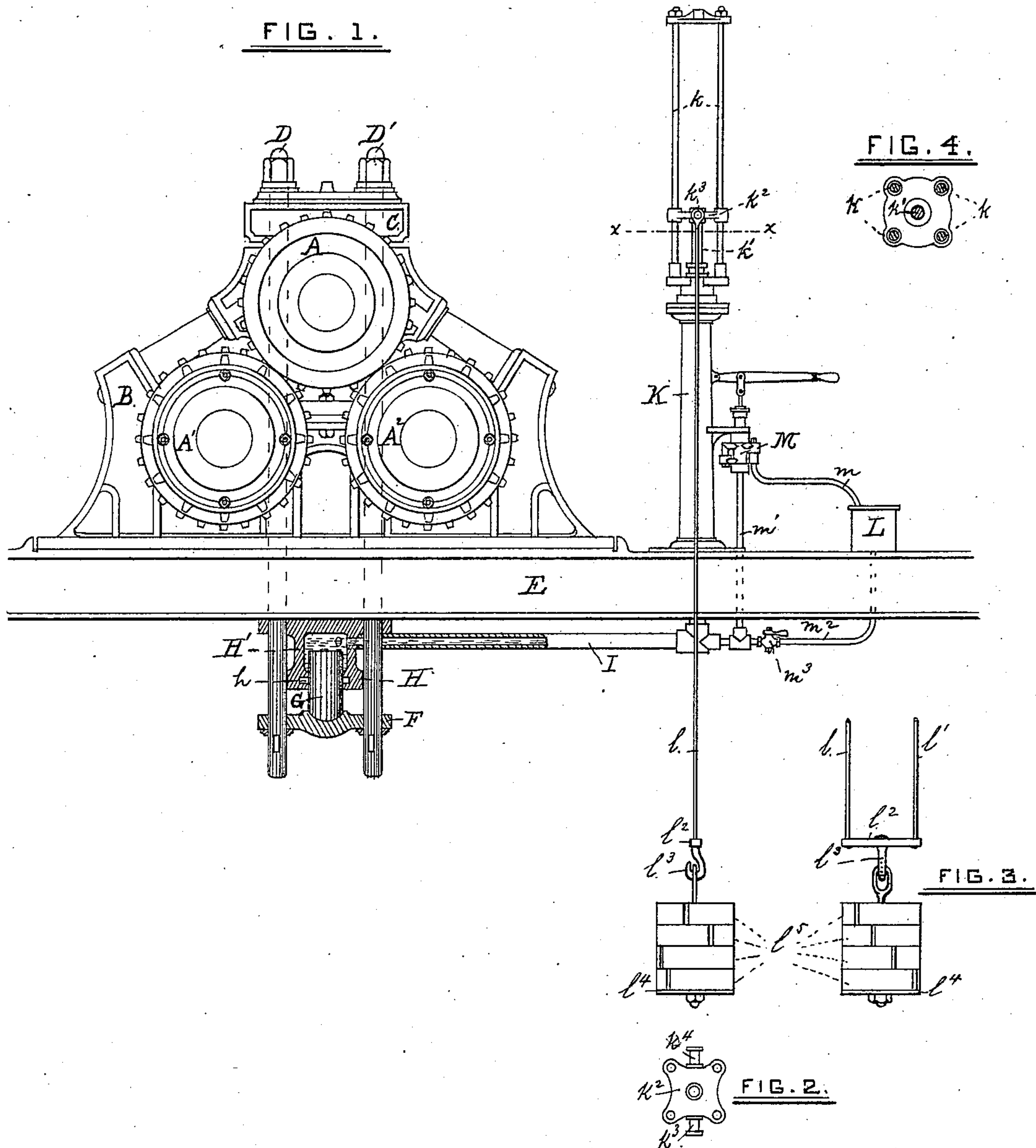


(No Model.)

J. S. McDONALD.
HYDRAULIC PRESSURE REGULATOR.

No. 292,026.

Patented Jan. 15, 1884.



WITNESSES
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JOHN SHEPHERD McDONALD, OF NEW ORLEANS, LOUISIANA.

HYDRAULIC-PRESSURE REGULATOR.

SPECIFICATION forming part of Letters Patent No. 292,026, dated January 15, 1884.

Application filed July 16, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN SHEPHERD McDONALD, a resident of the city of New Orleans, parish of Orleans, and State of Louisiana, have
5 invented a certain new and useful Improvement in Hydraulic-Pressure Regulators; and I do hereby declare the following to be a full, clear, and correct description of the same, reference being had to the annexed drawings,
10 making a part of this specification.

This invention relates to certain improvements in a pressure-regulator for which a patent, No. 128,235, dated June 25, 1872, was granted to me, and wherein a plunger is arranged within a chamber, said plunger being
15 connected with the bearing block or cap of one of the rollers of a series, and the chamber is connected with stand-pipes, into which weighted plungers press upon the liquid contained in
20 the above-described cylinder and stand-pipes and press downwardly upon the bearing block or cap and roller with a yielding pressure, depending upon the difference of area between the pressure-cylinder and stand-pipes, and upon
25 the weight applied to the stand-pipe plungers.

The object of my invention is to provide means for regulating or relieving the pressure from the bearings of heavy rollers in sugar-
30 mills, to admit of their uninterrupted action without causing undue strain to be brought upon them when they are overfed or become choked by the pressure of unyielding substances between them.

The improvements consist in the peculiar construction and arrangement of a stand-pipe or accumulator, provided with guide-rods secured to its upper end, and a piston within
35 the accumulator, acted upon in a direct manner by detachable weights, as will be hereinafter described.
40

The improvement further consists in the combination, with the accumulator or stand-pipe of a hydraulic regulator, of an oil or
45 liquid reservoir connected to the supply-pipe of said accumulator, and a pump arranged between the reservoir and accumulator, to fill the latter with any required pressure of liquid, or to reduce the pressure therein, or entirely
50 exhaust the liquid from said accumulator, as will hereinafter appear.

Figure 1 in the accompanying drawings rep-

resents a view in elevation of my improved apparatus in connection with an ordinary cane-mill. Fig. 2 is a detail showing a top
55 view of the cross-head of the accumulator-plunger. Fig. 3 is a front view of the detachable weights and frame, and Fig. 4 is a cross-section through the line *xx* of Fig. 1.

To clearly illustrate the nature of my invention, the same is shown, as above stated, in connection with a cane-mill, which, in this instance, is provided with a train of three rollers, *A A' A''*, arranged in triangular relation to each other, the roller *A* being arranged
60 above and between the rollers *A' A''*, and wherein said rollers are supported by housings *B*, in the usual manner. The upper roller, *A*, is provided with vertically-moving bearing-blocks or caps *C*, that are held in place upon
65 the upper side of the bearings at opposite ends of the roller, and are connected by housing-bolts *D D'*, arranged vertically and extending below the bed-plate *E* of the frame or housings. The bolts *D D'* are connected at their
70 lower ends by a cross-head, *F*, with a cylindrical plunger, *G*, that is accurately turned to fit 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
75 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
80 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 the bottom of the stand-pipe or accumulator *K*. A piston and rod, *K'*, fit the interior
85 of the stand-pipe, and the piston is raised by the pressure of the liquid beneath it, and depressed by detachable weights, any desired number of which are employed, as hereinafter described. Guide-rods *K* are secured to the
90 head or cap of the stand-pipe, and project perpendicularly therefrom. Four guide-rods are preferably employed, and a spider or cross-head, *k''*, having four guideways, may be employed to reciprocate upon the guide-rods. This cross-head is provided with side pins *k'''*
95 *k''''*, (see Fig. 2,) from which are suspended a pair of rods, *l l'*, the lower ends of which are secured to a cross-bar, *l''*, that is provided with
100

a hook, l^3 , for receiving a stand, l^4 , upon which any desired number of weights, l^5 , may be placed. This arrangement provides simple and direct means for applying the power or weights immediately under the piston of the stand-pipe, and admits of the free movement of the piston within the cylinder at all times.

In order to regulate the amount of liquid within the cylinder and stand-pipe, to replace the liquid that may escape by leakage, or to entirely remove the liquid from the pressure-cylinder or its connections, I employ a reservoir or chamber, L, connected at its upper end to the eduction-pipe m of a pump, M, the induction-pipe m' of which is connected to the pipe I, connecting the accumulator and pressure-cylinder, so that the liquid therein may be readily pumped from said cylinder-pipe and accumulator and discharged into the reservoir L. A pipe, m^2 , connects the bottom of the reservoir with the pipe I, and a stop-cock, m^3 , upon said pipe permits its passage to be opened or closed. When the cock is opened, the oil in the reservoir will flow into the pressure-chamber and its connections, and will rise in the stand-pipe or accumulator to a level with the height of oil in the aforesaid reservoir.

The pump above described may be conven-

iently arranged for operation by bolting it to the stand-pipe or accumulator. When water 30 is employed as a liquid, it is important to remove said water to prevent rust, and also to prevent freezing when subjected to cold. When oil is employed, it is often required to remove it for economic reasons. 35

I claim—

1. The accumulator-head provided with the perpendicular guide-rods, the vertically-moving piston, and the cross-head, in combination with the rods l l' and the removable 40 weights for regulating the pressure of the piston, substantially as described.

2. The hydraulic-pressure regulator herein described, consisting of the liquid-pressure cylinder and accumulator, in combination with 45 a reservoir, L, pump M, and pipes connecting said reservoir with the pressure-cylinder and accumulator, said parts being arranged substantially as described, and for the purpose set forth. 50

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

JOHN SHEPHERD McDONALD.

Witnesses:

J. N. MÜLLER,

P. J. FINNEY.