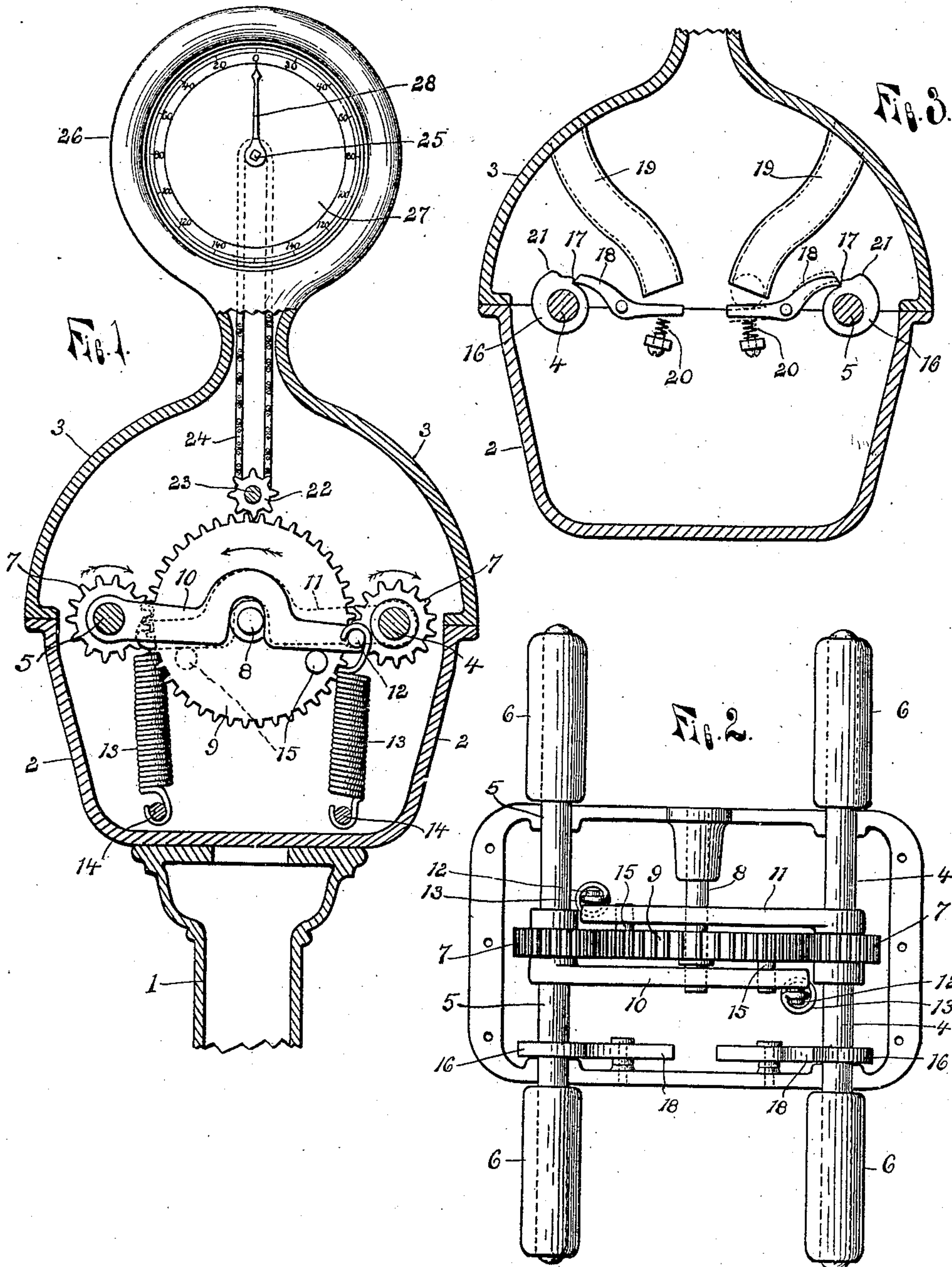


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PATENTED MAR. 26, 1907.

W. H. LEHMAN.
STRENGTH TESTING MACHINE.
APPLICATION FILED MAR. 31, 1906.



WITNESSES:

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WILLIAM H. LEHMAN, OF DETROIT, MICHIGAN.

STRENGTH-TESTING MACHINE.

No. 848,181.

Specification of Letters Patent.

Patented March 26, 1907.

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To all whom it may concern:

Be it known that I, WILLIAM H. LEHMAN, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Strength-Testing Machines, of which the following is a specification.

This invention relates to improvements in strength-testing machines; and its object is to provide a device having rotatable handles adapted to be grasped by the operator and turned against a heavy resistance to test the strength of his hands and arms.

It is also an object of the invention to so construct the device that it may be operated by two persons at the same time and the turning of the handles grasped by one person will be resisted by the force applied by the other person to the other handles, thus pitting the strength of one operator against that of the other.

A further object of the invention is to provide suitable means for indicating the strength of the operator and when the device is operated by two persons for indicating which is the stronger of the two and how much.

It is also an object of the invention to provide a device which is simple, cheap, and compact in its construction and provided with suitable coin-controlled locking mechanism, thus especially adapting it for use in so-called "penny exhibits," and to provide the same with certain other new and useful features, all as hereinafter more fully described, and shown in the accompanying drawing, in which—

Figure 1 is a vertical section of a device embodying the invention; Fig. 2, a plan view of the lower half of the casing with the operating mechanism in place therein, and Fig. 3 a detail showing the coin-controlled locking mechanism in side elevation.

As shown in the drawing, 1 is a standard or pedestal of any suitable construction, to the upper end of which is secured a casing divided horizontally into a lower part 2 and an upper part 3, bolted or otherwise detachably secured together. Bearings are formed on the sides of the casing near each end to receive two transverse parallel shafts 4 and 5, the ends of which extend some distance from the sides of the casing and are

provided with handle-grips 6, formed of any suitable material and shape to be grasped by the hands. Secured to each of these handle-shafts is a pinion 7, and mounted upon a stub-shaft 8, secured in a bearing extending inward from the side of the casing, is a large gear 9 in mesh with these pinions and transmitting motion from one to the other of said handle-shafts.

Mounted to turn freely upon the handle-shafts and extending past the gear 9, close to each side thereof, and over the stub-shaft 8, are the arms 10 and 11, each provided at its free end with a laterally-extending pin 12, to which is attached one end of a coiled spring 13, the opposite ends of said springs being attached to the casing below by means of transverse rods 14 or otherwise, and extending laterally outward beneath said arms from the sides of the gear 9 are the pins 15, said pins each extending from the side of the gear near that part of its periphery which is farthest from the shaft upon which the arm engaged by said pin is journaled, so that when the handle-shaft 5 is turned, revolving the pinion thereon in the direction indicated by the arrow in Fig. 1, the gear 9 will be turned thereby in the direction indicated, thus carrying the pin 15 upward against the under side of arm 11 and raising said arm against the action of its spring 13.

The gear and pinion are so proportioned and the spring made of such resistance that the pin 15 in its upward course will not be permitted to pass the vertical center line of the gear, and therefore when the force applied to turn said pinion in the direction indicated is removed the spring 13 will by exerting a downward force on the pin 15 turn said gear and pinions back to their original position. The downward movement of said arms is limited by the stub-shaft over which they extend.

When the handle-shaft 5 is turned as described, it will be seen that motion will be transmitted by gear 9 to the handle-shaft 4, turning said shaft in the same direction as that of shaft 5, so that when said shaft 4 is grasped by an opponent he may resist such turning and endeavor to turn said shaft in the opposite direction against the force applied by the other operator to the shaft 5.

Secured upon each of the handle-shafts adjacent to one side of the casing is a cam mem-

ber 16, formed with a shoulder 17, adapted to be engaged by a gravity-dog 18, which prevents the turning of the shaft in one direction only, said shoulders and dogs being so arranged that one shaft is prevented from being turned in one direction and the other shaft from being turned in an opposite direction, and thus when both dogs are engaged with their cam-shoulders both handle-shafts are prevented from turning, owing to the gear connection between said shafts; but when one dog is turned on its pivot out of engagement with its cam-shoulder by a coin falling through a suitable coin-chute 19 upon the free end of said dog, that handle-shaft may be turned forward or toward the dog, as the other handle-shaft is not held by its dog from turning in that direction or away from its dog. Beneath the free ends of the dogs are provided light spring-supports 20, into contact with which the dogs are turned by the coin, these supports being so positioned that the weight of the coin will turn the dog just far enough to disengage it from the shoulder on the cam, but not far enough to permit the coin to escape from the end of the chute and fall from the dog. Adjacent to the shoulder on each cam is an enlargement 21, which when the handle-shaft is turned a short distance will engage the point of the dog and turning said dog on its pivot compress the stop-spring and release the coin. The dog is thus held out of engagement with the shoulder on the cam to permit a partial turning of the handle-shaft before the dog is released to again engage the cam and hold the shaft, and therefore when two persons are operating the machine it is not necessary that they both drop the coin and grasp the handles at the same time and the contest for supremacy may take place before the coins are released, thus permitting the free turning in either direction of either shaft by either contestant.

When the machine is to be operated by two persons at the same time, each will drop in a coin to release his handles, so that both handle-shafts will be free to turn backward or forward.

To indicate the force applied to turn the handle-shaft, a small pinion 22 is secured to a horizontal shaft 23 in engagement with the gear 9 at its upper edge, and from this shaft 23 a sprocket-chain 24 or other means for transmitting motion extends upward to an indicator-shaft 25, mounted in a head 26, connected to the upper half of the casing by a hollow neck portion. A dial 27 is secured in the head, and an indicator-hand 28 is secured on the end of the indicator-shaft. When one of the handle-shafts is turned and the gear 9 actuated thereby, motion is transmitted from said gear to the indicator-shaft, turning the indicator-hand in proportion to the amount of rotation of the handle-shaft. The

dial is preferably marked each way from a zero-point, the markings in one direction being for one handle-shaft and those in the opposite direction for the other handle-shaft, and therefore when the device is operated by two persons the indicator-hand will indicate only the amount of power which one operator exerts over that of the other, the hand vibrating back and forth as first one and then the other of the operators exerts the greater power. I do not wish, however, to limit myself to the particular form of indicator shown, as it is obvious that other forms may be used, and it is also clear that other forms of coin-controlled locking mechanism than the cams and gravity-dogs shown may be used.

Having thus fully described my invention, what I claim is—

1. In a strength-testing machine, the combination of rotatable handles, and means for transmitting motion from one to the other of said handles, whereby the turning of one handle may be resisted by grasping the other handle.

2. In a strength-testing machine, the combination of rotatable shafts adapted to be turned by hand, means for transmitting motion from one to the other of said shafts, and an indicator actuated by the turning of each of said shafts to indicate the direction in which each is turned and the amount of force applied to one over that applied to the other.

3. In a strength-testing machine, the combination of rotatable shafts, pinions on said shafts, a gear interposed between said pinions to transmit motion from one to the other of said shafts, and means for resisting the turning of said gear in either direction.

4. In a strength-testing machine, the combination of rotatable shafts, a pinion on each of said shafts, a gear engaging said pinions to transmit motion from one shaft to the other, means for resisting the turning of said shafts, and means for preventing one of said shafts from turning in one direction and similar means for preventing the other shaft from turning in the other direction.

5. In a strength-testing machine, the combination with a casing, of horizontal shafts mounted in bearings in said casing with their ends extending from the sides of the casing, handle-grips on said projecting ends, pinions on the shafts, a gear interposed between said pinions, and springs to resist the turning of said shafts.

6. In a strength-testing machine, the combination of parallel shafts, pinions on said shafts, a gear interposed between said pinions, means for resisting the turning of said gear, an indicator, and means for transmitting motion from said gear to turn the indicator in both directions.

7. In a strength-testing machine, the combination with parallel shafts, of pinions on said shafts, a large gear interposed between

said pinions, arms extending adjacent to said gear, means on the gear adapted to engage the arms when the gear is turned and coiled springs acting upon said arms to resist their movement.

8. In a strength-testing machine, the combination with parallel shafts, of pinions on said shafts, a gear interposed between said pinions, an arm mounted upon each of said shafts to turn freely thereon, springs attached to the free ends of said arms, means for limiting the downward movement of said arms, and means on the gear for engaging the under sides of the arms and lifting the same when the gear is turned.

9. In a strength-testing machine, the combination with a casing, of transverse shafts mounted in said casing and projecting therefrom at each end, handle-grips on the projecting ends of said shafts, pinions on the shafts, a stub-shaft mounted on the casing between the said shafts, a gear on the stub-shaft in mesh with the pinions, an arm on each shaft to turn freely thereon and extending past said gear at each side thereof over the stub-shaft, coiled springs attached to the free ends of said arms, and pins on the gear to engage the lower sides of said arms when the gear is turned.

10. In a strength-testing machine, the combination with parallel shafts adapted to be turned by hand, pinions on said shafts, a gear interposed between said pinions, a member on each shaft provided with a shoulder, dogs to engage said shoulders and prevent the turning of each of said shafts in one direction, and means for operating said dogs.

11. In a strength-testing machine, the combination with a casing, of parallel handle-shafts mounted in said casing and projecting at each end therefrom, handle-grips on the projecting ends of said shafts, pinions on the shafts, a stub-shaft, a gear on the stub-shaft engaging said pinions, springs to resist the turning of said gear, a head on the casing, a dial in the head, an indicator-shaft, an indicator-hand on said shaft, a transverse shaft in the casing, a pinion on said transverse shaft in engagement with the said gear, and means for transmitting motion in either direction from said transverse shaft to the indicator-shaft.

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

WILLIAM H. LEHMAN.

Witnesses:

LEWIS E. FLANDERS,
GUY HAMILTON.