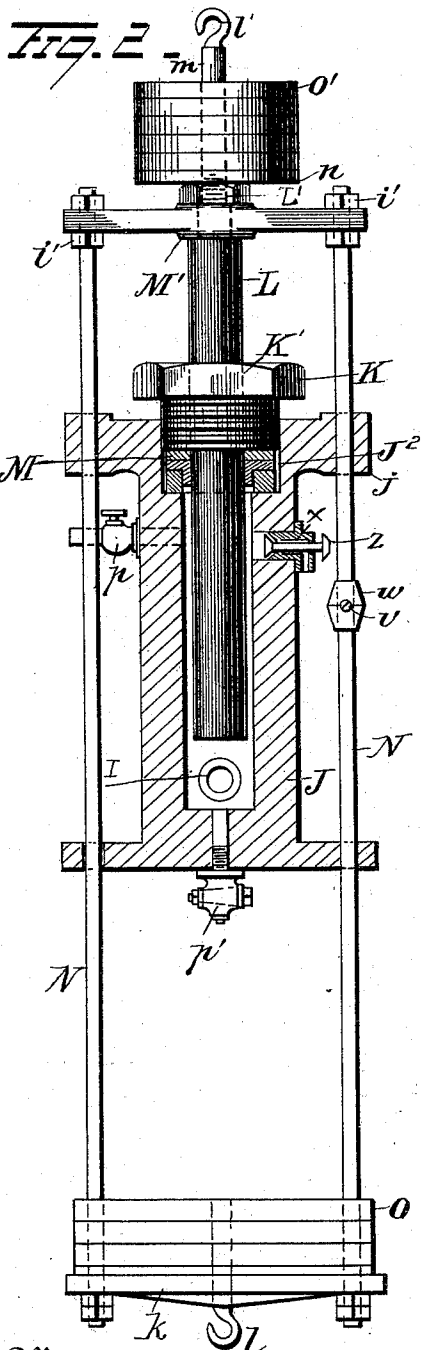


Fig. 5

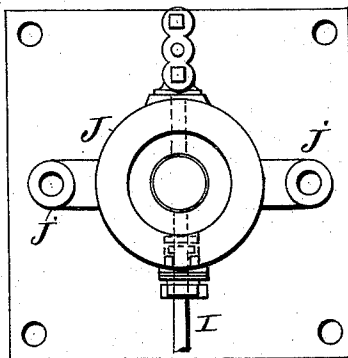
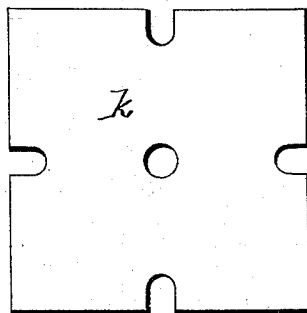


Fig. 6



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UNITED STATES PATENT OFFICE.

WILLIAM WILSON SUTCLIFFE, OF NEW ORLEANS, LOUISIANA.

HYDRAULIC-PRESSURE ACCUMULATOR OR REGULATOR.

SPECIFICATION forming part of Letters Patent No. 477,468, dated June 21, 1892.

Application filed April 28, 1891. Serial No. 390,879. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM WILSON SUTCLIFFE, of New Orleans, in the parish of Orleans and State of Louisiana, have invented certain new and useful Improvements in Hydraulic-Pressure Accumulators or Regulators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in hydraulic-pressure accumulators or regulators, the object being to provide means for automatically relieving the accumulator at any desired point, and especially from the exterior.

A further object is to provide positive bearings for the guide-rods, so as to obviate all possibility of spring of the parts, or of their getting out of level.

A further object is to so construct the accumulator and regulator that a small number of joints will be employed, whereby the liability of leakage will be diminished.

A further object is to construct an accumulator in such manner that the plunger shall be maintained at all times in perfect alignment, and thus prevent undue wearing of the parts and consequent leakage.

A further object is to produce a hydraulic accumulator which shall be of simple construction, dispensing with all unnecessary fixtures for guiding the plunger and connecting the accumulator with the hydraulic cylinder, thereby simplifying and cheapening the construction and increasing its durability and effectiveness.

A further object is to so construct a hydraulic accumulator that the plunger may be weighted both above and below.

With these objects in view the invention consists in certain novel features of construction and combinations and arrangements of parts, as hereinafter set forth, and pointed out in the claims.

In the accompanying drawings, Figure 1 is an elevation of my improved hydraulic accumulator in connection with a cane-mill. Fig. 2 is an enlarged sectional view of the accumulator-cylinder. Fig. 3 is a detail view of the upper guide-head. Fig. 4 is a detail in

section of relief-valve. Fig. 5 is a plan view showing the lower guideways, auxiliary pump, and hydraulic-ram connections. Fig. 6 is a view of the lower guide-rod plate.

My invention is illustrated in the accompanying drawings in connection with a cane-mill provided with three rollers $A A' A^2$, arranged in triangular relation to each other, the roller A being arranged above and between the rollers $A' A^2$, said rollers being supported by housings B in the usual manner. The upper roller A is provided with vertically-movable bearing blocks or caps C , held in place upon the upper side of the bearings at opposite ends of the roller and connected by bolts $D D'$, arranged vertically and extending below the bed-plate E of the frame or housing. The bolts $D D'$ are connected at their lower ends by a cross-head F with a cylindrical plunger G , adapted to fit in an opening in the head H of a hydraulic cylinder H' , and a packing h effectually prevents leakage or escape of the liquid from said cylinder. The cylinder H' is of sufficient capacity to hold the quantity of liquid required to give the desired area of piston-surface and length of movement to the plunger to suit the pressure to which the roller is subjected and the distance it is to be separated from the other rollers. A pipe I , of much smaller area than that of the cylinder H' , connects said cylinder with an accumulator-cylinder J , the connection J' of said pipe I with the cylinder J being provided with hydraulic packing J^2 . In the top of the cylinder J a screw-threaded opening is made for the accommodation of a similarly-threaded packing-nut K , having a perforation K' in its center, through which a plunger L is adapted to pass, hydraulic packing M being located in the opening in the top of the cylinder and beneath the nut K . The plunger L is preferably extended somewhat and provided in proximity to its upper end with a screw-threaded portion L' for the reception of a screw-threaded boss of a guide-head M' . At or near the ends of the guide-head M' perforations i are made, as shown in Fig. 3, through which guide-rods N are passed and secured by means of nuts i' . The guide-rods N extend downwardly from the guide-head M' and pass loosely through perforated ears or lugs j , projecting from the cylinder J at the top

and bottom thereof. These form positive bearings, which are necessary in order to obviate all possibility of springing of the parts or of the machine getting out of level or perpendicular position. At their lower ends these guide-rods are connected by a plate or bar *k*, on which a weight or series of weights *O* are placed, and projecting downwardly from the plate or bar *k* is a hook *l*, to which a compensating-weight—such as a chain—may be attached. The stem *m* (which is merely an extension of the plunger-rod, as previously stated) is provided with a disk or plate *n*, having a perforation and adapted to screw upon said stem just above the boss of guide-head *M'*. On this disk or plate *n*, and encircling the stem *m*, a series of weights *O'* may be placed, and in the upper extremity of the plate a hook *l'* may be secured.

In proximity to the top of the cylinder *J* an inlet cock or valve is located, whereby to charge the cylinder, and at the bottom of said cylinder an outlet-cock *p'* is located, by means of which the contents of the cylinder may be emptied when desired. Secured to the exterior of the cylinder *J* and adapted to communicate therewith is a pump *P*, by means of which liquid may be forced into the cylinder *J* from any convenient source to compensate for any leakage which might occur.

Provision is made for automatically relieving pressure upon the accumulator-cylinder when necessity demands it. This consists of a valve *x*, located in one side of the cylinder and extending into the interior of the cylinder. The stem of this valve is provided on its outer end with a head *z*, preferably rounded or convex. This head extends out normally in close proximity to one of the guide-rods, and on the guide-rod is mounted an adjustable sleeve *w*. This sleeve is double-cone shaped, preferably, and held in place by set screw *v* or other similar means, so that when the guide-rods rise to a certain height this sleeve, by its contact against the valve-stem, forces the latter inward, thus opening the valve, so as to relieve the cylinder of pressure which might otherwise be too great and cause the cylinder to burst. Hence the sleeve may be placed at any convenient place on the guide-rod, according to the stage in the operation when it is most desirable to relieve the pressure upon the cylinder. As soon as the pressure is thus relieved the guide-rods, of course, drop from their own weight and the valve is again closed by virtue of the pressure from within.

With the apparatus thus constructed, arranged, and connected with the rolling-mill, should the center roll be caused to rise, due to irregularity in the quantity of material being passed through the mill, the bolts or rods *D D'* will also rise, carrying with them the plate or bar *F* and the plunger *G*, whereupon liquid will be forced through the connecting-pipe *I* into the accumulator-cylinder and dis-

place the plunger. If sufficient pressure is reached, the sleeve strikes the valve and the pressure is relieved. After the irregularity has passed out of the mill the weight *O O'* will cause the accumulator-plunger to be forced down and displace the liquid which has been forced through the connecting-pipe *I* back from whence it came, and so the work of regulation will be accomplished.

By constructing the accumulator as above set forth it will be seen that the plunger of the accumulator-cylinder will be always maintained in a vertical position and in exact alignment with the bore of the cylinder and that as there are a small number of connections and wearing parts the amount of leakage and friction will be reduced to a minimum.

I am aware that pressure-regulators have been constructed in which the guide-rods were permanently fixed and a cross-head was arranged to operate on them. In my present invention the guide-rods are movable and answer the double purpose of regulating and guiding at once.

Slight changes might be made in the details of construction of my invention. For instance, various forms of valve could be employed other than that shown. A lever-valve could be used, or the stem could have a lever attached to it.

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

1. The combination, with a hydraulic cylinder having a relief-valve therein, of a plunger, a weighted guide-rod connected to said plunger, and means on said guide-rod for operating the relief-valve, substantially as set forth.

2. The combination, with a hydraulic cylinder, piston, and relief-valve in the cylinder, of guide-rod carried by the piston and a sleeve adjustably secured on the rod for operating the relief-valve, substantially as set forth.

3. The combination, with a cylinder having guides formed at opposite ends, a piston or plunger, and a relief-valve located between the guides and in alignment with two of said guides, of guide-rods carried by the piston or plunger and passing through the guides, and means on one of the rods for operating the valve, substantially as set forth.

4. The combination, with a hydraulic cylinder and plunger, of a relief-valve in the cylinder communicating with the interior and operated from the exterior by the displacement of the piston within the cylinder, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WILLIAM WILSON SUTCLIFFE.

Witnesses:

J. ZACH. SPEARING,
HARRY W. GLASER.