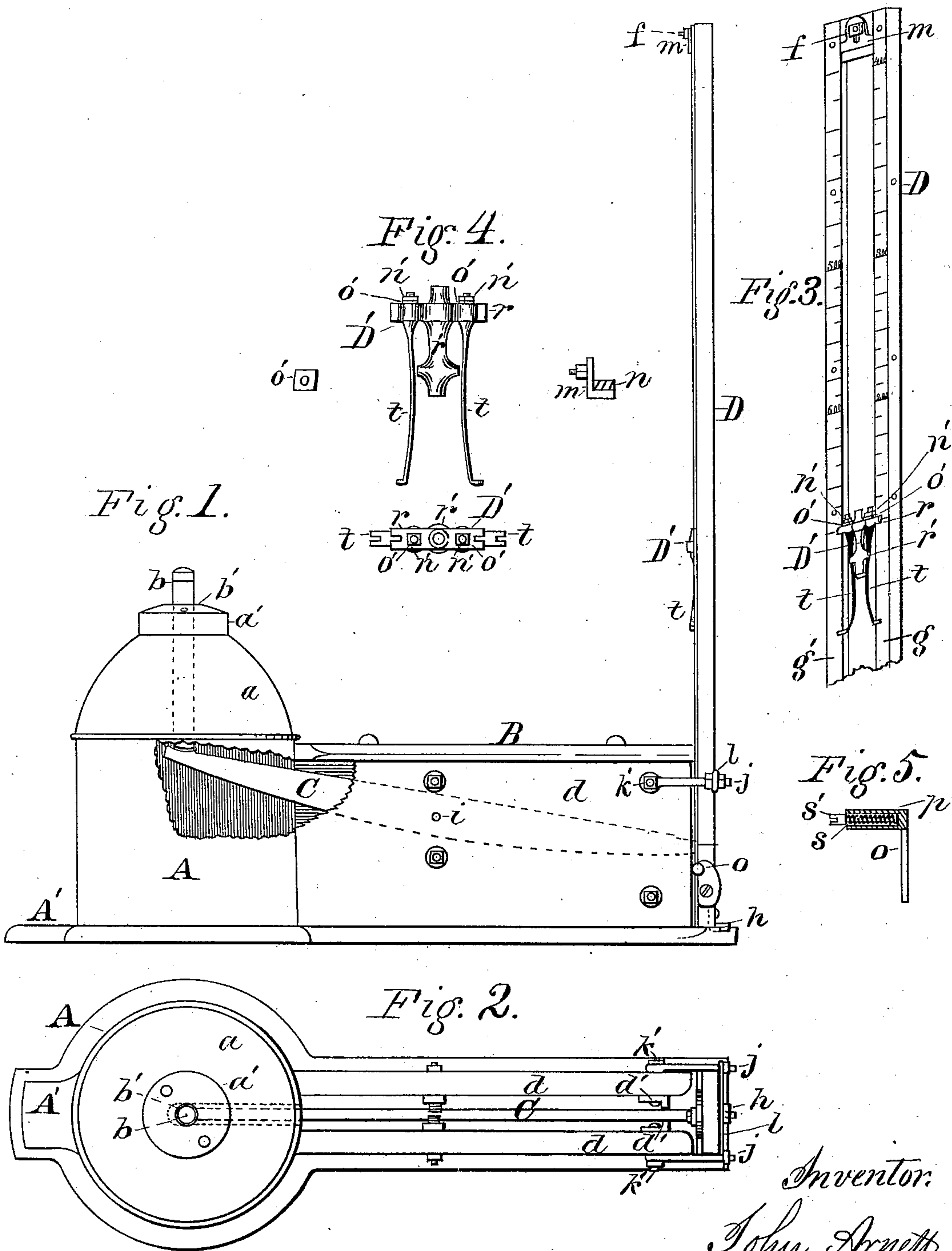


J. ARNETT.  
Exercising-Machine.

No. 226,438.

Patented April 13, 1880.



Attest.  
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# UNITED STATES PATENT OFFICE.

JOHN ARNETT, OF SPRINGFIELD, OHIO.

## EXERCISING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 226,438, dated April 13, 1880.

Application filed September 15, 1879.

*To all whom it may concern:*

Be it known that I, JOHN ARNETT, of the city of Springfield, in the county of Clarke and State of Ohio, have invented new and  
5 useful Improvements in Exercising-Machines, which are clearly, fully, and concisely set forth in the following specification.

My invention relates to machines for registering the weight or force of a blow given to  
10 a plunger-rod which is held in a vertical position in the bore of an upright block. The rod rests upon one end of a pivoted lever, which receives the weight of the blow and transmits the force through the opposite end  
15 to a spring-dart which is thrown up between two long vertical guides at the rear end of the machine.

The face of the guide-board is graduated, from end to end on each side, in increased  
20 ratio of figures, which denote, in hundreds of pounds and the fractions thereof, the force of the stroke which is given to the plunger-rod by a wooden hammer or maul in the hands of the striker.

Figure 1 is a side elevation of my improved exercising-machine, which I call a "striking-machine." Fig. 2 is a plan view of the same,  
25 the lid which covers the lever-box between the block and guide being removed to show the position of the lever and connections from the top. Fig. 3 is a view of the guide-board detached. Fig. 4 is an enlarged view of the  
30 dart. Fig. 5 is an enlarged view of one of the spring-gibs which hold the lower ends of the metal guides in position to press upon the  
35 dart.

A is the block, which is solid and cylindrical, with a conical top, *a*, which is surmounted by a smaller cylindrical section, *a'*, turned on  
40 the peak of the block. This is hooped by a heavy iron band, and its top is also capped with the same material to protect it from the effects of a diversion of the blow aimed at the plunger-rod *b* in the central hole, *b'*, and which  
45 is seen projecting above the block in Fig. 1. The relative position of the plunger-rod *b* and the lever C, on the end of which it stands, are shown in this figure, a section being shown broken out. A section of the lever-box B is  
50 also shown in the same way.

The block A stands on a heavy base-plank,

A', which extends under the entire machine, projecting enough on the sides and front end to give it solidity and firmness. The lever-box B is constructed with two heavy plank  
55 sides, *d d*, set up edgewise, with a narrow space between them, in which the large lever C is pivoted. This lever is constructed of heavy malleable or wrought iron, about four  
60 inches broad in the middle and tapering toward each end, the under edge being slightly curved. It is about three-quarters of an inch thick. The upper edge is straight. The forward end has a seat for the plunger-rod and  
65 the rear end of the dart.

The lever C is pivoted centrally, a hole being drilled through it, and the pin *i* inserted through it and the planks *d*, which form the  
70 sides of the box. To allow the forward end of the lever to move through the arc of a circle, the block A is cut or mortised a little beyond its center, as shown in Fig. 1 and in dotted lines in Fig. 2.

Where the pivot-pin *i* rests in its bearings iron plates are bolted to the inside of the lever-box to give additional strength. At the rear,  
75 on each side of the lever-box, are seen link-bolts *j j*, which connect the transverse bar *l* (which is bolted to the back of the upright D) with the ends of bolts *k'*. These latter pass  
80 through the plank *d* and angular guide-plate *d'* (between the planks *d*) on each side, securing the latter in place on each side of the lever C, and prevent any lateral movement of the  
85 same, besides protecting the wood of the box from injury when the lever is operated.

D is the guide-post, which is detachable, being made so as to be easily separated from the rear end of the box B. A hook-pin, *h*,  
90 connects its lower end with the base A', and the link-bolts *j* above connect it with the planks *d d*, a thread being cut on the outer ends of these link-bolts, and a nut screwed on behind the plate *l* on each side. An eye on the forward end of *j* slips over the end of bolt *k'*, and  
95 is secured by a nut in the same manner.

On the front of the post D two long strips of metal are fastened, forming the guides *g g'*. These are graduated by an ascending scale from 0 to 1000, ascending on the guide *g* and  
100 descending on guide *g'*.

The operation of my machine is as follows:



The plunger-rod *b* is inserted in the hole *b'* in the block *A*, resting on the forward end of lever *C*. The dart *D'* (seen in Figs. 1, 3, and 4) is pushed down on the other or rear end of the lever, between guides *g g'*, till it reaches the bottom, raising the forward end of lever *C* and pushing the top end of the plunger-rod up out of the block. (See Fig. 1.) It is now ready to receive the stroke of the maul. When this is given the dart is thrown upward. The point at which it stops indicates the force of the blow. A very heavy blow carries it to the top of the guides, where it comes in contact with a spring-plate, *m*. (See detail, Fig. 4.) This is a right-angled plate, extending back between the top ends of the guides, and has a rubber spring, *n*, under it, and is made with a slot or extended hole, so that when it receives the shock of the dart-head it will move slightly on its fastening-bolt *f*, by which it is attached, through this slot, to the head of post *D*.

The object of the spring-plate *m* is to cause the dart *D'* to rebound downward by the increased force of the blow, and to mark its tally on the scale *g'* on the left. (See Fig. 3.) The guide-plates *g g'* are not fastened all the way down the post *D*, but are loose near the bottom, and are provided with spring-gibs *o*, which press upon them and increase the pressure on the dart. The gibbs *o* consist of a cylindrical case, *p*, in which there is a plunger, *S'*, having a spiral spring, *S*. The plunger is cut through so as to form a fork, which straddles the outer edge of each guide-plate near its bottom end. The gibbs are provided with a broad base-plate, by which they are screwed to the edges of post *D*.

The spring-dart *D'* is made in the form of a cross in its body part. Its cross-bar *r* is grooved vertically to straddle the inner edges of the guide-plates *g g'*. The vertical bar *r'* has its lower end made also in the form of a cross, (inverted,) its arms bearing against the two long curved springs *t t*. The upper ends of these are formed with an enlarged part, from which extends a threaded bolt end. This passes up through the bar *r*, and has a nut, *n'*, on it. A rubber gasket, *o'*, is interposed under the nut *n'*, to prevent the shock upon the dart from breaking the springs *t t*. (See Figs. 3 and 4.) The springs *t t* have their lower ends turned outwardly at right angles, and are also slotted vertically to straddle the edges of the guides. The springs taper from

the bar *r* a short distance down, and, being long, extend the bearing-points of the dart on the guides, and serve to stop it precisely at the point where the force which propels it is expended, thus accurately registering the weight or force of the blow given.

Having thus described my invention, what I claim is—

1. In an exercising-machine for registering the weight of a blow from a maul or hammer, the following elements, viz: a block, *A*, for receiving and retaining within its central bore, *b'*, an upright plunger-rod, *b*, a pivoted lever, *C*, on the forward end of which said plunger-rod rests when the machine is in its operative position, a spring-dart, *D'*, so constructed as to be retained between the edges of vertical guide-plates *g g'*, operated from the opposite end of said pivoted lever, and a vertical guide-post, *D*, provided with two graduated scales for registering both the primary force and the rebound from the spring-plate *m* at the top of said guide-post.

2. In the guide-post of an exercising-machine for registering the weight of a blow, the guides *g* and *g'*, having a gradually-increasing numerical scale from bottom to top on guide *g*, and from top to bottom on guide *g'*, as and for the purpose hereinbefore set forth.

3. In combination with spring-guides *g g'*, constructed as shown, the spring-dart *D'* and spring-gibs *o o*, as and for the purpose described.

4. Spring-dart *D'*, constructed substantially as described, and having its cross-bar *r* grooved vertically at its ends to straddle the inner edges of guide-plates *g g'*, its vertical bar *r'*, made in the form of an inverted cross at the lower end, to bear against the curved springs *t t*, and having the latter also grooved or slotted at their lower ends for the purpose of operating, in connection with said spring-guides, in registering the weight of a blow given to the plunger-rod *b*, and transmitted to said dart through the pivoted lever *C*, as set forth.

5. In an exercising-machine, as specified, a detachable guide-post, *D*, a lever-box, *B*, connecting the same with a cylindrical block, *A*, a pivoted lever within said lever-box, and a spring-dart, *D'*, operated substantially as described.

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