

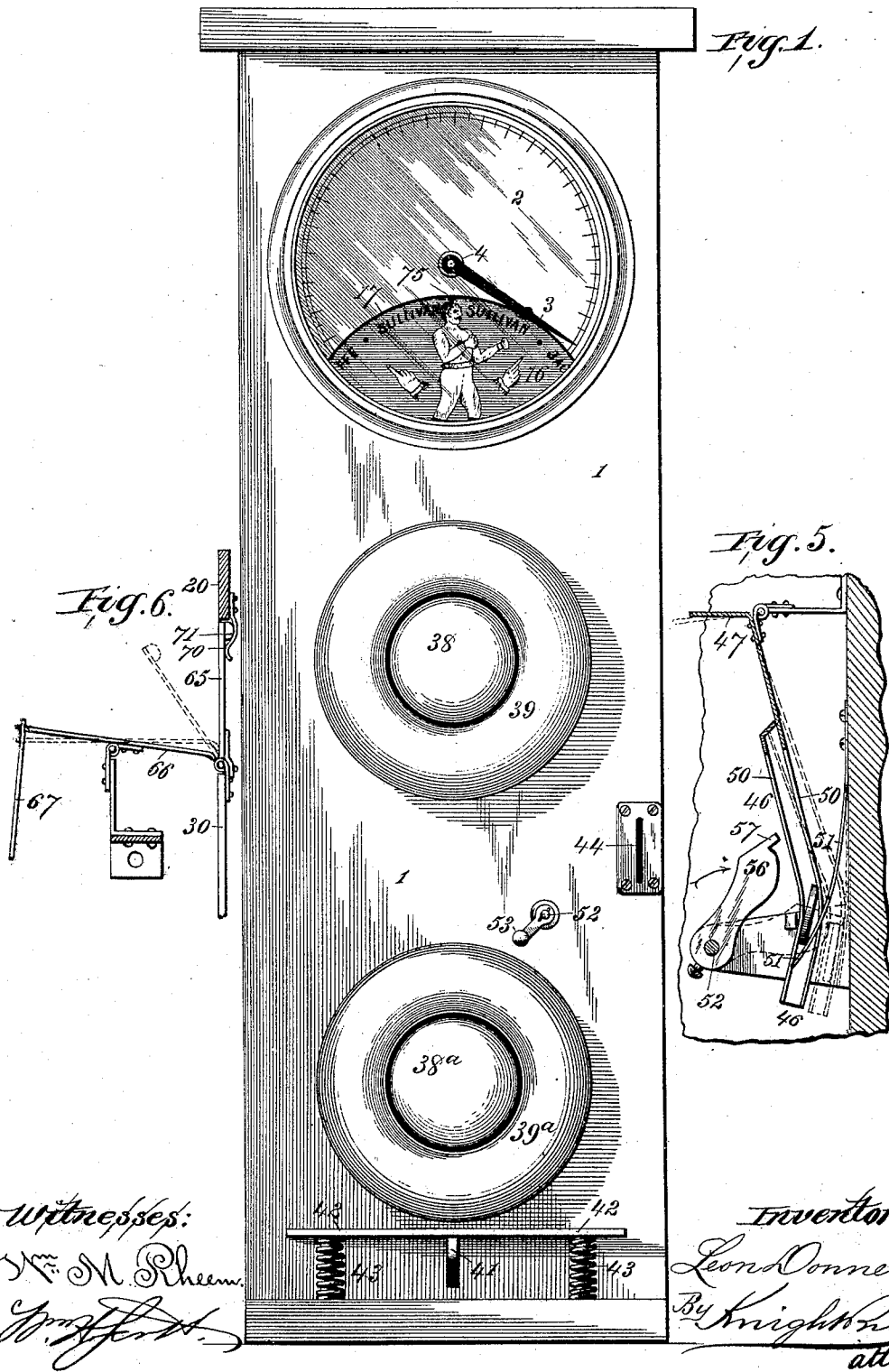
(No Model.)

4 Sheets—Sheet 1.

L. DONNE.
TESTING MACHINE.

No. 468,763.

Patented Feb. 9, 1892.



(No Model.)

4 Sheets—Sheet 2.

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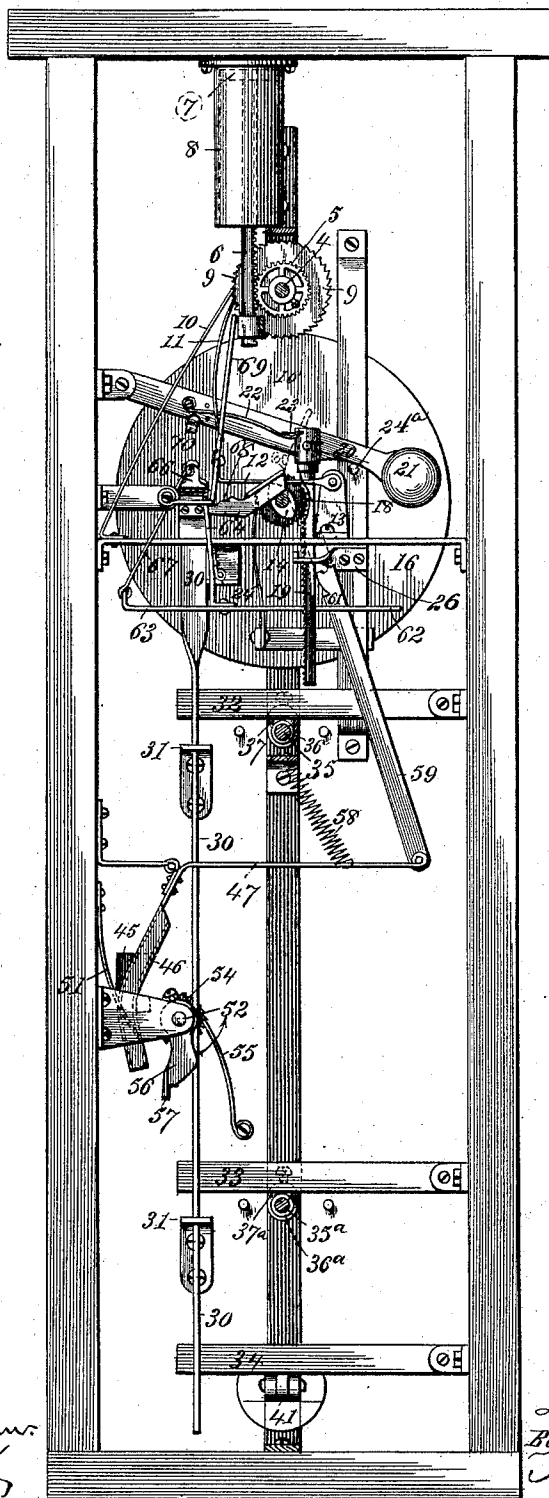


Fig. 2.

Witnesses:
Wm. A. Rhenm.
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Inventor:
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(No Model.)

4 Sheets—Sheet 3.

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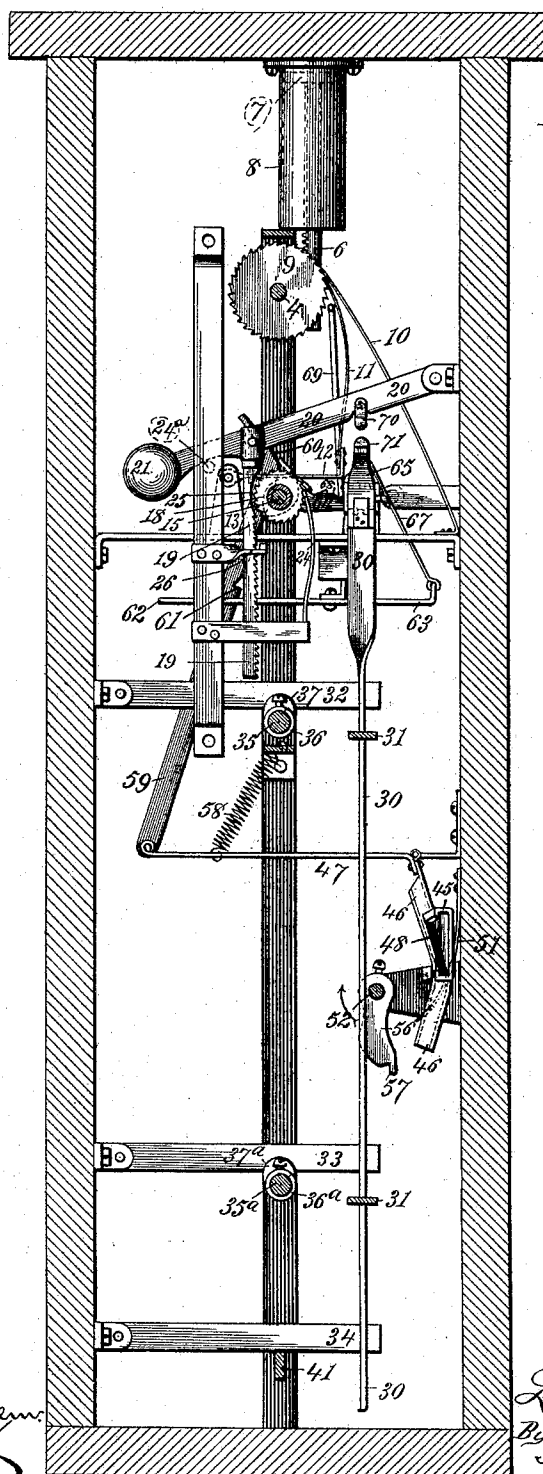


Fig. 3.

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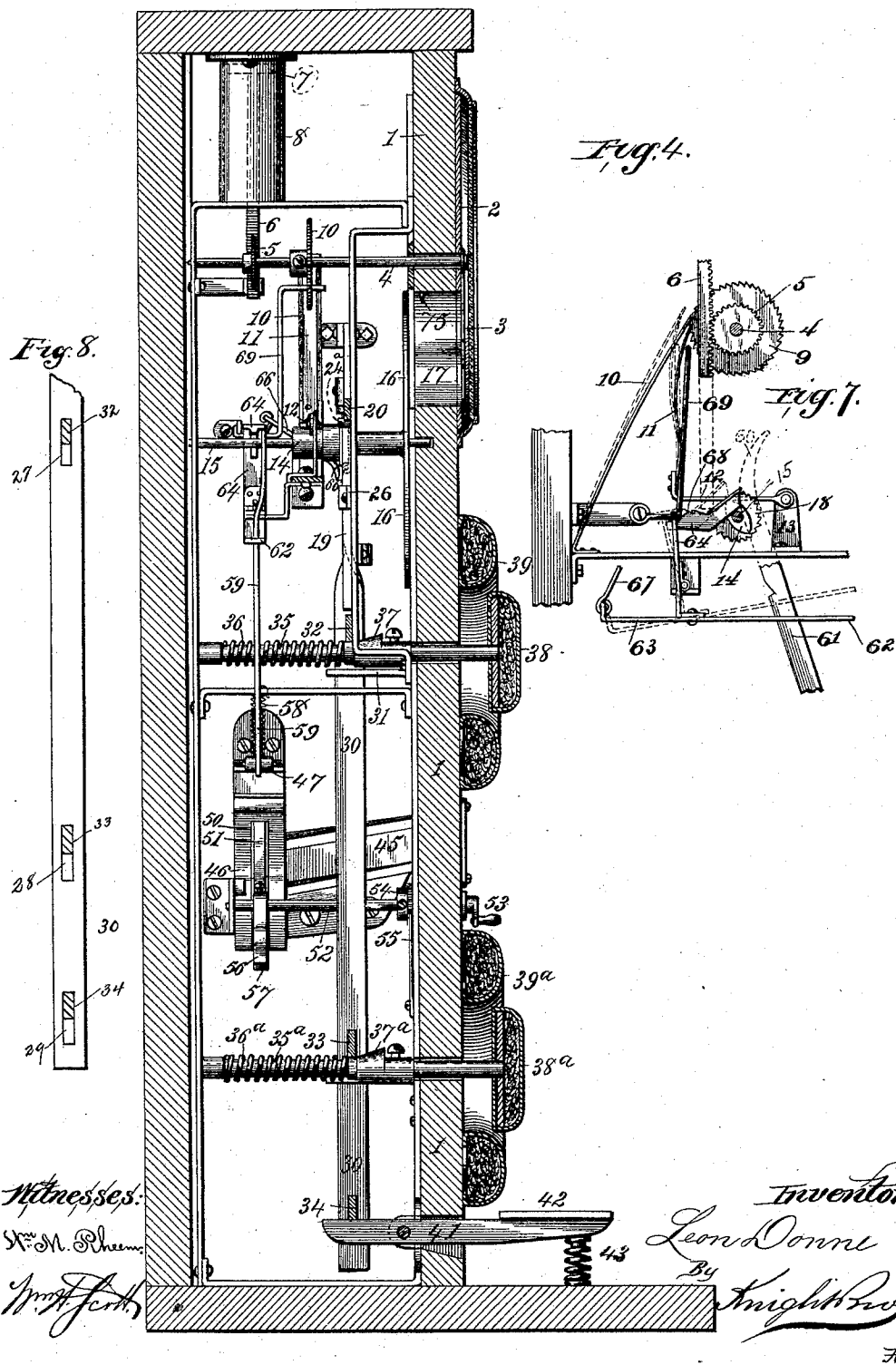
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4 Sheets—Sheet 4.

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Patented Feb. 9, 1892.



UNITED STATES PATENT OFFICE.

LEON DONNE, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE - HALF TO ETTA B. DANIELS, OF SAME PLACE.

TESTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 468,763, dated February 9, 1892.

Application filed July 28, 1890. Serial No. 360,128. (No model.)

To all whom it may concern:

Be it known that I, LEON DONNE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have
5 invented certain new and useful Improvements in Testing-Machines, of which the following is a specification.

The object of the present invention is a machine for indicating the force of a blow struck
10 with the fist, a kick, or a stamp with one or both feet, the machine being provided (in addition to a graduated dial and index) with a suitably-marked fly-wheel, which is put in rapid rotation by the blow and continues to
15 rotate until its momentum is spent.

The invention consists in certain features of novelty that are particularly pointed out in the claims hereinafter, a machine embodying said invention being first fully described
20 with reference to the accompanying drawings, which form a part of this specification, and of which—

Figure 1 is a front elevation of the improved machine. Fig. 2 is a rear elevation of the internal mechanism thereof. Fig. 3 is a sectional elevation thereof looking rearward, the cutting-plane of the section being just inside of the front wall of the casing. Fig. 4 is a sectional elevation thereof, the section being in
30 two planes, one in the center and the other to one side of the center of the machine, the principal parts being shown in side elevation. Fig. 5 is a section showing the coin-receptacle in detail. Fig. 6 is a sectional elevation showing in detail the displaceable tongue and its accessories. Figs. 7 and 8 are views showing details.

Upon the outside of the front wall 1 of the casing is a graduated dial 2, which is swept by
40 an index 3, the shaft 4 of which is journaled in a suitable support and has secured to it inside the casing a pinion 5, which meshes with a rack formed on a vertical plunger 6, whose upper end is secured to a piston 7, fitting loosely in a cylinder 8, the lower end of which is open, while the upper end is closed air-tight and secured to the top of the casing. To the shaft 4 is also secured a ratchet-wheel 9, with which engages a dog 10 and a pawl 11,
50 the latter for rotating it and the former for

preventing its retrograde movement. The pawl is fixed to the end of a lever 12, which is fulcrumed to an arm 13 of the frame and rests upon and derives its motion from a cam 14, secured to a second shaft 15, journaled in suitable supports beneath shaft 4. To this second
55 shaft is secured a solid disk 16, constituting a fly-wheel, situated just back of the front wall 1 and visible only in part through an opening 17 therethrough. As shown in the drawings, the opening falls within the periphery of the
60 dial, and both are covered and protected by a pane of glass. To the shaft 15 is secured a ratchet-wheel 18, which is engaged by a rack-bar 19, hinged to and depending from a lever
65 20, one end of which is fulcrumed to a suitable support and the other provided with a weight 21. A spring 22, fixed at one end to the lever 20 and at the other engaging a lug or short
70 arm 23, projecting laterally from the upper part of the rack-bar, tends to hold it normally in engagement with the ratchet-wheel 18. A spring-dog 24 engages the ratchet-wheel, so as to prevent it from being turned by the friction produced by the rack-bar against
75 it as the lever 20 is elevated. As the lever descends the teeth of the rack-bar successively engage those of the ratchet-wheel and impart to the shaft and its accessories a more or less rapid rotation, according to the height
80 from which the lever falls. When the lever is at its lowermost position and rests upon a stop 24^a, a cut-away portion 25 of the bar 19 is opposite the ratchet-wheel, and a guide 26, through which the bar passes, holds it out of
85 contact with said wheel, so that after the lever has come to rest the shaft and its accessories may continue to rotate by reason of the momentum of the fly-wheel 16, acquired during the descent of the lever.

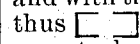
Situated beneath the lever 20 is a rod 30, which is capable of sliding vertically, suitable brackets 31 being provided for guiding it and confining it against lateral movement. This rod can be elevated by the upward movement of either one of three levers 32, 33, and
95 34, which are fulcrumed to the case and pass through slots 27, 28, and 29, respectively, formed through the rod. The slots are so located that when the parts are in their normal
100

positions each lever occupies the upper end of its slot, (the rod being supported by the levers,) and each slot is of such length that said rod may be elevated to its highest possible position by either one of said levers without disturbing the positions of the others. The levers themselves may be elevated by as many separate devices from the outside of the casing. The lever 32 rests upon and is supported by a stem 35, which is supported by the frame so as to be capable of endwise movement and passes out through the front wall of the casing. Surrounding the stem and bearing at one end against it and at the other end against the frame is a stout spring 36, which tends to hold the stem normally in its outermost position, its outward movement being limited by a second shoulder, which comes in contact with the front of the casing. On the top side of the push-stem, extending outward from the lever 32, is a cam 37, which when the said stem moves inward impinges against the under side of the lever and elevates it, thereby elevating the rod 30. Upon the outer end of the stem is secured an enlarged head 38, which is well padded and is designed to be struck with the fist, said head being prevented from rotating by any suitable means—as, for example, one or more pins secured to the under side of the head and entering corresponding perforations formed through the front wall of the casing. Surrounding the head is an annular pad 39 for protecting the fist of the striker in case it should miss or glance off from the head.

The parts numbered 35^a, 36^a, 37^a, 38^a, and 39^a are respectively duplicates of the parts numbered 35 to 39, inclusive, the parts 35^a, &c., being arranged in the same relation to the lever 33 as the parts 35, &c., bear to the lever 32. The padded head 38 is situated at about the height of a man's breast, while the padded head 38^a is situated about knee-high, or a little lower, and is designed to be kicked. Situated beneath the head 38^a is a heavy lever 41, passing through the front wall of the casing. Its inner end engages the under side of lever 34, while its outer end is provided with a platform 42 of sufficient size to receive both of a man's feet at one time. This platform is held normally in its elevated position by a heavy spring 43, which is situated beneath it and rests on the heavy iron base-plate of the machine.

By striking the head 38, or by kicking the head 38^a, or by stamping with one or both feet, or jumping upon the platform 42, the vertical rod 30 will be elevated a greater or less distance, according to the extent of the movement of the device that receives the blow, which movement will be proportional to the extent of the compression of the spring (36, 36^a, or 43, as the case may be) that resists the blow, said compression being of course proportional to the force of the blow. When the rod 30 is connected with the lever 20 (by mechanism presently described) at the

time the blow is struck, said lever will be thrown upward a distance proportional to the force of the blow, and in descending will set the fly-wheel 16 in motion at a speed proportional to the distance it descended, the number of revolutions made by said fly-wheel being proportional to its initial speed, and the extent of the movement of the index 3 proportional to the number of revolutions of the fly-wheel. Thus the extent of the movement of the index and the number of revolutions made by the fly-wheel are proportional to the force of the blow. This operative connection between the rod 30 and lever 20 can be established by the mechanism now to be described when a coin of proper size is introduced, the coin itself forming an operative part of such mechanism. The coin is introduced through a slot-opening 44 at the front of the machine, whence it passes by gravity through a chute 45 to a coin-receptacle 46, which latter, in fact, forms one arm of a bell-crank lever, the other arm of which is shown at 47. The outline of the cross-section of the arm 46 is rectangular, and through one of its side walls is formed a slot 48, which, when the parts are normal, is opposite the open end of the coin-chute 45 and permits the coin to pass to the interior of the receptacle.

Through the front and rear walls of the receptacle are cut slots 50, which are situated opposite each other and extend to the end of the arm, reducing it in effect to a pair of channel-irons situated a short distance apart and with their hollow sides toward each other, thus . To retain the coin within this receptacle until it has performed its proper function, a spring-tongue 51 is fixed to the side wall of the casing in such a position as to project into the slot 50 and cross the channel of the receptacle below the slot 48. A shaft 52 extends through the front wall of the casing and is provided on its front end with a hand-crank 53, whereby it may be turned. On the inside of the casing this shaft is provided with a ratchet-wheel 54, with which engages a spring-pawl 55 to prevent its being turned in one direction. Upon it is also an arm 56, which is situated directly opposite the slot 50. When there is no coin in the receptacle, the shaft 52 may be turned freely in the direction of the arrow without affecting the lever 46 47, the spring-tongue 51 being pressed back by the arm 56, which moves in slot 50.

When there is a coin in the receptacle 46, the end of the arm 56 will come in contact with its flat side, while a toe 57, projecting from the end of the arm, will engage the periphery of the coin from above. The lower portion of the arm 46 occupies a position tangential to the path of the arm 56, and consequently as the arm 56 is rotated, carrying with it the coin which bears against the rear wall of the receptacle, the arm 46 will be moved to the position shown by dotted lines, producing a corresponding movement of the

arm 47. The coin engaged by the toe 57 is expelled as soon as it reaches the end of the receptacle, and thereupon the lever 46 47 is instantly restored to its former position by a spring 58.

To the free end of the arm 47 is pivotally connected the lower end of a rod 59, whose upper end is provided with a cam 60, for a purpose that will appear presently. The rod 59 has a tooth or shoulder 61 and passes through a slot formed through a horizontal arm 62 of a tri-armed lever, the other arms of which are indicated by the numerals 63 and 64, respectively. While the parts are in normal position the shoulder 61 is above the arm 62; but when the position of the lever 46 47 is changed it draws the rod 59 down until its shoulder is below the arm 62. Then when the lever 46 47 is restored to its normal position the rod 59 is thrust up to its normal position. In rising the shoulder 61 engages the arm 62 and moves the tri-arm lever about its fulcrum to the position shown by dotted lines. When the tri-arm lever has reached this position and before the rod has completed its upward movement, the cam 60 will come in contact with the shaft 15, and the farther upward movement of the rod will cause the cam to move its upper end laterally and thereby disengage the shoulder 61 from the arm 62, leaving the tri-arm lever for the instant in the position shown by dotted lines. Hinged to the upper end of rod 30 is a tongue 65, which rests normally out of alignment with said rod, as shown by dotted lines in Fig. 6. Projecting beneath this tongue is one end of a lever 66, the other end of which is connected by a link 67 with the extremity of the arm 63. When the tri-arm lever is moved from the position shown by full lines to that shown by dotted lines, the lever 66 lifts the tongue 65 to the position shown by full lines—that is, places it in alignment with the rod 30, with its upper end in engagement with the underside of the weighted lever 20—thus establishing operative connection between the rod and the lever.

Normally the plunger and piston 6 and 7 are held elevated by the engagement of the dog 10 and pawl 11 with the ratchet-wheel 9; but the movement of the tri-arm lever 62 63 64 to the position shown by dotted lines causes a cam 68, formed on its bent arm 64, to shift a bent lever 69 from its position shown in full lines to that shown in dotted lines. In so doing said lever 69 presses both the dog 10 and pawl 11 out of engagement with the ratchet-wheel 9, permitting the plunger to fall. In falling it restores the index 3 to zero and also strikes the arm 64 with sufficient force to restore the levers 62, 64, 66, and 69 to their normal positions, thereby permitting the dog 10 and pawl 11 to re-engage the wheel 9, but leaving the tongue 65 in engagement with the lever 20. The device is then in condition for operation, and a blow on either of the heads 38 or 38^a or on the platform 32 will cause a

sudden upward movement of rod 30 with the result already described. The suddenness of the upward movement of the lever 20 causes it to move away from the tongue 65 as the upward movement of the latter ceases, and in so doing a cam 70 on said lever impinges against a shoulder 71 on the end of said tongue and throws it out of alignment with the rod 30, whereupon it falls by gravity to its normal position. A stop prevents the tongue 65 from moving too far. The stop is so situated that the tongue can be moved by lever 66 a little beyond vertical position, so that it will be held in its upright position by gravity.

In machines of this character as heretofore constructed the index is so connected with the impact device that its movement from zero to the point indicating the force of the blow is so rapid that it cannot be followed with the eye. In the machine that forms the subject of this application the movement of the index will be slow, gradually decreasing in speed from start to finish. After the blow is struck the index remains at the point to which it was moved by the blow until another coin is deposited and the handle 54 turned to set the machine for the next operation.

The outer face of the fly-wheel 16 may be provided with words, letters, figures, pictures, advertising-cards, in short, any desired symbols, arranged in any desired manner, either arbitrarily or according to some system. I propose to divide it off into a number of spaces or segments and place in each space a picture and accompanying each picture an advertising-card. For example, in one space will be placed the picture of a pugilist and the advertisement of a dealer in boxing-gloves, in another the picture of an oarsman and the advertisement of a shell-builder, and so on, using any pictures or other symbols. The various spaces have well-defined marks of division on the periphery of the wheel, and a pointer 75, projecting downward from the top side of the opening 17, indicates which space is uppermost when the wheel stops.

The term "indicator" is used in this specification in a generic sense, meaning any device for indicating or showing the effect produced by the operation of the device, and the term "fly-wheel" is used to denote a wheel free to rotate by its momentum after the device which set it in motion has come to rest.

Having thus described my invention, the following is what I claim as new and desire to secure by Letters Patent—

1. The combination, with an impact device, of a fly-wheel provided with symbols and free to rotate, and mechanism for transmitting motion from the former to the latter, substantially as set forth.

2. The combination, with an impact device, of a fly-wheel provided with symbols and free to rotate, mechanism for transmitting motion from the former to the latter, and a pointer arranged opposite said wheel, substantially as set forth.

3. The combination, with an impact device, of a fly-wheel provided with symbols and free to rotate, mechanism for transmitting motion from the former to the latter, and a casing within which the wheel is situated, having an opening exposing only a portion of the wheel, substantially as set forth.

4. The combination, with a fly-wheel provided with symbols and free to rotate, of a plurality of impact devices and mechanism for imparting motion from either of said devices to said wheel, substantially as set forth.

5. The combination, with a fly-wheel provided with symbols, of a movable head for receiving a blow, a spring for resisting its movement, and mechanism for transmitting its movement to the fly-wheel, substantially as set forth.

6. The combination, with a fly-wheel provided with symbols and free to rotate, of a depressible platform, a spring for resisting its depression, and mechanism for transmitting its movement to the fly-wheel, substantially as set forth.

7. The combination, with a fly-wheel provided with symbols, of a movable cushioned head for receiving a blow of the fist, a second movable head situated below the first for receiving a kick, a depressible platform for receiving a stamp, a spring for resisting the movement of said heads and platform, and mechanism for transmitting the movement of either to the fly-wheel, substantially as set forth.

8. The combination, with an indicator, of a plurality of impact devices and mechanism movable independently of all of said devices for transmitting motion from either of them to said indicator without disturbing the position of any other, substantially as set forth.

9. The combination, with an indicator, of a movable head for receiving a blow of the fist, a second movable head situated beneath the first for receiving a kick, a depressible platform, and mechanism for transmitting motion from either of said heads or platform to said indicator, substantially as set forth.

10. The combination, with an indicator and a plurality of impact devices, of mechanism common to all of said devices for establishing operative connection between either of said impact devices and the indicator, the operation of said mechanism being dependent upon the presence of a coin, substantially as set forth.

11. The combination, with an indicator, a plurality of impact devices, and mechanism having a displaceable part adapted when set to transmit the movement of either of said impact devices to said indicator, of a handle and mechanism including a coin-receptacle, by which said part may be set when a coin is in said receptacle, substantially as set forth.

12. The combination, with an impact device, a fly-wheel free to rotate, and mechanism for transmitting motion from the former to the latter, of a dial and index and mechanism for

transmitting motion from the fly-wheel to said index, substantially as set forth.

13. The combination, with an impact device, a fly-wheel free to rotate, and mechanism for transmitting motion from the former to the latter, of a dial, an index, means for transmitting motion from the fly-wheel to the index, a dog for preventing backward movement of said index until tripped, and means for tripping said dog and restoring the index to zero, substantially as set forth.

14. The combination, with an impact device, a fly-wheel provided with symbols and free to rotate, and mechanism for transmitting motion from the former to the latter, of a dial, an index, and mechanism for transmitting motion from the fly-wheel to the index, substantially as set forth.

15. The combination, with an impact device, a fly-wheel, and mechanism for transmitting motion from the former to the latter, of a dial, an index, a shaft by which it is carried, a ratchet-wheel on said shaft, a pawl engaging said ratchet-wheel, and a cam carried by the fly-wheel for actuating said pawl, substantially as set forth.

16. The combination, with an impact device, a fly-wheel, and mechanism for transmitting motion from the former to the latter, of an index, means tending to hold it at zero, a ratchet-wheel, a dog and a pawl engaging said wheel, and means for disengaging the dog and pawl from the ratchet-wheel for permitting the index to be restored to zero, substantially as set forth.

17. The combination, with an impact device and a fly-wheel provided with symbols and free to rotate, of a weighted lever, connections between the impact device and lever, whereby the latter is elevated by the movement of the former, and connections between the fly-wheel and lever, whereby said wheel is set in motion by the movement of said lever, substantially as set forth.

18. The combination, with an impact device and a fly-wheel, of a weighted lever, connections between the impact device and lever, whereby the latter may be elevated, connections between said fly-wheel and lever, an index, and connections between the fly-wheel and index, substantially as set forth.

19. The combination, with an impact device and an index, of a weighted lever, mechanism for transmitting motion from said impact device to said lever for elevating it, and mechanism for transmitting the descending motion of said lever to said index, substantially as set forth.

20. The combination, with an impact device and a fly-wheel provided with symbols, of a weighted lever, mechanism for transmitting motion from the impact device to said lever for elevating it, a ratchet-wheel on the shaft of the fly-wheel, and a ratchet-bar carried by the weighted lever and adapted to engage said ratchet-wheel, substantially as set forth.

21. The combination, with an impact device

and a fly-wheel, of a weighted lever, mechanism for transmitting motion from the impact device to the weighted lever, a ratchet-wheel on the shaft of the fly-wheel, a ratchet-bar carried by the weighted lever and adapted to engage said ratchet-wheel, an index, and connections between said index and the fly-wheel, substantially as set forth.

22. The combination of an impact device, a fly-wheel provided with symbols, a ratchet-wheel on the shaft of said fly-wheel, a weighted lever, a ratchet-bar carried thereby and adapted to engage said ratchet-wheel, mechanism for transmitting motion from the impact device to the weighted lever, an index, and mechanism for transmitting motion from the fly-wheel to the index, substantially as set forth.

23. The combination of an impact device, a weighted lever, mechanism for transmitting motion thereto from the impact device, a ratchet-bar carried by said lever, a fly-wheel, a ratchet-wheel on the shaft of said fly-wheel with which said ratchet-bar engages, an index, a ratchet-wheel on the shaft of said index, a cam on the shaft of the fly-wheel, and a lever operated by said cam and having a pawl engaging the ratchet of the index-shaft, substantially as set forth.

24. The combination of an impact device, a fly-wheel, a ratchet-wheel on the shaft of said fly-wheel, a weighted lever, mechanism for transmitting thereto the movement of the impact device, and a ratchet-bar carried by said lever adapted to engage said ratchet-wheel and having the cut-away portion permitting said wheel to revolve after the lever has come to rest, substantially as set forth.

25. The combination of an impact device, a fly-wheel, a ratchet-wheel on the shaft of said fly-wheel, a weighted lever, a ratchet-bar carried by said lever and having a cut-away portion for the purpose set forth, a spring for holding said ratchet-bar normally in engagement with said ratchet-wheel, and a guide for holding the cut-away portion of said ratchet-bar out of engagement with said ratchet-wheel when the lever is in its lowermost position, substantially as set forth.

26. The combination, with an indicator, the slide-rod 30, and mechanism for connecting them, of a plurality of impact devices and connections between all of said devices and said rod, said rod being movable independently of all of said devices, substantially as set forth.

27. The combination, with an indicator, the slide-rod 30, and means for transmitting the motion of the latter to the former, of a plurality of impact devices and a lever for transmitting the motion of each to said rod, substantially as set forth.

28. The combination, with an indicator, the slide-rod 30, and means for transmitting the motion of the latter to the former, of the movable head 38, the second movable head 38^a, situated beneath it, the depressible platform 42, and means for transmitting the motion of

either of said heads or the platform to said rod, substantially as set forth.

29. The combination, with an indicator, the slide-rod 30, and means for transmitting motion from the former to the latter, of the levers 32, 33, and 34, engaging said rod and the three separate impact devices, each having means for actuating one of said levers, substantially as set forth.

30. The combination, with an impact device and an indicator, of mechanism for imparting motion from the former to the latter, comprising the displaceable tongue 65, and mechanism controlled by a coin for placing said tongue in operative position, substantially as set forth.

31. The combination, with an impact device, an indicator, mechanism for transmitting motion from the former to the latter, including a lever, the displaceable tongue 65, and mechanism for placing said tongue in operative position, of a cam for displacing said tongue at each operation, substantially as set forth.

32. The combination, with an indicator, the weighted lever 20, and mechanism for transmitting motion from the former to the latter, of an impact device, the rod 30, the tongue 65, and means for placing and displacing said tongue, substantially as set forth.

33. The combination, with an impact device, an indicator, and mechanism for transmitting motion from the former to the latter, comprising the displaceable tongue 65, of a lever 66 for engaging said tongue for placing it in operative position, a spring-actuated mechanism for moving said lever 65, and mechanism for restoring lever 66 to normal position, substantially as set forth.

34. The combination of an impact device, an indicator, mechanism for transmitting motion from the former to the latter, comprising the displaceable tongue, a plunger, means for holding it normally elevated, and spring-actuated mechanism for placing the tongue in operative position and freeing the plunger, permitting it to fall and restore to normal position the mechanism that placed the tongue, substantially as set forth.

35. The combination of an impact device, an indicator, mechanism connecting them, comprising the displaceable tongue 65, a plunger, mechanism for elevating it and holding it normally in elevated position, a lever having connections for placing said tongue and for elevating said plunger and having also an arm adapted to be engaged by said plunger as it descends, a spring-actuated push-rod having a shoulder adapted to engage said lever, and means for withdrawing said rod, substantially as set forth.

36. The combination of an impact device, an indicator, mechanism for transmitting motion from the former to the latter comprising the displaceable tongue 65, a plunger, mechanism for elevating it and holding it normally elevated, the lever 66 for engaging said tongue, the tri-arm lever 62 63 64, having the

cam 68, a link connecting arm 63 with lever 66, mechanism operated by the cam for freeing said plunger and permitting it to fall, said plunger having contact with the arm 64, and
5 spring-actuated mechanism for engaging the arm 62, substantially as set forth.

37. The combination of an indicator, a weighted lever, mechanism for imparting motion from the former to the latter, an impact
10 device, mechanism for imparting motion therefrom to said lever comprising the displaceable tongue 65, means for placing said tongue, and a cam 70 for displacing said tongue, substantially as set forth.

38. The combination, with the operating mechanism, of a movable coin-receptacle, a hand mechanism having an arm adapted to engage a coin in said receptacle and through the means of said coin move said receptacle,
15 a toe on said arm for expelling said coin, and a spring for restoring the receptacle to normal position, substantially as set forth.

39. The combination, with the operating mechanism, of the movable coin-receptacle 46, having connection with said mechanism and
25 having the slot 50, and the hand mechanism having arm 56 adapted to engage a coin in said receptacle and at one operation move said receptacle and expel the coin, substantially as set forth.

40. The combination, with the operating mechanism, of the movable coin-receptacle having the slots 48 and 50, the spring-tongue 51, projecting into the channel of the receptacle below slot 48, and the hand mechanism
30 having arm 56 situated opposite the slot 50 and adapted to move said receptacle through the medium of a coin therein, substantially as set forth.

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Witnesses:

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