THOMAS S. CRANE.

Improvement in Lifting Machines.

No. 124,885. Patented March 26, 1872.

Fig 1

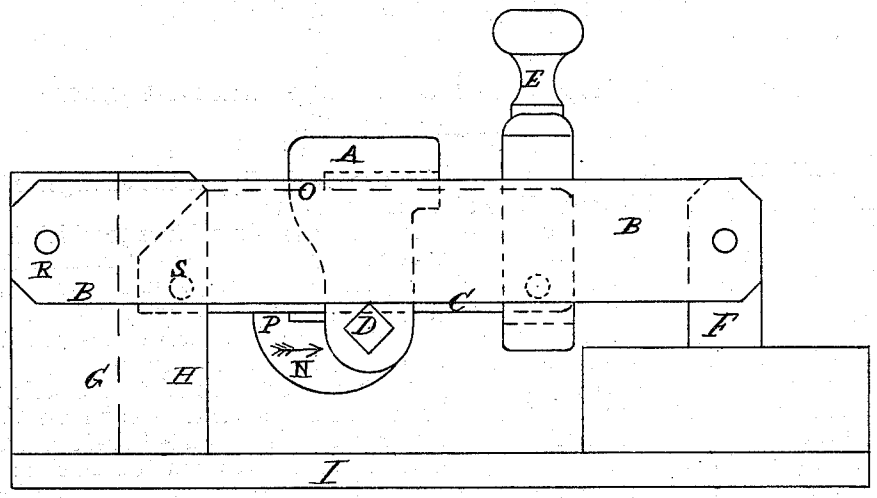
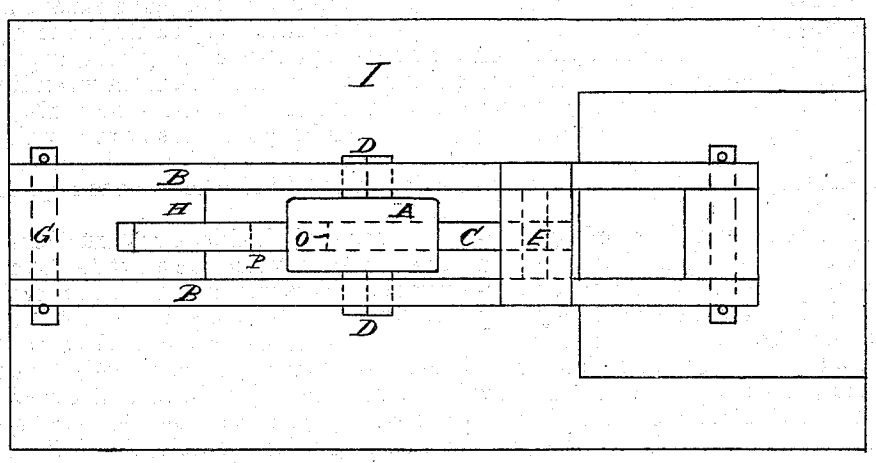


Fig 2



Witnesses.

Wm. H Dodd

Fredk K. Day

Inventor.

Thos S. Crane

UNITED STATES PATENT OFFICE.

THOMAS S. CRANE, OF NEWARK, NEW JERSEY, ASSIGNOR TO HIMSELF, CHARLES M. BOLEN, AND FRED. K. DAY, OF SAME PLACE.

IMPROVEMENT IN LIFTING-MACHINES.

Specification forming part of Letters Patent No. 124,885, dated March 26, 1872.

SPECIFICATION.

I, THOMAS S. CRANE, of Newark, Essex county, New Jersey, have invented an Improvement in Health Lifting-Machines, of which the following is a specification:

My invention relates to that class of machines in which levers are employed to lift a certain weight or resistance, and the effect upon the person who lifts, or the strain he exerts to overcome the weight, is graduated by a movable fulcrum, which, as it is placed further or nearer from another fixed fulcrum, varies the resistance and the strain required to overcome it. This movable fulcrum has been made in various forms, chiefly as a strap or hanger, embracing the lever upon which it operates, and carrying a knife-edge or pin which furnishes the fulcrum required, and which is carried by the strap to or from the fixed fulcrum, as required. This strap, in the act of lifting, receives a thrust from the knife-edge in direction of the length of the lever on which it rests, which causes it, if not fastened by any means, to slide toward the fixed fulcrum, thus altering the distance from the fixed to the movable fulcrum, and destroying the relation meant to exist between them.

This will be more fully understood by referring to the drawing, in which Figure 1 is a side elevation of the levers used with a movable fulcrum and the frame to which they may be attached; and Fig. 2 is a plan of the same.

I represents a frame of any material, to which two fixed fulcrums, R and S, are attached by supports G and H. To R are attached two levers, B B, to the other ends of which a weight is fastened by rod F. To S is attached another lever, C, which, with its fixed fulcrum S, is located between the two levers B B, as shown in Fig. 3. On this lever C a movable fulcrum, D, is placed, and a rod to apply the power for lifting is attached to the end of the lever at E. It is evident that the power required to lift a weight fastened at F depends upon the position of the movable fulcrum D, or its distance from the fixed fulcrum of the lever C.

In lifting-machines used for promoting health the strength of the operator is commonly developed by lifting light weights at first upon the machine, and afterward increasing the resistance gradually, as the strength of the operator warrants.

In the class of machines to which my invention relates this increased resistance is not produced by any increase in the weight employed with the machine, but by moving the movable fulcrum D further from the fixed fulcrum S of the short lever C.

As this adjustment of the movable fulcrum has to be made several times whenever the operator takes his graduated exercise, and many times in an hour, when the machine is used in a public place for regular patients it is a matter of no small importance that this fulcrum D should be easily moved and adjusted, and that it should stay securely at the place upon the lever C where it is set. Many devices have been used for this purpose, such as set-screws, keys, and gibs; but all have caused great annoyance in practice, by cutting and roughening the lever upon which they hold, or proving insufficient to hold the fulcrum when lifting. I have therefore devised a movable fulcrum, which can be moved easily at any time when the operator is not lifting, and requires no fastening of any kind when in the required position.

To accomplish this, I construct the hanger or slide A, in which the movable fulcrum D is secured firmly, with a slot to embrace the lever C, but permit the sides of the slot and the top and bottom of the same to clear the lever a sufficient distance to move very loosely, say, one-sixteenth of an inch, and throw all the weight imposed upon the fulcrum D upon two biting or griping surfaces, O and P, which are forced into closer contact with the lever the more the fulcrum has to bear.

The construction of these griping surfaces is fully shown in the drawing, Fig. 1, where P is shown distant from the fulcrum D about one half of the depth of the lever C, and the griping surface O is shown pressing upon the top of the lever C about midway between vertical lines that might be drawn through P and D. It is evident that a force tending to press the fulcrum D downward produces a rotary or swinging movement of the slide A about the point O, which clamps the slide firmly upon the lever C.

To move the slide freely upon the lever, a rotary or tipping motion in the opposite direction must be produced. This is effected by grasping the slide with the thumb pressing on the top and the fingers beneath; a twisting motion in the direction of the arrow N then instantly loosens the slide, which can be moved to any new point on the lever. This movable fulcrum has been tested in many lifting-machines, and remains firmly fixed wherever it is set by the operator.

Claim.

Having thus described the construction and operation of this movable fulcrum, I claim and desire to secure by Letters Patent—

A self-clamping movable fulcrum, in combination with a lever or system of levers, as shown and described.

THOS. S. CRANE.

Witnesses:
FREDK. K. DAY,
WM. H. DODD.