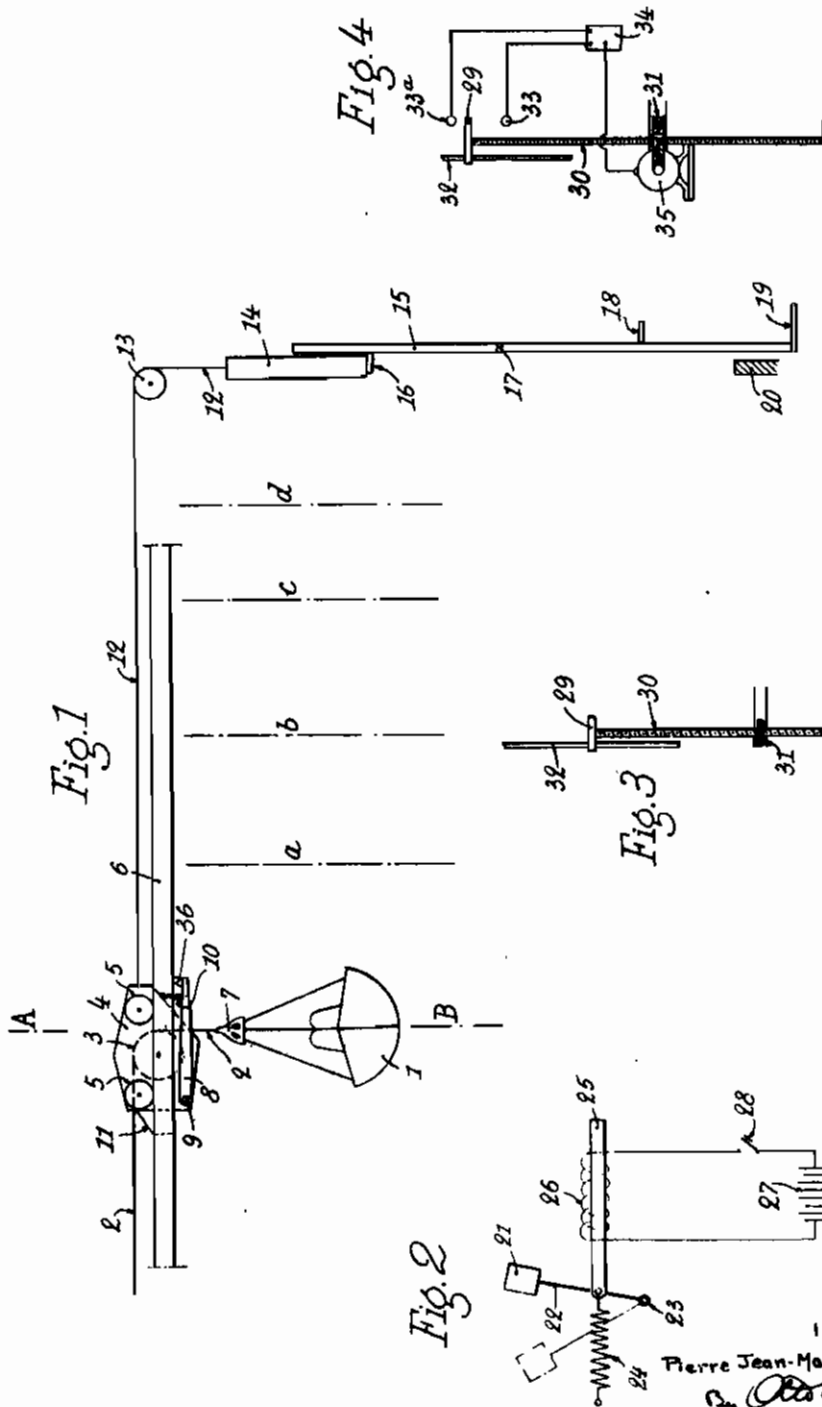


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 COUNTERWEIGHT CONTROL SYSTEMS FOR
 LIFTING DEVICE CRABS
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COUNTERWEIGHT CONTROL SYSTEMS FOR LIFTING DEVICE CRABS

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My invention relates to lifting devices of the type including a horizontal or slightly inclined guideway along which a crab is adapted to run, to which crab is hung an automatic grab or the like goods-handling device, said crab advancing in a given direction under the action of a counterweight adapted to return the crab towards the discharging position. The invention is more particularly applicable to the apparatuses of the type described in my prior specification Ser. No. 282,-817, filed on July 4, 1939.

Said invention has for its object a counterweight control system for returning the crab towards the discharging position and adapted to stop the crab at a predetermined position and adapted to stop the crab at a predetermined point of its return travel. To this end, according to the invention, an adjustably positioned stop is arranged in the path of the counterweight so as to balance the action of the latter and to stop the crab at the desired point.

In the case of an automatic grab of the type described in the above mentioned prior specification, this stopping of the crab produces at the same moment the automatic emptying of the grab through the slack given to the lifting cable to which the grab is suspended.

Other features of the invention will appear from the following description, reference being made to the accompanying drawing in which:

Fig. 1 is a diagrammatic view of a first form of execution of the invention.

Fig. 2 shows diagrammatically a modified control for the stops, constituted by an electromagnetic relay.

Fig. 3 shows an arrangement including a single stop adjustably positioned as to height.

Fig. 4 shows diagrammatically an automatic device for giving the stop a reciprocating vertical motion at a uniform or variable speed so as to produce a regular or irregular displacement of the point at which the grab or the like part empties its contents between the two extreme points corresponding to the extremities of the path allowed for the adjustable stop.

Reverting to the drawings, 1 designates an automatic grab, secured to the end of a hoisting cable 2 passing over a return pulley 3 carried by a carriage or crab 4 the rollers 5 of which run along a horizontal or slightly inclined rail 6. The opening ring 7 is suspended to a cable arranged in the same longitudinal vertical plane as the cable 2 and secured to a lever 8 pivoted at 9 to the crab 4 and provided with a counterweight

or a spring 10 urging the brake shoe 38 into contact with the rail or guideway 6.

When in position for loading over the axis AB, the crab abuts against the stop 11 under the action of the weight of the grab suspended to the cable 2.

The crab is urged backwards by the return system including a cable 12 passing over a return pulley 13 and to the end of which is suspended a driving counterweight 14.

In the form of execution of Fig. 1, a rotary rod 15 is arranged parallel to the path of the counterweight 14 and is provided at different heights with projecting fingers 16, 17, 18 angularly shifted one with reference to the others by suitable angles. The rod 15 carries also a lever 19 whereby it is possible to give said rod the desired angular position. The lowermost stop may be constituted by a stationary part 20.

According to the angular position given to the rod 15, the counterweight is arrested by either of the stops constituted by a finger 16, 17 or 18 or the part 20, so as to stop the grab in the corresponding emptying position as shown diagrammatically at a, b, c and d.

In the form of execution illustrated in Fig. 2, 21 designates one of the stops distributed at different heights along the path of the counterweight 14. This stop is carried by a lever 22 adapted to pivot round a stationary axis 23 and urged in one direction by a spring 24 and in the opposite direction by the armature 25 of a coil 26 inserted in the circuit of a current supply 27 with a switch 28. Normally, the switch 28 being open, the spring 24 urges the lever 22 into the position shown in dot and dash lines, for which the stop 21 is no longer in the path of the counterweight 14. When the switch 28 is closed, the coil 26 attracts its armature 25 which brings the stop 21 back into the path of the counterweight.

In the example shown in Fig. 3, the stop 29 which stands constantly in the path of the counterweight 14 is constituted by a plate adjustably positioned as to height. To this end, the plate 29 is secured to a screw 30, screwed inside a nut 31 held horizontally stationary by any suitable means while a guiding rod 32 cooperates with the plate 29 in order to prevent the screw from rotating. By rotating the nut 31 by means of a crank, a hand wheel, a small motor or the like, there is provided a vertical displacement of the plate 29.

In the modification according to Fig. 4, the plate 29 or a contact moving integrally therewith may engage the contacts 33, 33a of a reversing switch 34 inserted in the circuit of a motor 35

controlling the rotation of the nut 31. As the motor is constantly rotating either in one direction or in the other according to the position of the reversing switch 34, the plate 29 moves at a uniform speed between the two contacts 33, 33a, alternately upwards and downwards. Consequently the point where the counterweight is stopped during its successive travels varies for each travel of the grab in a regular manner. Thus the grab is emptied to form a uniform heap between two extreme emptying points (say a and b) the position of which depends on that of the contacts 33, 33a.

Of course, the invention is by no means limited to the examples of execution described hereinabove, which are given solely by way of example and it is obvious that many mechanical, electrical, hydraulic or the like devices may be readily imagined for varying the position of the stops for the counterweight 14, either at will or automatically.

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