

UNITED STATES PATENT OFFICE.

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HOISTING-CRANE.

No. 821,399.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, MILFORD F. BERRY, a citizen of the United States, residing at Fay, in the county of Franklin and State of New York, have invented a new and useful Hoisting-Crane, of which the following is a specification.

This invention relates to fluid-pressure hoists, and has for its principal object to provide a hoisting mechanism that will gradually cease its upward movement at a predetermined point without any sudden jar or shock and is of particular value in the handling of fluids or semifluid substances—such, for instance, as milk and other fluids in creameries and the like.

A further object of the invention is to provide a fluid-pressure cylinder in which provision is made for equalizing the pressure on opposite sides of the piston as the latter nears the limit of its stroke, and thus bring the piston to a gradual stop at a predetermined point.

A still further object of the invention is to provide a hoisting-cylinder wherein the speed of travel of the piston may be quickly adjusted without alteration in the quantity of actuating fluid admitted to the cylinder.

A still further object of the invention is to provide a novel means for attaching a hoisting-cylinder to a crane to permit the free turning of the crane-arm without effecting movement of the cylinder, the latter being separately supported and remaining at all times in operative position without regard to the position to which the arm may be adjusted.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claim, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is an elevation, partly in section, of a fluid-pressure-operated hoist constructed in accordance with the invention. Fig. 2 is a detail sectional view of the upper portion of the frame on the line 2 2 of Fig. 1. Fig. 3 is a

detail view illustrating a slightly-modified construction of motor mechanism.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

The mast 10 of the hoist is of the ordinary construction and carries at its upper end an arm or bar 11, that is braced by a diagonal 12. The lower end of the mast carries a pin that is stepped in a bearing 13, and at the upper end of said mast is a tubular socket 14, in which fits a stem 15. This stem is bifurcated at its upper end, forming two arms 16, that extend into sockets formed in a beam or other elevated support, the lower pin 13 and the stem 15 being in vertical alinement with each other and forming the axis of rotation of the mast.

At a convenient point adjacent to the mast is secured a cylinder 20, and in said cylinder is a piston 21, carried by a rod 22, that extends out through a suitable stuffing-box at the front end of said piston. This rod is connected to one end of a cable or chain 23, the opposite end of which passes over a sheave 24 at the end of the arm 11 and carries a hook or other hoisting device, as 25. Each of the arms 16 carries a sheave 26, and the distance between the peripheries of said sheaves is just sufficient for the passage of the cable or chain 23, and as said sheaves are arranged at the center of rotation of the mast it follows that the arm 11 may be swung around to any point without interfering with the operation of the hoisting of the cylinder.

At one end of the cylinder are two pipes 29 and 30, both provided with valves. The pipe 29 is connected to a steam-boiler or other supply of fluid under pressure, while pipe 30 constitutes the exhaust. At a point some distance from the opposite end of the cylinder is connected an air-escape pipe 32, having a suitable valve 33, which is adjusted in order to govern the length of time to be occupied during each stroke of the piston. If this valve be closed or nearly closed, the air in advance of the piston will be compressed to form a cushion, which will stop the movement of the piston when the pressure equals that of the operating fluid, or if but slightly open the escape of air will be gradual and the movement of the piston will be retarded. In all cases, however, the piston moves across the mouth of the escape-pipe in advance of

the completion of the stroke, so that an air-cushion is formed which will serve to gradually check the movement of the piston, this being of especial value in the handling of milk
5 or other liquid or semiliquid materials.

At one side of the cylinder is a by-pass in the form of a pipe 34, having a valve 35. This pipe is connected at one end to the end
10 end and communicates with the cylinder at a point slightly in advance of the mouth of the pipe 32. If the valve 35 in said pipe is fully open the operating fluid will pass therethrough to the cushion-space at the end of the cylinder,
15 and the pressure will be rapidly equalized on both sides of said piston. If the valve is partly closed, it will take a greater time to equalize this pressure, and in some cases the piston will continue to move for
20 some distance toward the end of the cylinder or until the escape-pipe 32 is opened, whereupon the reduction on the pressure side of the piston will cause the pressure in the cushion-space to move said cushion in the opposite
25 direction and close the pipe 32. This equalization of pressure is of importance in that it brings the piston to substantially the same position at each operation, while the whole of the stroke and the time occupied in
30 stopping the piston may be accurately adjusted by the valves 33 and 35.

During the return movements of the piston which is accomplished by opening the valve in pipe 30 air will be drawn in through the

pipe 32, and the piston can therefore move
35 only as fast as air can enter the cylinder through said pipe 32. This produces the desired gradual movement and avoids all danger of damage to the material being raised or
40 the vessels containing such material.

Instead of employing a by-pass in the form of a pipe 34 the piston-rod may be hollow, containing a passage 34', that is open to the
45 cushion end of the cylinder and communicates with the pressure end through a small port 38 after the port has passed through the stuffing-box of the cylinder.

Having thus described the invention, what is claimed is —

In a crane, a mast having a lower pivot, an
50 upper socket member secured to the mast, a pivot-rod extending within said socket member and provided with bifurcated arms, a support for receiving the ends of said arms, guiding-sheaves mounted on the bifurcated
55 arms, a crane-arm also having guiding-sheaves, a hoisting-cable guided by the several sheaves, a stationary operating-cylinder, a piston disposed in said cylinder, a piston-rod, and means for connecting the cable to
60 the piston-rod.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

MILFORD F. BERRY.

Witnesses:

FREDUS H. WILCOX,
WILLIE C. DRURY.