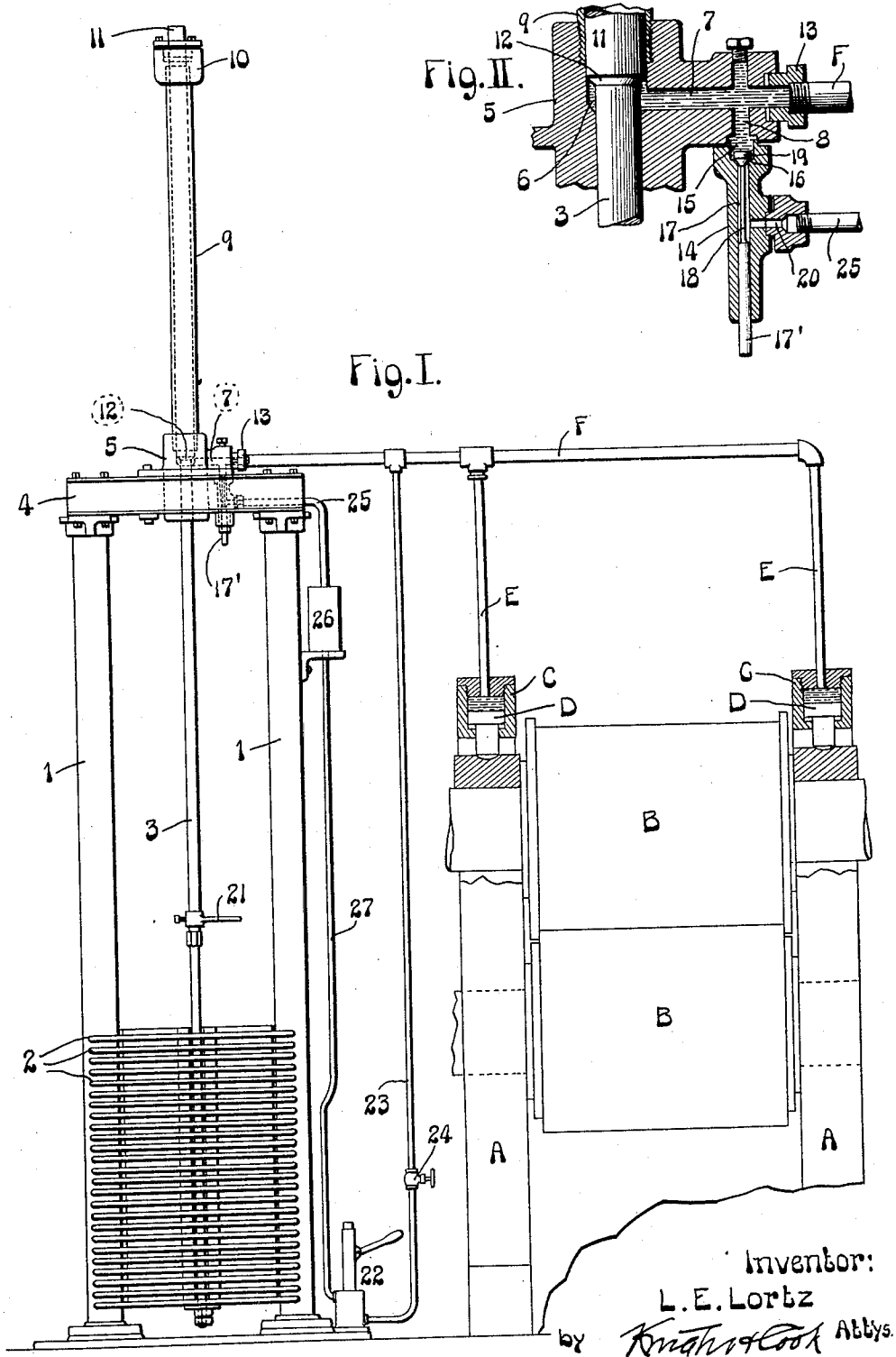


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HYDRAULIC APPARATUS FOR CRUSHING MILLS.
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1,383,473.

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Inventor:
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by *Knaht & Cook* Attys.

UNITED STATES PATENT OFFICE.

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HYDRAULIC APPARATUS FOR CRUSHING-MILLS.

1,383,473.

Specification of Letters Patent.

Patented July 5, 1921.

Application filed August 19, 1918. Serial No. 250,582.

To all whom it may concern:

Be it known that I, LOUIS EDWARD LORTZ, a citizen of the United States of America, a resident of the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Hydraulic Apparatus for Crushing-Mills, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to a hydraulic apparatus for applying pressure to the rolls of cane or other crushing mills, the invention pertaining more particularly to the accumulator of such a hydraulic apparatus.

Figure I is an elevation, partly in section, of my hydraulic apparatus shown connected to a crushing mill.

Fig. II is an enlarged vertical section through the lower cylinder head of the accumulator.

In the drawings, A designates the housings of a crushing mill constituting supports for the journals of rolls B, one of which is movable toward and away from the other. C designates hydraulic caps having rams D therein adapted to yieldingly hold the movable roll B relative to the other roll. The hydraulic caps have connected to them conducting pipes E through which water or other fluid may be delivered under pressure to the caps, said pipes E being in turn connected to a main delivery pipe F.

Referring now to the accumulator in which my present invention resides, 1 designates vertical guide columns by which the vertical movement of a series of weights 2 may be directed. The weights 2 are removably mounted on a vertical weight carrying rod 3, thereby making it possible to add to or subtract from the number of weights hung on said rod.

The guide columns 1 serve to support a cylinder bed 4 located at an elevation above the weights 2, said cylinder bed being preferably perforated to permit of the operation of the weight carrying rod 3 there-through.

5 designates a lower cylinder head supported by the bed 4 and having a vertical opening therein in which the weight carrying rod 3 is adapted to move. 9 is a cylinder barrel mounted in the lower cylinder head 5 and extending vertically therefrom, said cyl-

inder barrel being concentric with the weight carrying rod 3 but of larger diameter than said rod. The cylinder barrel 9 is closed at its upper end by a top cylinder head 10.

11 designates a piston operable in the cylinder barrel 9. The piston is preferably a continuation of the weight carrying rod 3 and is sufficiently larger in diameter than the upper end of the weight carrying rod to snugly fit the cylinder barrel 9 in which the piston is adapted to rise and fall. At the lower end of the piston is a shoulder or abutment 12 against which fluid may operate to impart vertical movement to the piston and to the weight carrying rod 3. Within the lower cylinder head 5 is a fluid-receiving chamber 6 beneath the lower end of the piston 11. Said fluid-receiving chamber 6 communicates with a duct 7, which leads through the lower cylinder head 5 from the receiving chamber 6 to a pipe connection 13, which serves to join the fluid conducting pipe F to the lower cylinder head.

14 designates an escape valve casing depending from the lower cylinder head 5 and having a valve chamber 15 therein, provided with a valve seat 16. In the escape valve casing is a vertical passageway 17 in which is located a vertical valve stem 18, carrying a valve 19 situated in the chamber 15. The upper portion of the valve rod 18 is smaller than the passageway 17 to permit flow of fluid therearound to a duct 20, leading laterally from said passageway while the lower portion of the valve rod is enlarged to fit the vertical opening in the valve casing 14 beneath the passageway 17 and slide therein with a fluid-tight fit. The lower portion of the valve rod constitutes a valve lifting stem 17' which protrudes beneath the valve casing 14 and adapted to be engaged by a lifting finger 21 carried by the weight carrying rod 3. 22 designates a pump for subjecting the fluid entering the pipes F and E and the lower cylinder head 5 to pressure. This pump is connected to the pipe F by a conducting pipe 23, which may contain a controlling valve 24, by the operation of the pump fluid under any desired pressure may be forced into the pipes E and F, the lower cylinder head 5 and the hydraulic caps C of the crushing mill. A pipe 25 connected to the escape valve casing at the location of the

duct 20 therein leads to a reservoir 26 and a return pipe 27 extends from said reservoir to the pump 22.

In the practical use of my hydraulic apparatus, pressure of fluid is first obtained in the pipes F and E, the hydraulic caps C and the lower cylinder head 5 by the operation of the pump 22. When material is passed between the rolls of the crusher the shiftable roll B, which is under the control of the hydraulic rams, will move relative to the other roll and the hydraulic pressure medium will act against the piston 11 to elevate it, thereby lifting the weights 2 which regulate the degree of pressure against the hydraulic rams. If a greater degree of pressure against the rams is desired, additional weights are added, whereas if less pressure is needed the number of weights is lessened. In the event of an excessive pressure occurring in the apparatus, the lifting finger 21 carried by the weight carrying rod 3 becomes elevated sufficiently to strike the valve lifting stem 17' and unseat the valve 15, whereby the fluid in the lower cylinder head 5 and the pipe F leading thereto is partially discharged through the escape valve casing 14 to the pipe 25, to the reservoir 26 and returns through the pipe 27 to the pump. It is thereafter necessary to restore the hydraulic pressure medium to the pipes F and E, the lower cylinder head 5 and the hydraulic cap C by the operation of the pump 22.

I claim:—

1. In an apparatus of the character described, a vertical weight carrying rod, a weight on said rod, a piston movable with said rod, a cylinder in which said piston operates, a conductor for a hydraulic medium in communication with said cylinder, an outlet device in communication with said conductor, a vertically movable relief valve

in said outlet device, a vertical operating stem depending from said valve, an abutment carried by said vertical rod for engaging said vertical stem and opening said relief valve, and means for returning the hydraulic medium from said relief valve to said conductor.

2. In an apparatus of the character described, a weight carrying rod, a weight on said rod, a piston movable with said rod, a cylinder in which said piston operates, a conductor for a hydraulic medium in communication with said cylinder, an outlet device in communication with said conductor, a relief valve in said outlet device, means actuated by said piston for engaging and opening said relief valve, and means for returning the hydraulic medium from said relief valve to said conductor, the last mentioned means including a pump, a conductor where by the intake of said pump is connected to said outlet device, a return conductor where by said pump is placed in communication with the first mentioned conductor, and a valve adapted to close said return conductor.

3. In an apparatus of the character described, a vertical rod, weights carried by the lower end of said rod, the upper end of said rod being enlarged to form a piston, a cylinder in which said enlarged upper end is slidably mounted, a fluid conductor communicating with said cylinder at a point below said enlarged upper end, an outlet device communicating with said conductor, a relief valve in said outlet device, an abutment on said rod at a point below its enlarged upper end, and means for transmitting movement from said abutment to said relief valve.

In testimony that I claim the foregoing I hereunto affix my signature.

L. EDWARD LORTZ.