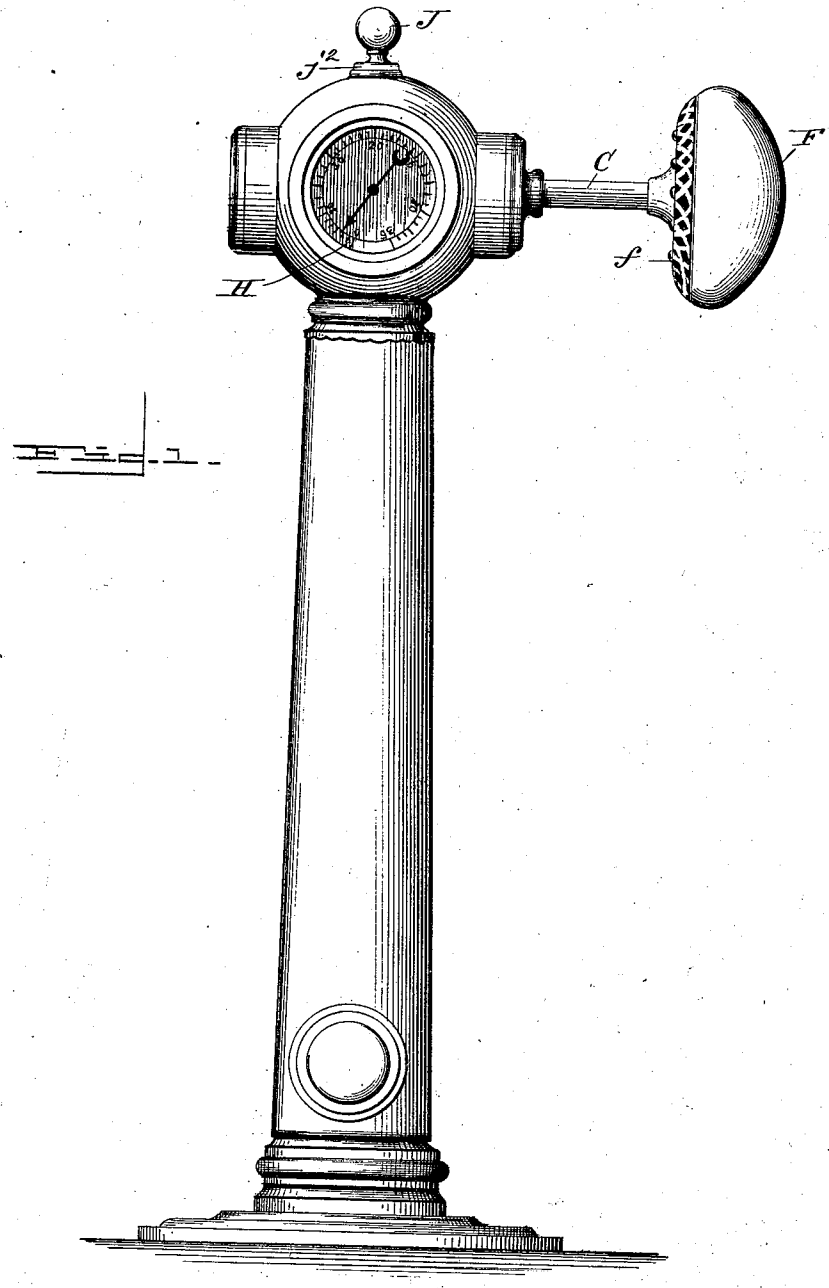
(No Model.) 4 Sheets—Sheet 1.

F. W. KREMER.

COIN CONTROLLED STRIKING AND STRENGTH TESTER.

No. 487,033. Patented Nov. 29, 1892.



Witnesses
F. W. Cumphrey.
Harrison Decker

Inventor
Franklin W. Kremer
By his Attorneys
Myers & Co.

(No Model.) 4 Sheets—Sheet 2.

F. W. KREMER.

COIN CONTROLLED STRIKING AND STRENGTH TESTER.

No. 487,033. Patented Nov. 29, 1892.

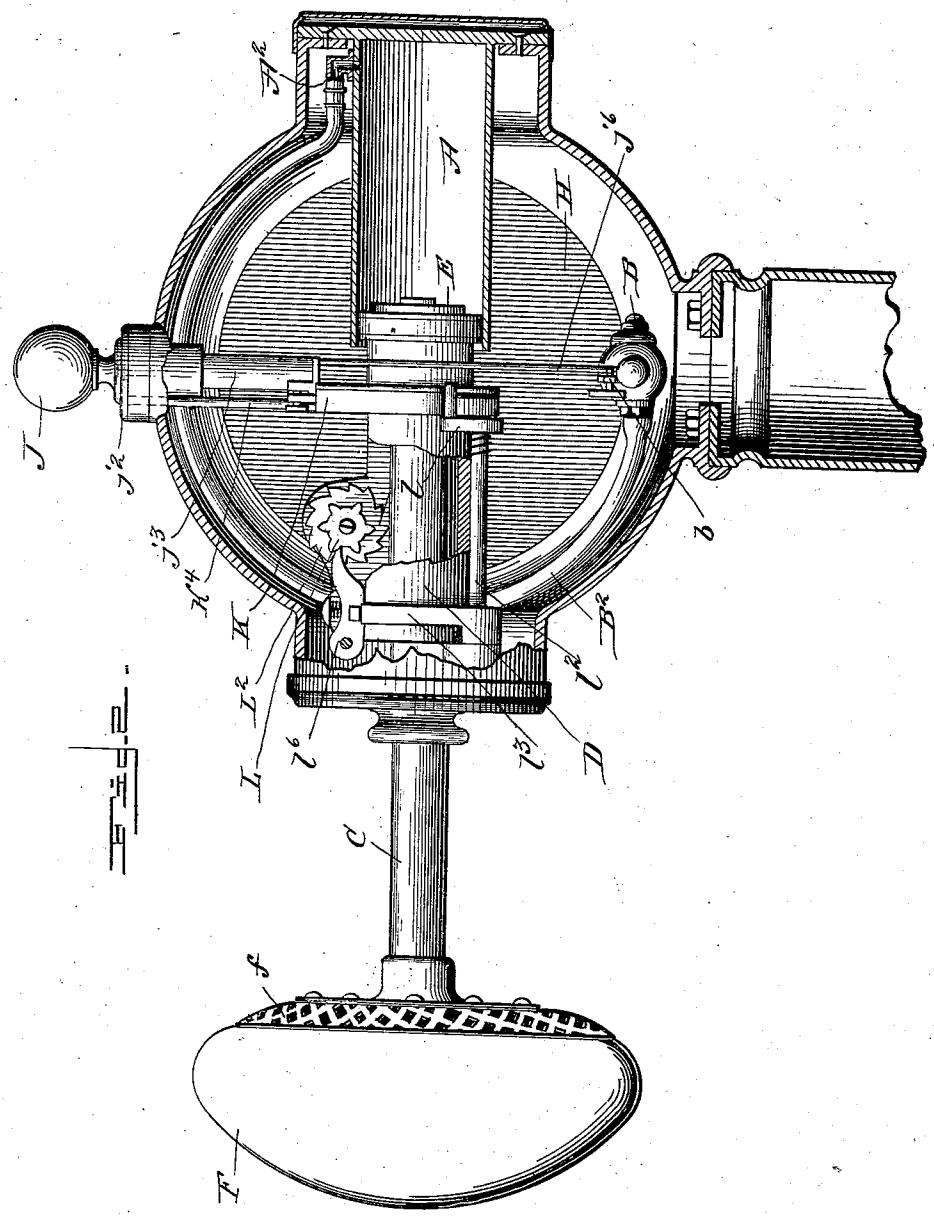


Fig. 2.

Witnesses
W. N. Humphrey
Harrison Decker

Inventor,
Franklin W. Kremer
By his Attorneys,
Myers & Co.

(No Model.) 4 Sheets—Sheet 3.

F. W. KREMER.

COIN CONTROLLED STRIKING AND STRENGTH TESTER.

No. 487,033. Patented Nov. 29, 1892.

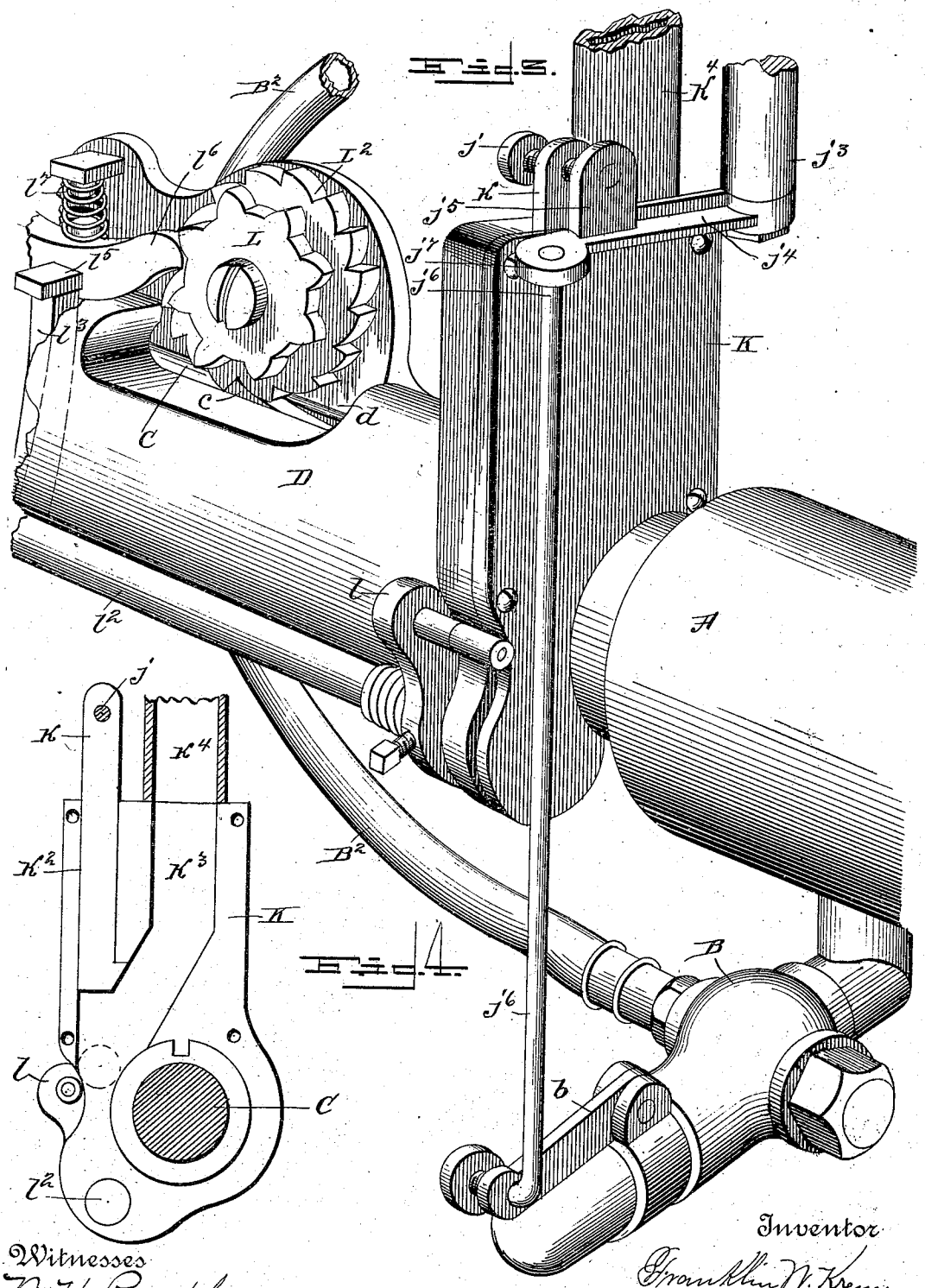


Fig. 4.

Witnesses
F. L. Pumphrey.
Harrison Decker.

Inventor
Franklin W. Kremer.
By his Attorneys
Myers & Co

(No Model.) 4 Sheets—Sheet 4

F. W. KREMER.

COIN CONTROLLED STRIKING AND STRENGTH TESTER.

No. 487,033. Patented Nov. 29, 1892.

Fig. 5.

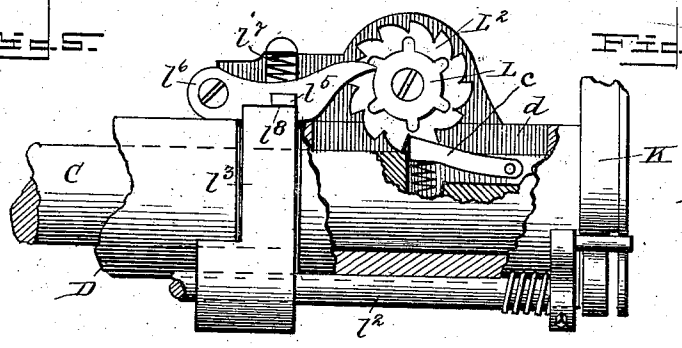


Fig. 8.

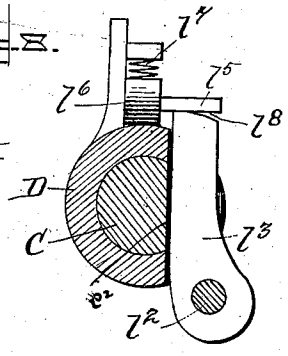


Fig. 6.

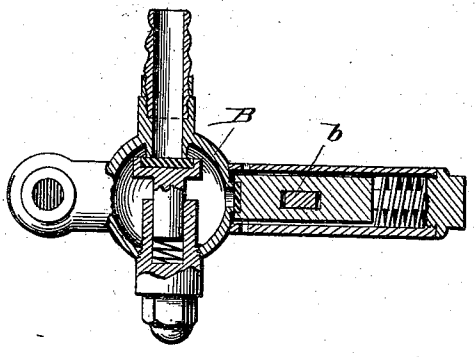
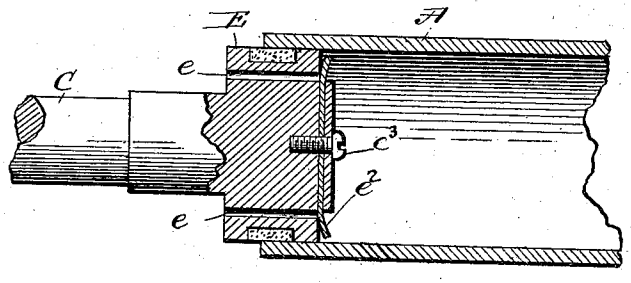


Fig. 7.



Witnesses
W. N. Pumphrey.
Harrison Decker.

Inventor
Franklin W. Kremer
By his Attorneys
Myers & Co.

UNITED STATES PATENT OFFICE.

FRANKLIN W. KREMER, OF CLEVELAND, OHIO.

COIN-CONTROLLED STRIKING AND STRENGTH TESTER.

SPECIFICATION forming part of Letters Patent No. 487,033, dated November 29, 1892.

Application filed January 4, 1892. Serial No. 416,971. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN W. KREMER, a citizen of the United States of America, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Coin-Controlled Striking and Strength Testers, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to that class of machines known generally as "coin-controlled machines," and more particularly as "strength-testing or striking machines."

The object of the invention is, first, to produce suitable apparatus, in combination with a striking-head or buffer, whereby a blow delivered on the striking-head will act to effect a compression of air contained in a cylinder having direct communication with a pressure gage or indicator to automatically register the force of the blow by the travel of an indicator-finger over a dial-plate; secondly, in the employment of suitable mechanism whereby the machine may be set for any predetermined number of operations by the insertion of a coin of certain size; thirdly, to prevent against fraudulent attempts on the part of an operator to set the machine for action by the insertion of coins of smaller denomination or disks, such as buttons, &c.; fourthly, to so construct the apparatus as to compel the operator to actuate an exhaust-valve when the coin is inserted, thereby setting the machine for a number of operations, relieving the gage of the air compressed by the preceding operation, and allowing the index-finger of the gage to return to the zero-point of the scale, and, finally, to avoid complicated or delicate mechanism and produce a machine of this class that shall be at once strong, durable, and comparatively inexpensive of manufacture.

With these objects in view the invention consists in a pneumatic striking-machine comprising an air-cylinder having a piston and piston-rod and a striking-head or buffer mounted on the outer projecting end of the piston-rod, whereby the air in the cylinder shall be compressed proportionately to the force of the blow delivered on the striking-head; furthermore, in combination with the air-cylinder a pressure-gage directly connected thereto and adapted to register and indicate the force of a blow delivered on the striking-head; and, furthermore, in suitable mechanism adapted to operate on the insertion of the coin of certain size to set the machine for a predetermined number of operations and at the same time exhaust the gage and allow the index-finger to return to the zero-point of the scale preparatory to registering and indicating for the next blow, the said mechanism consisting of a standard suitably mounted and having formed therein a slot connecting with a chute leading from an exterior opening in the casing of the machine, this opening being formed in a flattened portion of the surface, which is covered by a projecting flange of an operating handle or knob having a downwardly-extending rod connected with a plunger working in a slot in the standard which communicates with the coin-slot. By this peculiar construction it is necessary to raise the handle or knob before the coin can be inserted, and by reason of the connection the plunger is raised at the same time, allowing the coin to pass into the plunger-slot and stop at a point between the piston-rod and a roller loosely mounted on the stud of an arm rigidly secured to a shaft carrying a locking-arm. When the handle or knob is released, it falls by gravity, carrying with it the plunger, which comes in contact with the coin and forces it out of the slot, thereby throwing the roller-arm outwardly, which motion is transmitted to the locking-arm to unlock a ratchet device.

To obtain, for example, two operations of the machine by the insertion of a coin of a certain size, a double ratchet is employed formed of two disks rigidly secured together, the larger disk having two teeth for every tooth of the smaller. The pawl of the larger wheel is formed by a spring-pawl on the piston-rod, thereby allowing two strokes of the piston before the spring locking-pawl of the smaller wheel is operated or engaged by a tooth which actuates the locking mechanism. This mechanism consists of a locking-arm mounted on or near the end of a spring-held rod, the latter having secured at or near the opposite end the coin-actuated arm, whereby as the plunger engages the coin to force it out of the slot motion will be transmitted to the locking-arm, effecting a disengagement

between said locking-arm and a recess in the plunger-rod. At the same time a spring-actuated pawl automatically operates to lock said arm, thus setting the machine for action. An exhaust-valve interposed in the connection between the pressure-gage and the air-cylinder is connected with a projection of the downwardly-extending rod of the operating handle or knob, whereby said exhaust-valve is actuated when the knob is raised.

Furthermore, the invention consists in various novel details of construction whereby the objects are attained.

In the drawings forming part of this specification, wherein the similar letters of reference indicate similar parts in the several views, Figure 1 is a view in side elevation of the machine mounted on a pedestal. Fig. 2 is an enlarged view in elevation of the machine proper with the casing cut away and various parts sectioned. Fig. 3 is an enlarged view in perspective of the coin-operated mechanism, together with the exhaust-valve and connections and the double ratchet and pawls. Fig. 4 is a detail view of the standard with the front plate removed, showing the coin-slot and plunger elevated. Fig. 5 is a detail view of the locking device and accompanying parts. Fig. 6 is a horizontal sectional view of the combined non-return and exhaust valve. Fig. 7 is a detail sectional view of the piston, showing the automatic inlet-valves. Fig. 8 is a detail sectional view illustrating the locking mechanism.

In the drawings, A indicates the air-cylinder, having formed in the upper portion thereof an outlet A^2. Connection between said outlet and a non-return valve B is effected by a flexible tube B^2. A piston-rod C, mounted and guided in a supporting-tube D, has secured on its inner end the piston E of the air-cylinder and on its outer end a striking-head or buffer F, provided with a protecting-plate *f*. The piston E is provided with a series of air-supply passages *e*, which are controlled by a flap-valve e^2, secured to the piston-head by means of the washer and screw e^3, whereby as the plunger is drawn outwardly the cylinder is automatically supplied with air. After the air has been forced out of the cylinder by a blow delivered on the striking-head or buffer it enters a pressure-gage H through a flexible tubing B^3, the return being prevented by a non-return valve formed in combination with the exhaust-valve B. The gage, acting in the well-known manner, registers the pressure of air in pounds, which represents the force of the blow.

The coin-operated mechanism consists of an operating handle or knob J, having a projecting flange j^2, which is designed to cover the coin-slot in the casing, and a downwardly-extending rod j^3, connected to an arm j^4. Said arm j^4 is in turn connected with a plunger *k*, working in a slot k^2 of the standard K, by the screw *j*, which passes through an aperture formed in the upper end of the plunger to the threaded aperture of lug j^5. A rod j^6, passing through an aperture formed in a lug j^7 of the arm j^4, is connected with a pivoted lever *b* of the exhaust-valve B. Adjacent to the plunger-slot in the standard K is formed a coin-slot k^3, connected by means of chute k^4 with the slot in the casing. Thus when the coin is inserted it passes through the chute k^4 into slot k^3 and falls at a point near the bottom of the plunger-slot between the collar of the piston-rod and a loosely-mounted roller of a pivoted arm *l*. As the operator pushes on the knob J the lower end of the plunger engages the coin, which acts as a key, and forces it out of the slot into a suitable receptacle in the pedestal. As the coin is pushed out of the slot by the plunger it causes the arm *l*, carrying the roller, to swing outwardly, thereby transmitting motion through a rod l^2, provided with a torsinal spring, to the locking-arm l^3. This movement effects a disengagement between the latter and a recess c^2 of the plunger C. At the same time the pawl l^6 is actuated by the spring l^7 and forced downwardly and the lug l^6 engages the locking-arm, holding the same out of alignment with said recess c^2, thereby setting the machine for action.

The locking-arm l^3, as shown in Fig. 3, normally engages the under side of the lug l^5, which is so proportioned that the motion given the arm *l* by the passage of the coin of certain diameter—for example, a five-cent piece—is just sufficient to cause the locking-arm to pass from under said lug, which is immediately forced downwardly by the spring l^7, thereby causing the locking-arm to engage the face l^8 and retain it in that position until the pawl l^6 is engaged by a tooth of the ratchet-wheel L.

To obtain two operations of the machine by the insertion of a coin, a double ratchet is provided, consisting of two disks secured rigidly together, the disk L having eight teeth and the disk L^2 sixteen, as shown in Fig. 3, or with six and twelve teeth, respectively, as shown in Figs. 2 and 5. A slot *d* in the supporting-tube D is formed to allow for the travel of a spring-pressed dog or pawl *c*, secured in a slot of the piston-rod. Said dog *c* is adapted to engage the teeth of the disk L^2, and thus it will be understood that on the first stroke of the piston the dog *c* moves the disk L^2 one tooth, which brings the pawl l^6 midway of the distance between the teeth on the disk L, and at the second stroke of the piston the dog *c* moves the disk L^2 another tooth, causing a tooth of the disk L to engage the pawl l^6 and turn it upwardly on its pivot against the action of the spring l^7, thus allowing the locking-arm to spring back and again engage the recess c^2 of the plunger C, being retained in that position by the lug l^5 to prevent further operation until another coin is inserted.

If it is desired to obtain three operations, the disks are toothed in the proportion of one

to three or four operations, one to four, and so on.

The operation of the machine is as follows: The operating-handle is raised to exhaust the pressure-gage and allow the coin to be inserted. After the coin has arrived at the bottom of the plunger-slot and the plunger has pushed it through, thereby partially rotating the rod l^2, carrying the locking-arm l^3, by forcing it outwardly against the action of the spiral spring secured on the said rod, the ratchet is unlocked and the machine is set for action. As the blow is delivered on the striking-head or buffer the piston is given its forward stroke, compressing the air in the cylinder and forcing it through the flexible tubing and through the non-return valve into the gage, which acts in the usual manner to measure the pressure of air and to indicate by the travel of an index-finger over a dial-plate the number of pounds or the force of the blow. Before the next operation the operating handle or knob must be elevated to exhaust the gage, thereby returning the index-finger to the zero-point of the scale. On the second stroke of the piston a similar working of the parts will occur, with the exception of the locking mechanism, which operates as heretofore described.

Having fully described my invention, what I desire to secure by Letters Patent is—

1. In a striking-machine, the combination, with a pneumatically-operating buffer, of a movable rod having mounted thereon a piston-head adapted to operate in an air-cylinder and a suitable connection between said air-cylinder and a pressure-gage, substantially as described.

2. In a striking-machine, the combination, with a pneumatically-operating buffer, of the piston rod and head, the air-cylinder communicating with a pressure-gage through a flexible connection, and a non-return valve interposed between said air-cylinder and pressure-gage, substantially as described.

3. In a striking-machine, the combination, with a pneumatically-operating buffer, of a movable rod carrying a piston-head adapted to operate in an air-cylinder, said air-cylinder having communication with a pressure-gage through a flexible connection, and a combined non-return and exhaust valve interposed in said conneetion between said air-cylinder and pressure-gage, substantially as described, and for the purpose set forth.

4. In a striking-machine, the combination, with a pneumatically-operating buffer secured on the end of a movable rod, of an air-cylinder connecting with a pressure-gage and provided with a piston, said piston being secured on the opposite end of said movable rod and having valves and passages, substantially as described, to form an automatic inlet or supply, as and for the purpose set forth.

5. In a striking-machine, the combination, with a pneumatically-operating buffer, of the automatic locking device comprising the multiple or differential ratchet and pawls and the locking-arm mounted on a rod carrying the coin-actuated arm, all parts being constructed and arranged, substantially as described, to allow for a multiple action of the piston previous to the operation of the locking parts, as set forth.

6. In a striking-machine, an automatic locking device, substantially as described, comprising a double or differential ratchet, said ratchet being toothed proportionately to the number of actions the machine is set for by the insertion of a coin, the pawls engaging said double ratchet, and the locking-arm mounted on a rod carrying the coin-actuated arm, as and for the purpose set forth.

7. In a striking-machine, the combination, with a pneumatically-operating buffer, of a vertically-sliding operating handle or knob connecting with a plunger, an exhaust-valve connecting with said operating-knob, the coin and plunger slots arranged as described, and the spring-pressed rod carrying a locking-arm, and coin-actuated arm for operating said locking-arm, substantially as set forth.

8. In a striking-machine, a pneumatically-operating buffer having a back plate, said buffer and back plate removably secured on a piston-rod guided in a supporting-tube and provided with suitable means adapted to cooperate with a locking device at predetermined intervals, substantially as described.

9. In a striking-machine, a pneumatically-operating buffer removably secured on one extremity of a piston-rod having a spring-dog to engage and actuate a locking device, substantially as described.

10. In a striking-machine, the combination, with an automatic locking device, substantially as described, comprising the double ratchet L L^2, the pawls c l^6, the latter provided with the lug l^5, and the locking-arm l^3, said arm l^3 mounted on the rod l^2, carrying the coin-actuated arm l, of the standard K, the slots k^2 k^3, formed in said standard, and the plunger k, connecting with the operating-knob J, said knob having a flange j, covering the coin-slot, whereby said knob must be elevated before the insertion of a coin, as and for the purpose set forth.

11. In a striking-machine, the combination, with a pneumatically-operating buffer, of the air-cylinder connecting with a pressure-gage, the combined non-return and exhaust valve interposed in said connection, the piston having a self-acting inlet-valve, the automatic locking device, the coin-actuated mechanism, and the operating-handle connected with said coin-actuated mechanism and exhaust-valve, substantially as and for the purpose described.

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

FRANKLIN W. KREMER.

Witnesses:
THEODORE L. STRIMPLE,
ABRAHAM HERSHEY.