

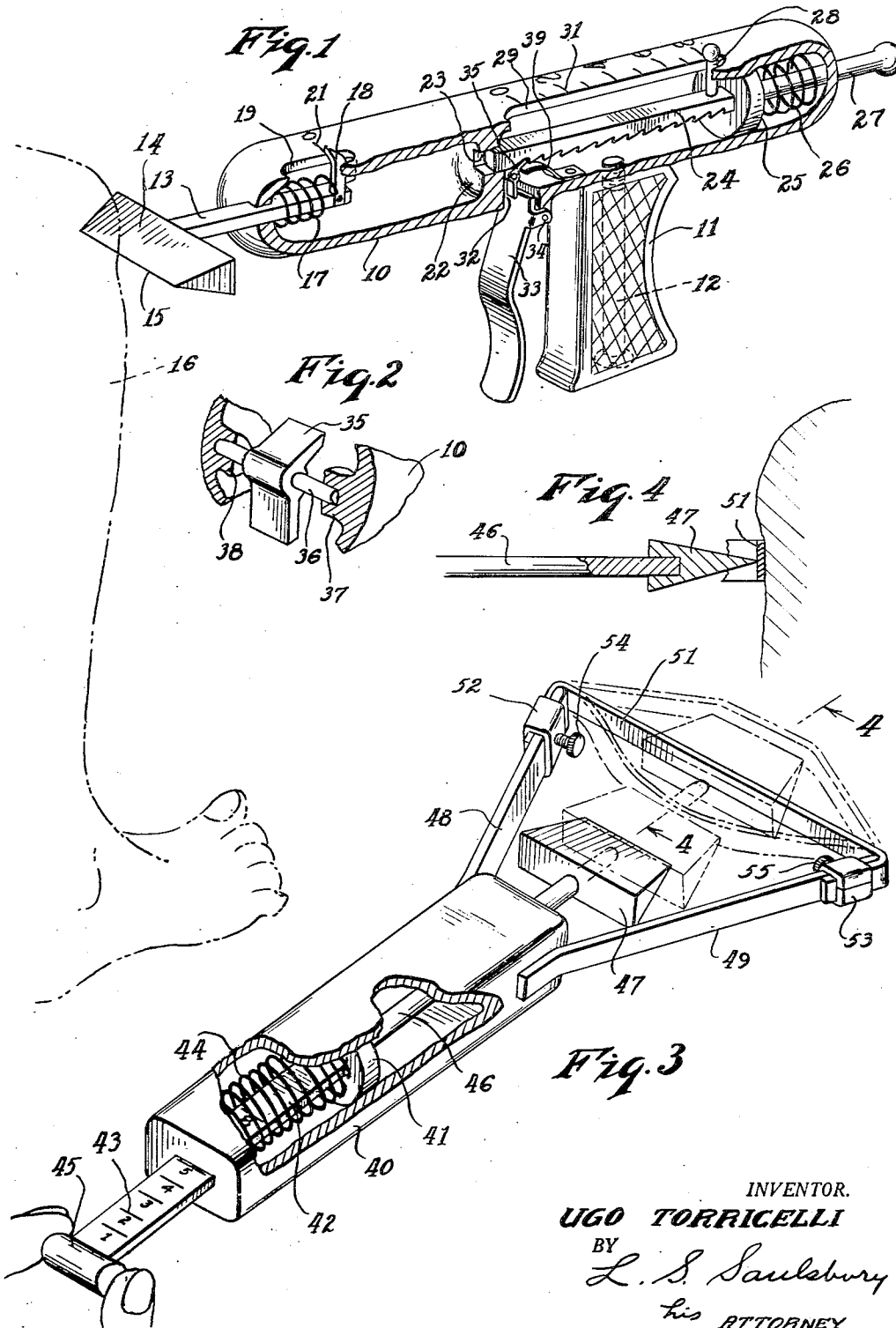
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U. TORRICELLI
HAND REFLEX GUN

2,800,895

Filed July 11, 1951

2 Sheets-Sheet 1



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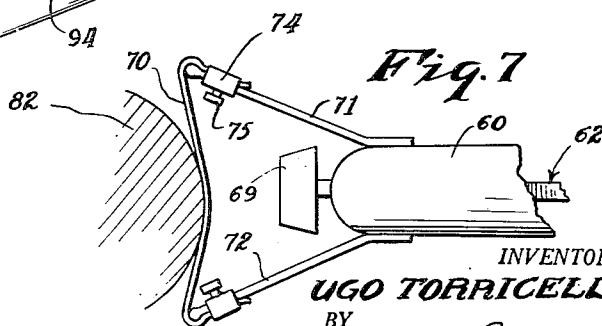
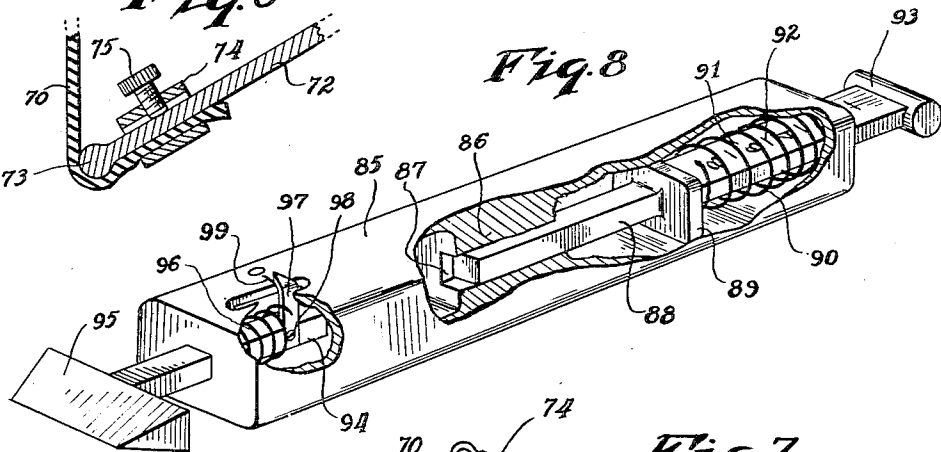
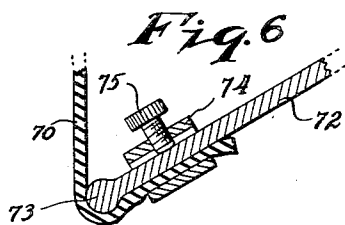
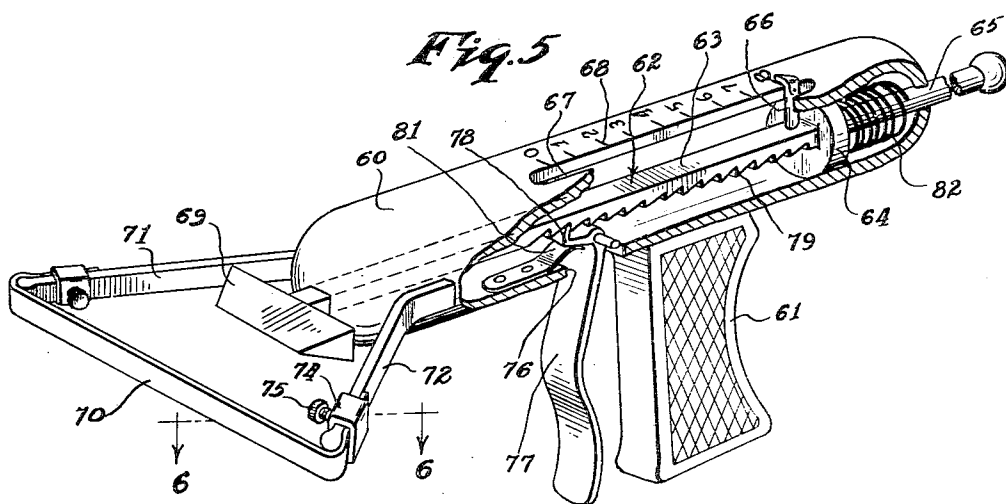
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HAND REFLEX GUN

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6 Claims. (Cl. 128-2)

This invention relates to striking guns for testing the reflexes of humans.

It is an object of the present invention to provide a striking gun for use with reflex measuring devices wherein contact can be made with reflex areas of the individual being tested in order that it will be properly positioned in the exact location for the testing of reflex action, before the striking force is effected, the gun being placed with light pressure against the skin, prior to the release of the operating plunger, and whereby the skin will be prepared for the blow and skin reaction resulting from a slight touch thereof will be avoided.

It is another object of the invention to provide a striking gun for use in evoking the reflex action of a human wherein measured amounts of striking force can be readily determined so that the amount of reflex action for the different striking forces can be readily determined.

Other objects of the invention are to provide a striking gun for use with reflex measuring devices and providing the above objects, which is of simple construction, inexpensive to manufacture, has a minimum number of parts, is compact and easy to operate and to apply to the body of the patient, and is adapted to be carried in the hand and to be supported on the limb by a slight pressure, and which is durable and efficient in use.

For other objects and for a better understanding of the invention, reference may be had to the following detailed description taken in connection with the accompanying drawings in which:

Fig. 1 is a perspective view, with parts broken away, of a hand striking gun according to one form of the invention wherein a rack plunger can be held at any of a plurality of retracted positions in order, upon being released, to effect a measured amount of striking force upon the contact element that engages the limb.

Fig. 2 is an enlarged fragmentary perspective view, partly in section, showing the trigger element that normally retains the rack plunger in its retracted position in the form of the invention shown in Fig. 1.

Fig. 3 is a perspective view of a modified form of the invention employing an elastic strap disposed between the ends of forwardly diverging members and engageable with the limb to conform to the surface thereof and to be supported thereby while the striker is retracted and released.

Fig. 4 is a fragmentary sectional view taken on line 4-4 of Fig. 3 and showing the striking element of the gun in striking position.

Fig. 5 is a perspective view, with parts broken away, of a further form of the invention and using the extended strap for the engagement of the gun with the limb and a trigger release for releasing the rack plunger containing the striking element.

Fig. 6 is an enlarged fragmentary sectional view taken on line 6-6 of Fig. 5.

Fig. 7 is a plan view of a fragment of the form of the invention of Fig. 5 showing the striking gun strap en-

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gaging with the limb and the striking element retracted in readiness to be released.

Fig. 8 is a perspective view, with parts broken away, of a still further form of the invention utilizing a plunger and a striking element engageable by the plunger and wherein the striking element engages directly against the skin of the limb of the patient.

Referring now particularly to Figs. 1 and 2, the numeral 10 designates a tubular casing, closed at the ends except for small openings through which operating parts project. To the underside of the casing 10 there is secured a handle 11 by means of a screw or bolt 12. Slidable through the forward end of the casing 10 is a rod 13 of rectangular cross-section on the outer end of which is a tapered body-engaging element 14 with a thin edge 15 that contacts the skin of a limb 16. The gun is placed so that the edge 15 at first engages a limb at the proper location thereon. A helical spring 17 encircling the rod 13 within casing 10 normally reacts against the end of the casing to urge the rod 13 rearwardly. An indicating arm 18 extends upwardly through an elongated slot 19 in the top of the casing to register the zero indication 21.

Intermediate the ends of the casing 10 is a partition wall 22 in which is disposed an opening 23 shaped to accommodate the rack shaft 24 connected at its rear end to a plunger 25. This rack is urged forwardly upon being released, by a helical compression spring 26 that encircles a handle rod 27 projecting outwardly through the opening in the rear end of the casing. A projection 28 extends upwardly through an elongated slot 29 in the top of the casing on which are graduations 31.

In the bottom of the casing 10 is a slot 32 into which extends a trigger 33 pivoted on a pin 34 that extends through projections provided for that purpose on the bottom of the casing. This trigger is convenient and accessible to the hand that grips the handle 11.

In the slot 32 is pivoted a catch 35, Fig. 2, carried on a pin 36 pivoted in opposing bosses 37 and 38. A leaf spring 39 acts upon the catch 35 to urge its engagement with the rack teeth of the rack rod 24 and to hold the plunger 25 in its retracted position. The plunger can be retracted any distance along the indications 31 so that a measured amount of striking force can be effected with the rack rod. By pulling the trigger 33, the latch 35 is pivoted downwardly against the action of the spring 39 and the rack rod 24 is released so as to slide through the opening 23 of the partition 22 and to effect a blow upon the end of the rod 13 which carries the contact element 14. It will thus be apparent that the gun can be put in place and the engaging edge 15 aligned properly on the limb 16 and then a measured blow effected upon it. With such a gun there is no necessity to be concerned as to the gun not striking at the proper location. The gun will be properly located upon the reflex nerve and the blow extended thereto.

Referring now particularly to Figs. 3 and 4, the numeral 40 designates an elongated casing in which a plunger 41 is slidable. Connected to this plunger is a shaft 42 that extends rearwardly out of the casing 40, and which has indications 43 thereon to determine the amount of pressure to be exerted. A helical spring 44 encircles the shaft 42 within the casing and normally urges the plunger 41 forwardly through the casing. A handle 45 is on the end of the shaft 42 by means of which the shaft can be grasped to pull the same rearwardly to the desired extent.

A round rod 46 extends forwardly from the plunger 42 and through the forward end of the casing. On the forward end of this rod is a striking contact element 47. Extending forwardly from the end of the casing are diverging supports 48 and 49 for an elastic or flexible trans-

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verse strap piece 51 that may engage the skin on the limb next the reflex nerve. The ends of the strap 51 are secured respectively around the ends of the supports 48 and 49 by clamp devices 52 and 53 and can be made tight by pulling rearwardly upon the clamping devices. The clamping devices respectively have clamping screws 54 and 55. The striking element 47, when the handle 45 of the rod 42 is released, will exert a blow of measured amount against the intermediate portion of the strap 51. The strap is made to engage the limb at the proper location over the reflex nerve, whereupon release of the element 47, after the same has been pulled rearwardly, effects a measured blow upon the inner face of the strap 51. Here again, the gun can be properly located before the blow is effected. This gun will be handled with two hands, one to hold the casing and the strap against the skin and the other to pull the rod 42 and plunger rearwardly. A measured amount of pull can be effected so that a known force will be transmitted to the reflex nerve.

Referring now particularly to Figs. 5 and 6, the numeral 60 designates a casing closed at the ends thereof except for small openings. A handle 61 is connected to the underside of the casing. Slidable through the end openings of the casing is an adjustable structure 62 comprising a rack bar portion 63, a plunger formation 64 and a handle rod 65. On the rack bar is an indicator projection 66 that extends upwardly through an elongated slot 67 in the top of the casing and adjustable therealong to different spring pressure indications 68.

On the forward end of the rack bar 63 is a tapered contact element 69 which is adapted to strike the flexible strip 70 which is connected to the ends of forwardly diverging projections 71 and 72. This strip 70 is preferably of rubber and is bent around enlargements 73 of the respective projections 71 and 72. A clamp sleeve 74 is carried on each projection 71, 72 and these sleeves retain the ends of the flexible strip therewithin, being made secure to the projection by means of clamping screws 75.

In the bottom of the casing 60 is a slot or opening 76 into which extends a trigger 77 having a latch portion 78 thereon engageable with rack teeth 79. A leaf spring 81 engages the latch portion 78 of the trigger 77 to hold the same normally in engagement with the rack teeth 79. The gun is supported with the hand about the handle 61 with the fingers about the trigger 77. The tapered contact element or striking head 69 is retracted by pulling the handle 65. The amount that this element 69 is retracted can be determined from the indicating projection 66. The helical spring 82 encircling the handle 65 will be compressed by the plunger formation 64 so as to supply the force necessary to effect the blow of the engaging element 69 upon the strap 70. As shown in Fig. 7, the gun is applied to limb 80 so that the strap is depressed inwardly and at the proper location on the limb to effect the blow upon the reflex nerve.

In Fig. 8 there is shown a still further modified form of the invention wherein there is provided an elongated casing 85 having a central partition 86 with a square opening 87 therein. Slidable through this square opening 87 is a slide 88 having a plunger formation 89 thereon. A spring 90 surrounds a handle rod 91 which has indications 92 thereon. This handle rod is pulled outwardly through the rear end of the casing 85 by grasping handle portion 93 to compress the spring 90. Upon release of the handle rod 92 the rod member 88 is projected through the opening 87 of the partition 86 to strike a blow upon the end of rod 94 slidable in the forward end of the casing 85. This rod has a tapered engaging element or head 95 thereon which can be put into place on the limb over the reflex nerve. Surrounding the rod 94 is a spring 96 that reacts between the forward end of the casing and an upstanding indicating arm 97 fixed by a screw 98 to the inner end of the rod 94, to normally urge the rod 94 and the skin engaging element 95 rearwardly to a zero position 99 on the casing 85.

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It should now be apparent that there has been provided striking guns for use with reflex measuring devices or for effecting a blow upon a reflex nerve of a limb wherein the gun can be properly located on the limb to receive the blow so as to eliminate any guess work in determining whether or not the blow has been effected in the proper location and wherein there is provided within a striking gun means for measuring the amount of the blow that is effected, this being made possible by compressing pressure springs to predetermined distances.

It will be apparent that with the flexible band engaging the skin the latter is prepared for the blow. With this arrangement a skin reaction is avoided. The gun will be applied to the skin at a constant initial pressure so that the blow is effected with a striking element which will always be pulled back a constant distance and a measured one so that the same shock or blow can always be effected upon the reflex nerve. With the skin reaction avoided by the use of this hand gun, true readings can be taken. With the gun located on the skin and pressed the desired distance to provide a zero location, it will be noted that a constant pressure will have been always placed upon the skin and thereafter the blow which is effected will be abrupt and in addition to the pressure of the engaging element.

While various changes may be made in the details of construction, it will be understood that such changes are within the spirit and scope of the appended claims.

I claim:

1. A striking gun for testing the reflex actions of humans, comprising a hollow elongated casing, means carried by the casing forwardly thereof and adapted to be placed over the reflex nerve of the limb to position a gun thereupon, and spring pressed means operable within and actuatable from without the casing and engageable with said means positioning the gun upon the limb and releasable to effect a blow upon said positioning means to transmit shock through the positioning means to the limb nerve.

2. A striking gun for striking the reflex nerve of humans comprising a hollow casing body closed at its ends except for small slide openings, a spring pressed rod structure means within the casing and slidable through said openings, forwardly extending arms connected to the side of the casing, a flexible member connected between the outer ends of the arms, a striking head on said rod structure disposed in alignment with the flexible strip in order to effect a blow thereagainst, said flexible strip adapted to position a gun upon the proper location on the limb of the patient, said rod structure having a handle portion extending outwardly through the opening in the rear of the casing by which the rod structure can be pulled and means associated with the rod structure and the casing to determine the extent in measured amounts that the rod structure has been retracted.

3. A striking gun for striking the reflex nerve of humans comprising a hollow casing body closed at its ends except for small slide openings, a spring pressed rod structure means within the casing and slidable through said openings, forwardly extending arms connected to the side of the casing, a flexible member connected between the outer ends of the arms, a striking head on said rod structure disposed in alignment with the flexible strip in order to effect a blow thereagainst, said flexible strip adapted to position a gun upon the proper location on the limb of the patient, said rod structure having a handle portion extending outwardly through the opening in the rear of the casing by which the rod structure can be pulled and means associated with the rod structure and the casing to determine the extent in measured amounts that the rod structure has been retracted, and a handle depending from the bottom of the casing and rigidly fixed thereto, said rod structure having ratchet teeth thereon, and trigger means engageable with the ratchet teeth and extending downwardly from the bottom of the

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casing forwardly of the handle whereby to be grasped while gripping the handle, said trigger means being engageable with the rack teeth on the rod structure, whereby the rod structure can be retained in its retracted position.

4. A striking gun for effecting a blow upon the reflex nerve of humans comprising a casing, forwardly extending diverging projections connected respectively to the opposite sides of the casing and extending forwardly thereof, clamping devices slidable upon the ends of the projections, flexible strap means extending between the ends of the projections and fixed by the clamp devices thereto, said flexible strap serving to conform to the limb of a patient and to position the gun thereupon, a spring pressed striking structure operable within the casing and having a head aligned with the flexible strap, said spring pressed structure being releasable to effect a blow with the head upon the strap whereby the blow through the strap will be transmitted to the reflex nerve of the limb.

5. A striking gun for testing the reflex action of humans comprising an elongated, hollow casing, a reflex-evoking contact member at one end of such casing terminating in a thin, forward, laterally elongated, striking edge and a force setting handle at the other end thereof, means extending longitudinally of the casing and actuatably connecting said contact member and handle for advancing and retracting said contact member axially with respect to said casing constructed to deliver a sudden blow of measured force against the contact member and thence against the human to be tested and means for setting the first means to provide a blow of known magnitude and for releasing said first means suddenly, said striking gun being a separate portable unit adapted to

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be held in the hand and manually positionable against the skin of the humans whose reflexes are to be tested, the casing being provided with diverging members and a flexible strap secured between the distal ends of such members, said diverging members and strap enclosing said contact member and the contact member being adapted to strike its measured blow against said strap, the strap being adapted to contact the reflex nerve area of the human to be tested prior to the delivery of the reflex-evoking blow to eliminate skin reaction during the test.

6. A striking gun for testing the reflex actions of humans, comprising a hollow elongated casing, means carried by the casing forwardly thereof and adapted to be placed over the reflex nerve of a limb to position the gun thereupon, and spring pressed means operable within and actuatable from without the casing and engageable with said means positioning the gun upon the limb and releasable to effect a blow upon said positioning means to transmit shock through the positioning means to the limb nerve, the second-named means including a striking element disposed forwardly of the casing and rearwardly of the first-named means and terminating in a thin, laterally-elongated edge.

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