(No Model.)

W. E. H. OTTO.

AUTOMATIC STOP ATTACHMENT FOR HYDRAULIC ELEVATORS.

No. 537,478. Patented Apr. 16, 1895.

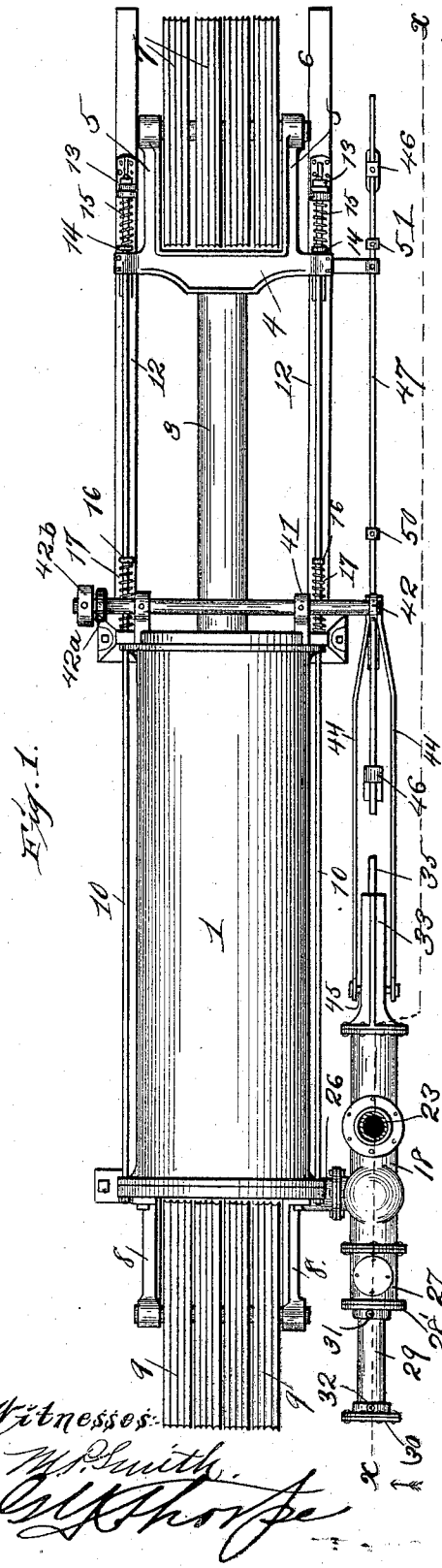

Fig. 1.

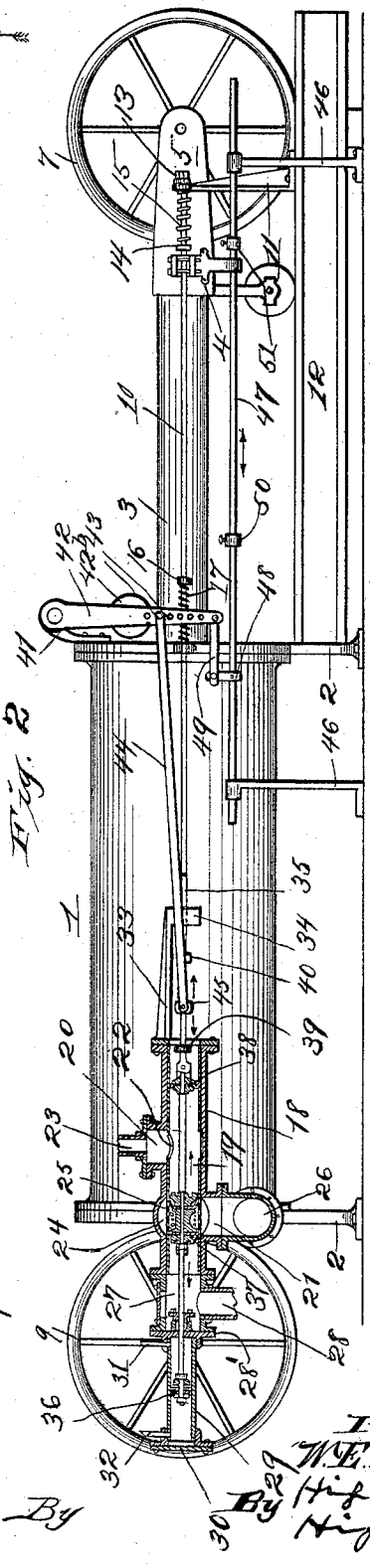

Fig. 2.

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UNITED STATES PATENT OFFICE.

WILLIAM E. H. OTTO, OF KANSAS CITY, MISSOURI.

AUTOMATIC STOP ATTACHMENT FOR HYDRAULIC ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 537,478, dated April 16, 1895.

Application filed July 24, 1893. Renewed September 25, 1894. Serial No. 524,120. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. H. OTTO, of Kansas City, Jackson county, Missouri, have invented certain new and useful Improvements in Automatic Stop Attachments for Hydraulic Elevators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to improvements in automatic stop attachments for hydraulic elevators; and it consists in a rock-arm or lever carried by the cylinder, pitman or link-rods connected to a cross-head upon the valve-stem and to the rock-arm, a slide-rod also linked to the rock-arm, and having adjustable collars thereon adapted to be struck by the cross-head of the piston, and adapted to move, through the connections mentioned, the valve to its inoperative position, that is, to the position the valve occupies when the elevator-car is stationary or at rest.

The object of my invention is to produce stop-attachments of this type, which are simple, strong, durable, and positive and reliable in operation; furthermore, to produce an attachment which lessens the amount of labor in putting in an elevator plant, and decreases the expense thereof materially, because of its compactness and the few parts required.

With these objects in view, my invention consists in the peculiar construction and novel arrangement of parts, that will be hereinafter described and claimed.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1, is a plan view of the cylinder, its component parts, the valve casing, and the stop attachments for the valve, constructed in accordance with my invention. Fig. 2, is a vertical sectional view, taken on the line *x*—*x* of Fig. 1.

Referring to the drawings, 1 designates the cylinder, which is supported upon standards 2 in the usual manner.

3 designates the piston rod projecting through one end of the cylinder in the usual manner and carrying a cross-head 4 upon its outer end. The cross-head 4 is provided with the forwardly projecting and parallel arms 5—5 in which is journaled near its opposite ends the shaft 6, and mounted upon this shaft 6 in the usual manner are the series of grooved wheels 7 for the cables (not shown). Projecting from the head at the opposite end of the cylinder are the parallel arms 8—8, and the grooved wheels 9 are mounted upon the shaft between the said arms in the usual manner. Extending longitudinally and at opposite sides of the cylinder are the guide-rods 10—10, said rods passing through the heads of the cylinder, and also passing through the outer ends of the cross-head 4. Said rods are further supported at their outer ends upon standards or brackets 11 carried by beams 12, and screwed upon the ends of said rods are retainer-nuts 13. A collar 14 is mounted loosely upon each guide-rod 10 near its outer end, and outward of the cross-head, and a spiral-spring 15 surrounds each rod and bears at its opposite ends against the collar 14 and the upper end of the standard 11. A collar 16 is also mounted loosely upon each guide-rod 10 a suitable distance outward of the front end of the cylinder, and springs 17 spirally surrounding said rods bear at their opposite ends against said collars and also against the front end of the cylinder. It will be seen from this construction that when the piston moves forwardly the cross-head comes in contact with the collars 14, and is cushioned by the springs 15 and that when the piston moves in the opposite direction the cross-head comes in contact with the collar 16 and is cushioned by the springs 17. The valve casing comprises the body-portion 18 having the usual lining 19, and provided with the tubular off-sets 20 and 21, the offset 20 communicating with the interior of said body-portion through an opening 22 in the lining, and also communicating with the supply pipe 23, through which the water is forced under pressure, to raise the elevator, as hereinafter referred to.

The outlet 21 communicates with an annular enlargement 24, and this annular enlargement or passage communicates with the interior of the body-portion 18 through the perforated lining, as shown at 25. The outlet further communicates, and is supported upon the pipe 26 leading from the rear end of the cylinder 1.

A tubular casting or pipe 27 is bolted to the

rear open end of the body-portion 18, or otherwise suitably secured, and is provided with an opening which communicates with the outlet-pipe 28, through which the water is forced by the descending elevator-car, as hereinafter referred to. The rear end of the pipe 27 is closed by a plate 28′, and carried by this plate 28′ is the cylinder or pipe 29, the rear end of which is closed by a plate 30, and communicating with this cylinder near its front and rear ends are the pipes 31 and 32 leading to the valve (not shown), by which the movement of the elevator-car is controlled.

Secured to the front end of the body-portion 18 is a bracket or casting 33, and this bracket or casting is provided with a depending arm 34, to form a bearing for the front end of the valve-stem 35; said stem extending centrally through the body-portion 18, the pipe 27 and into cylinder 29, and carrying upon its rear end the valve-cup or packing 36, which is adapted to reciprocate with said valve-rod or stem in the cylinder 29. Secured upon the valve-stem in the usual manner is the valve 37 of the usual construction, and this valve is adapted to reciprocate in the body-portion 18 and 27.

Mounted upon the valve stem 35 and adapted to reciprocate in the body portion, and between the inlet or supply opening 20 and the forward and open end of the body-portion is a valve-cup or packing 38. Secured adjustably by means of set-screws upon the valve-stem are the collars 39 and 40, the collar 39 being secured a short distance outward of the valve-cup or packing 38, and the collar 40 being secured upon the valve-stem a suitable distance inward of the bearing 34. A pair of brackets 41 is secured to the front end of the cylinder, and journaled therein is the transverse rock-shaft, and depending from said rock-shaft is a pair of rock-arms 42 and 42^a; the rock-arm or lever 42 being provided with a series of holes or apertures 43, and the rock-arm 42^a having a counterbalance weight 42^b. A pair of link bars 44 are pivotally mounted at their front ends upon a bolt passing through one of said holes or apertures, and are pivotally connected at their rear ends to the opposite ends of a cross-bar 45 carried by the valve-rod or stem, and about midway between the adjustable collars 39 and 40. Bolted or otherwise supported in a vertical position, and in the same vertical plane as the rock-arm or lever 42, is a pair of standards 46, one of these standards being located a suitable distance inward of the lower end of the rock-arm, and the other standard 46 being located a suitable distance outward of the cross-head 4 of the piston, and supported horizontally by and adapted to slide in bearings in the upper end of said standards is a rod 47. A suitable distance inward of the lower end of the rock-arm 42 the slide-rod 47 is provided with an adjustable collar 48, and pivotally connecting this collar with the lower end of the rock-arm is a link-bar or rod 49. Adjustably mounted by means of set-screws upon this slide-rod 47 is a pair of collars 50 and 51, the collar 50 being located inward or rearward of the cross-head 4 and the collar 51 being located outward of the cross-head 4.

The operation of my invention is as follows: The elevator-car being stationary the valve 37 occupies the position shown in Fig. 2, and the valve-cup or packing 36 occupies the position shown in the same figure, and the weight 42^b by gravity holds the rock-arm vertically pendent. When the valve is in this position, the water of course is prevented from entering the cylinder 1 or escaping therefrom. When it is desired to move the car upwardly, the lever is operated so that the valve (not shown) will allow the water under pressure to enter the cylinder 29 through the pipe 31 at its front end, and this forces the valve-stem and therefore the valve rearward, or so that the valve 37 closes the outlet-pipe 28. Immediately this takes place, the water under pressure rushing through the supply pipe 23 and into the body-portion 18 passes through the perforated lining at 25, and thence through the pipe 26 into the rear end of the cylinder, and coming in contact with the rear side of the plunger or piston-head forces said piston outward, and through the medium of the cables (not shown) passing over the grooved wheels 7 and 9 raises the elevator until the desired height is attained. When it is desired to stop the elevator, by operating the valve so that the water may enter the pipe 32 and force the piston back to its central or inoperative position, as shown in the drawings, the supply of water to the cylinder, and also the escape of water from the cylinder is cut off. Now should the operator after starting the elevator upon its upward journey fail to stop the elevator by the ordinary means, when the elevator has reached a predetermined height, the cross-head 4 will come in contact on its outward stroke with the adjustable collar 51 and move the slide-rod outward, and this movement of the slide rod of course, by operating the rock-arm 42 causes the cross-head 45 linked thereto, to come in contact with the collar 40, and move the valve from its position controlling the outlet pipe 28 back to its inoperative position, and automatically stop the elevator; and immediately the operator starts the car downward, the weight automatically returns the slide-rod 47 to its original position, or so that the rock-arms are vertically pendent. When this movement takes place, the cross-head 45 is moved from contact with the collar 40, to its original or normal position, and adjacent to the collar 39, which of course has been advanced with the valve. To move the car downward, the operator allows the water to pass through the pipe 32 and force the valve-stem and the valve 37 forward, until they occupy a position forward of the annular enlargement or passage 24, and cut off the supply of water through the pipe 23. Now when the valve reaches this position the elevator

by gravity begins to descend, and the piston forces the water up through the pipe 26 through the perforated lining at 25, and out through the outlet-pipe 28. When the elevator reaches a certain predetermined position the cross-head 4 moving inwardly strikes the adjustable collar 50 and causes through the medium of the slide-rod, rock-arms and link-bars, the cross-head 45 to come in contact with the adjustable collar 39 and force the valve back to its inoperative position. This of course by controlling the entrance of water to or escape of water from the cylinder stops the elevator-car, and as soon as the car is moved upwardly, the weight again causes the slide-rod 47 to resume its normal position.

From the above description, it will be seen that I have produced attachments which may be adjusted to any desired travel of car, and which will positively stop and hold stationary the elevator when such limits of travel have been reached, and also attachments of this character which are simple, strong, durable and inexpensive of construction.

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

1. In a hydraulic elevator, the combination with a valve having a stem, and the collars adjustably mounted upon said stem, and a cross-head mounted to slide upon said stem and between said collars, a rock-arm having a series of holes or apertures, and carried by the cylinder, and pitmen or link-rods connecting the cross-head and the rock-arms, of a slide-rod pivotally linked to the lower end of the rock-arm, and collars adjustably carried by said rod, and a cross-head carried by the piston of the cylinder, and adapted to come in contact with said adjustable collars to move the valve to its inoperative position, substantially as set forth.

2. In a hydraulic elevator, the combination with a valve-casing, a valve having a stem, and collars mounted upon said stem, a slidable cross-head also mounted upon said stem, and a rock-shaft, and vertically pendent rock-arms carried thereby, and one of said arms adjustably linked to the slidable cross-head, and a slide-rod also linked to the said rock-arm, and means to move said slide-rod so that the arms will be rocked to move the valve to its inoperative position, and a counter-balance weight upon the other rock-arm to return the slide-rod to its initial or normal position, substantially as described.

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

WILLIAM E. H. OTTO.

Witnesses:
MAUD FITZPATRICK,
M. P. SMITH.