S. A. M. ROSE.

RECORDING TARGET.

APPLICATION FILED AUG. 3, 1908.

966,361.

Patented Aug. 2, 1910.

6 SHEETS—SHEET 1.

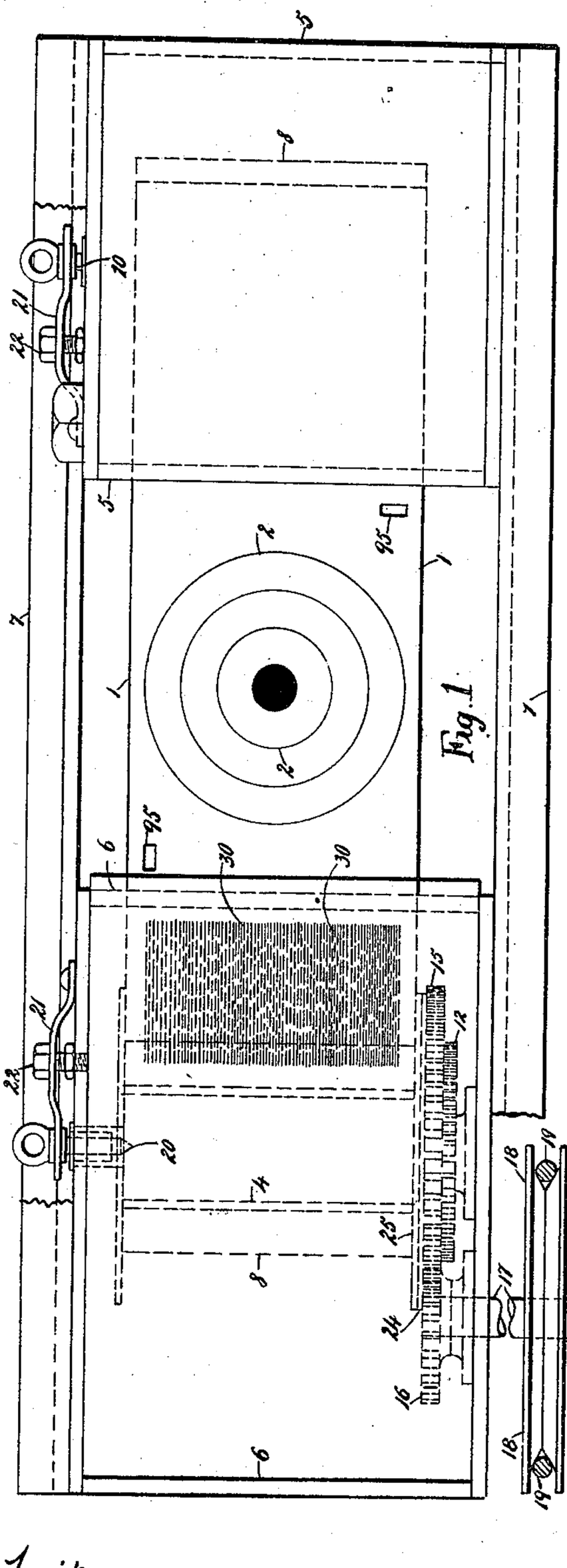

Fig. 1.

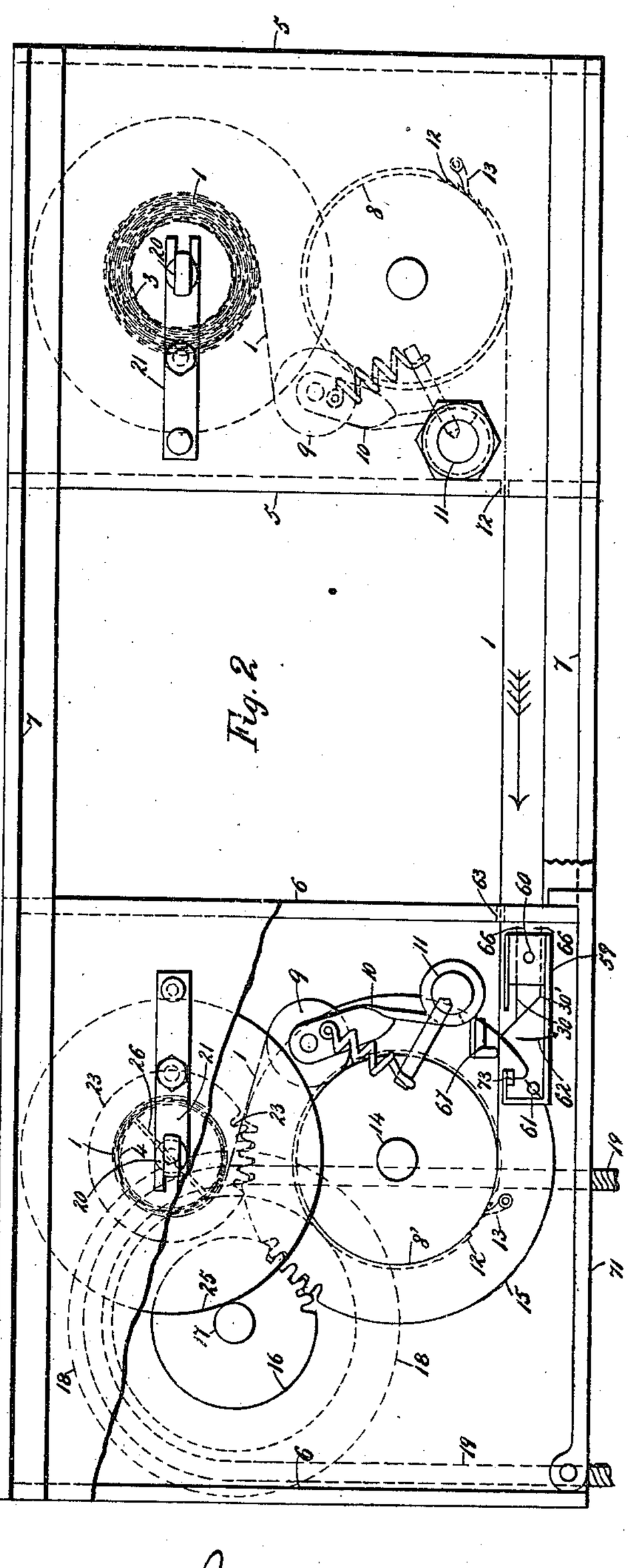

Fig. 2.

Witnesses
L. Lang
C. Hofmann

Inventor
Sydney Aston Mursey Rose
by B Singer Atty

S. A. M. ROSE.

RECORDING TARGET.

APPLICATION FILED AUG. 3, 1908.

966,361.

Patented Aug. 2, 1910.

6 SHEETS—SHEET 2.

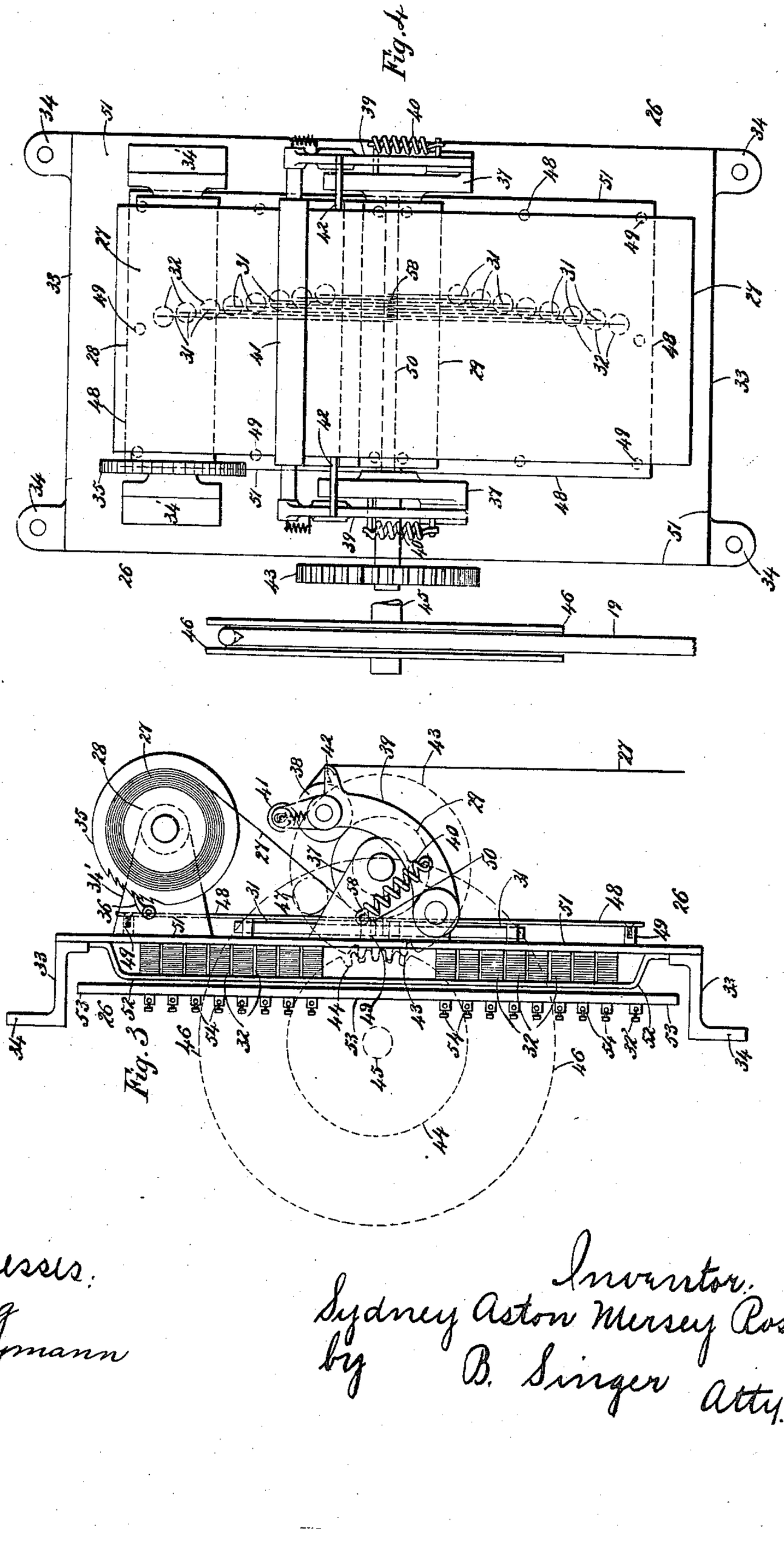

Fig. 4.

Fig. 3

Witnesses.
L. Lang
C. Helpmann

Inventor.
Sydney Aston Mersey Rose
by B. Singer Atty.

S. A. M. ROSE.

RECORDING TARGET.

APPLICATION FILED AUG. 3, 1908.

966,361.

Patented Aug. 2, 1910.

6 SHEETS—SHEET 3.

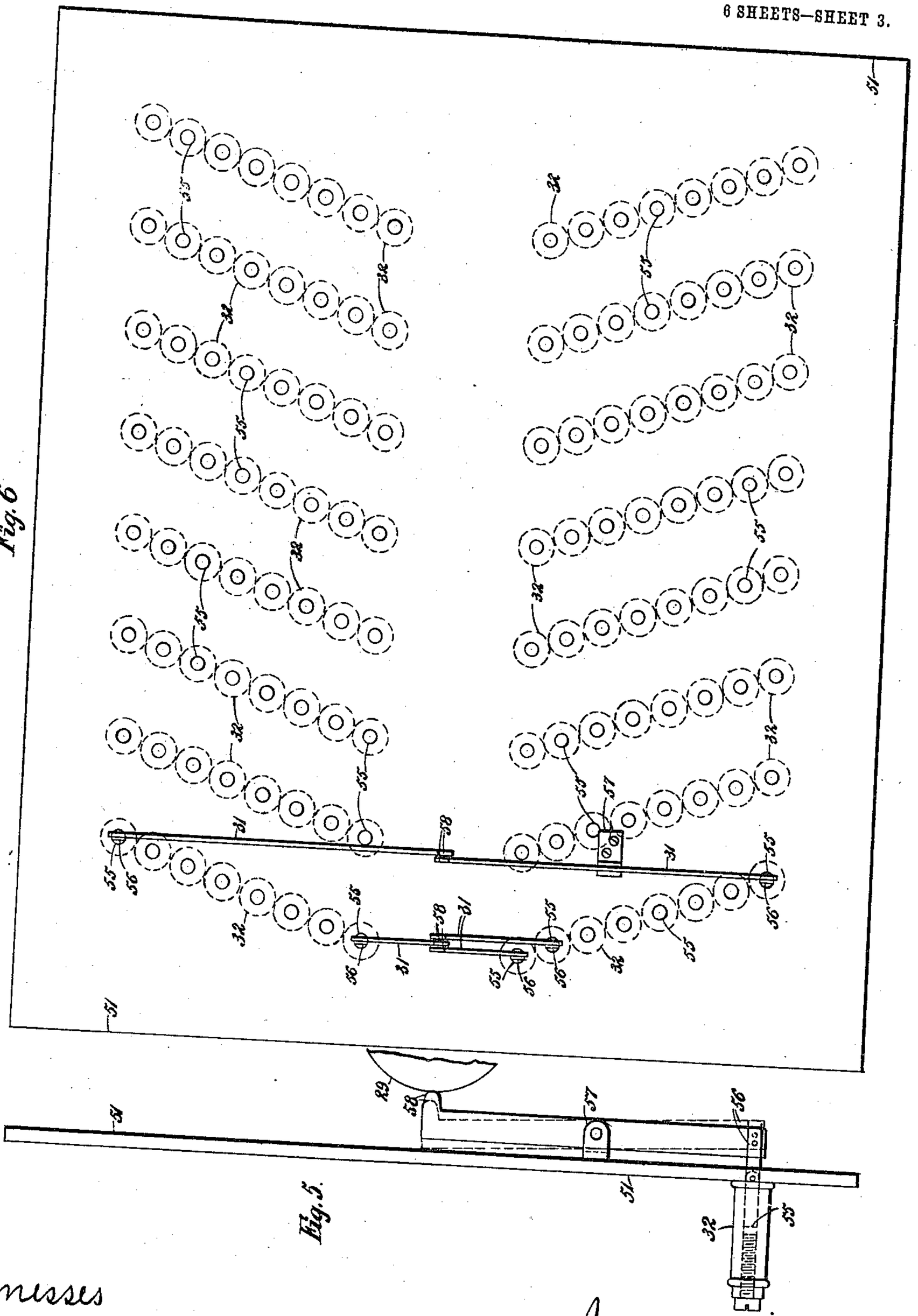

Fig. 6

Fig. 5.

Witnesses
L. Lang
C. Heymann

Inventor
Sydney Aston Mersey Rose
by B. Singer Atty

S. A. M. ROSE.

RECORDING TARGET.

APPLICATION FILED AUG. 3, 1908.

966,361.

Patented Aug. 2, 1910.

6 SHEETS—SHEET 4.

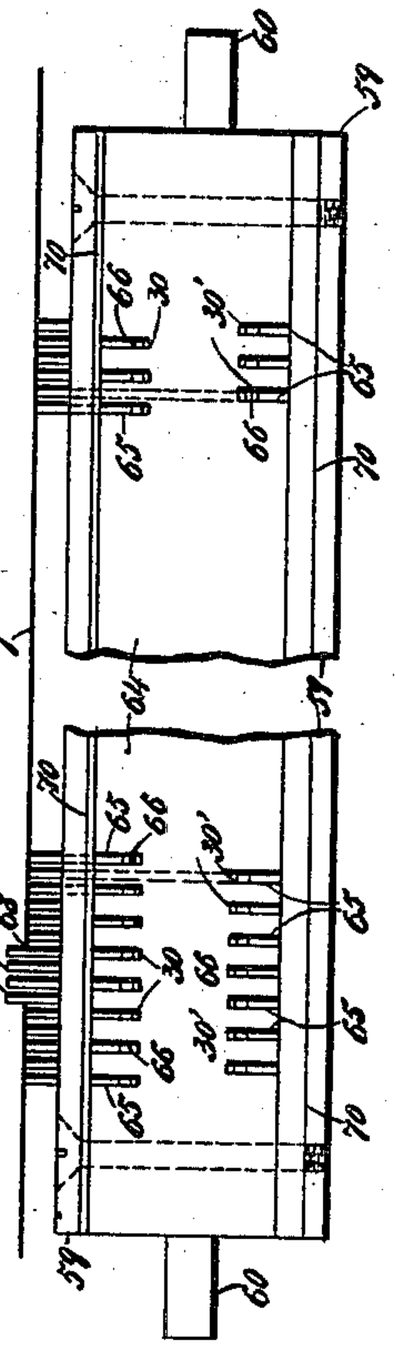

Fig. 9

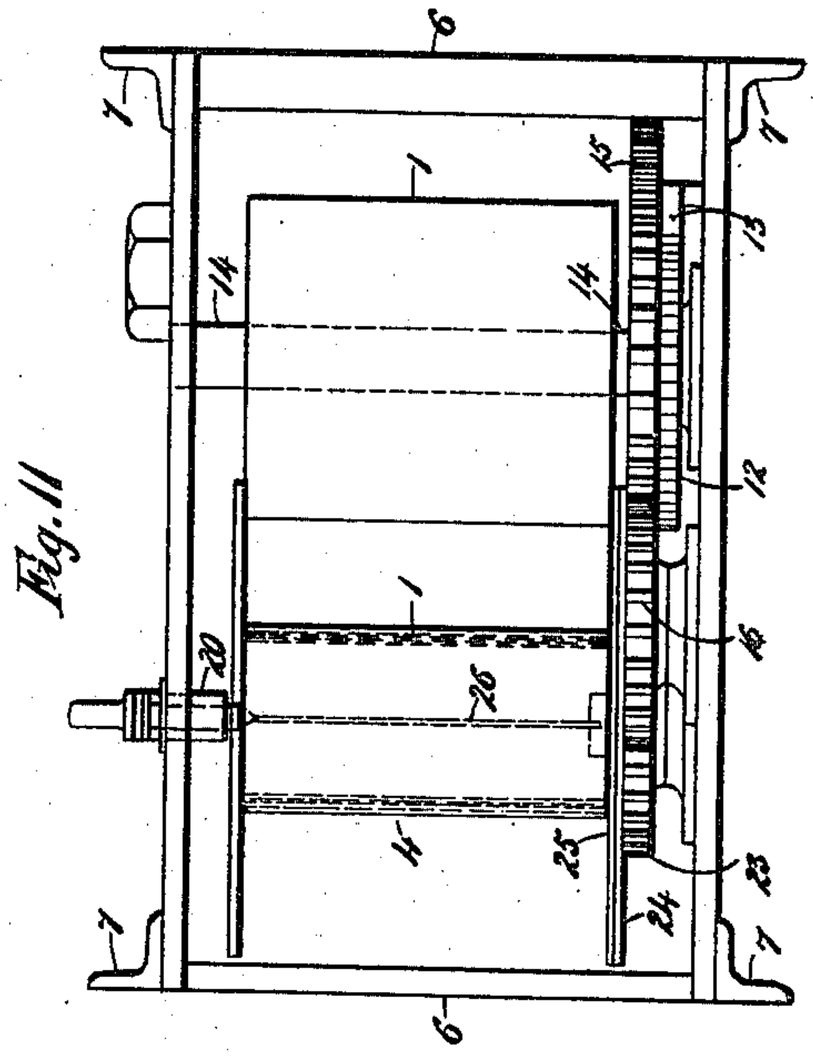

Fig. 11

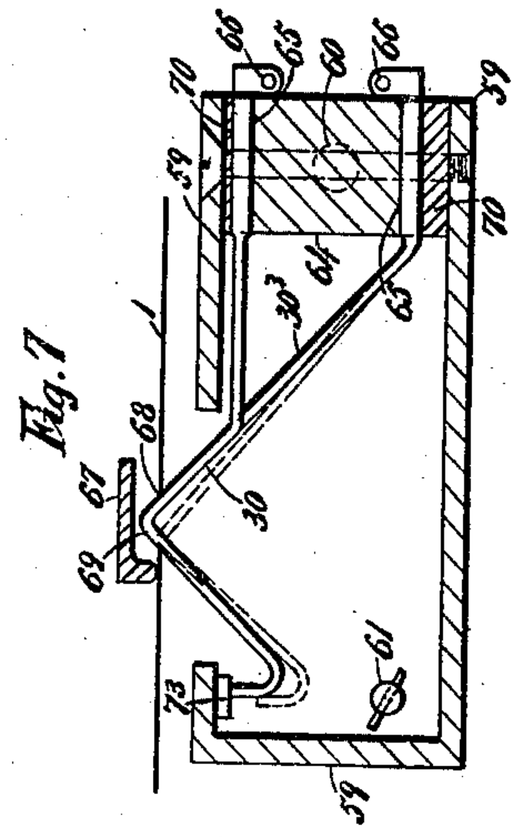

Fig. 7

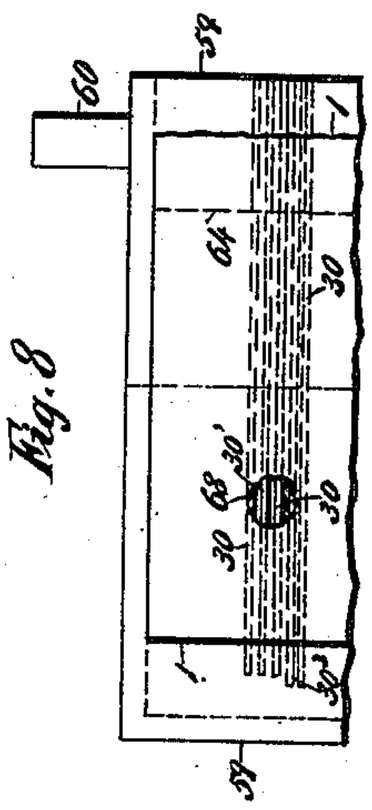

Fig. 8

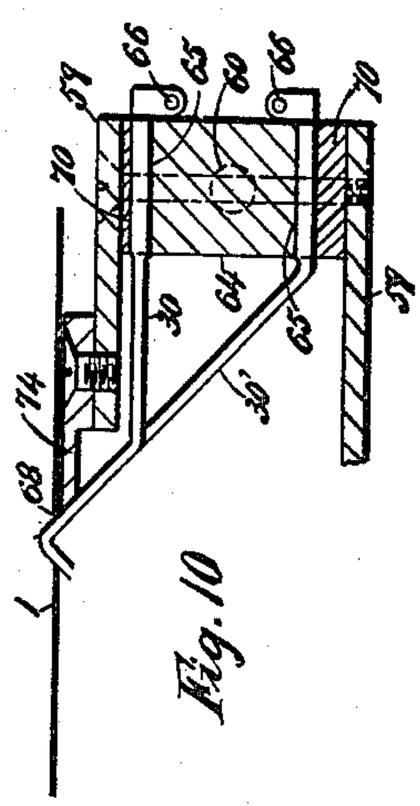

Fig. 10

Witnesses
L. Lang
C. Heymann.

Inventor
Sydney Aston Mersey Rose
by B. Singer Atty

S. A. M. ROSE.

RECORDING TARGET.

APPLICATION FILED AUG. 3, 1908.

966,361.

Patented Aug. 2, 1910.

6 SHEETS—SHEET 5.

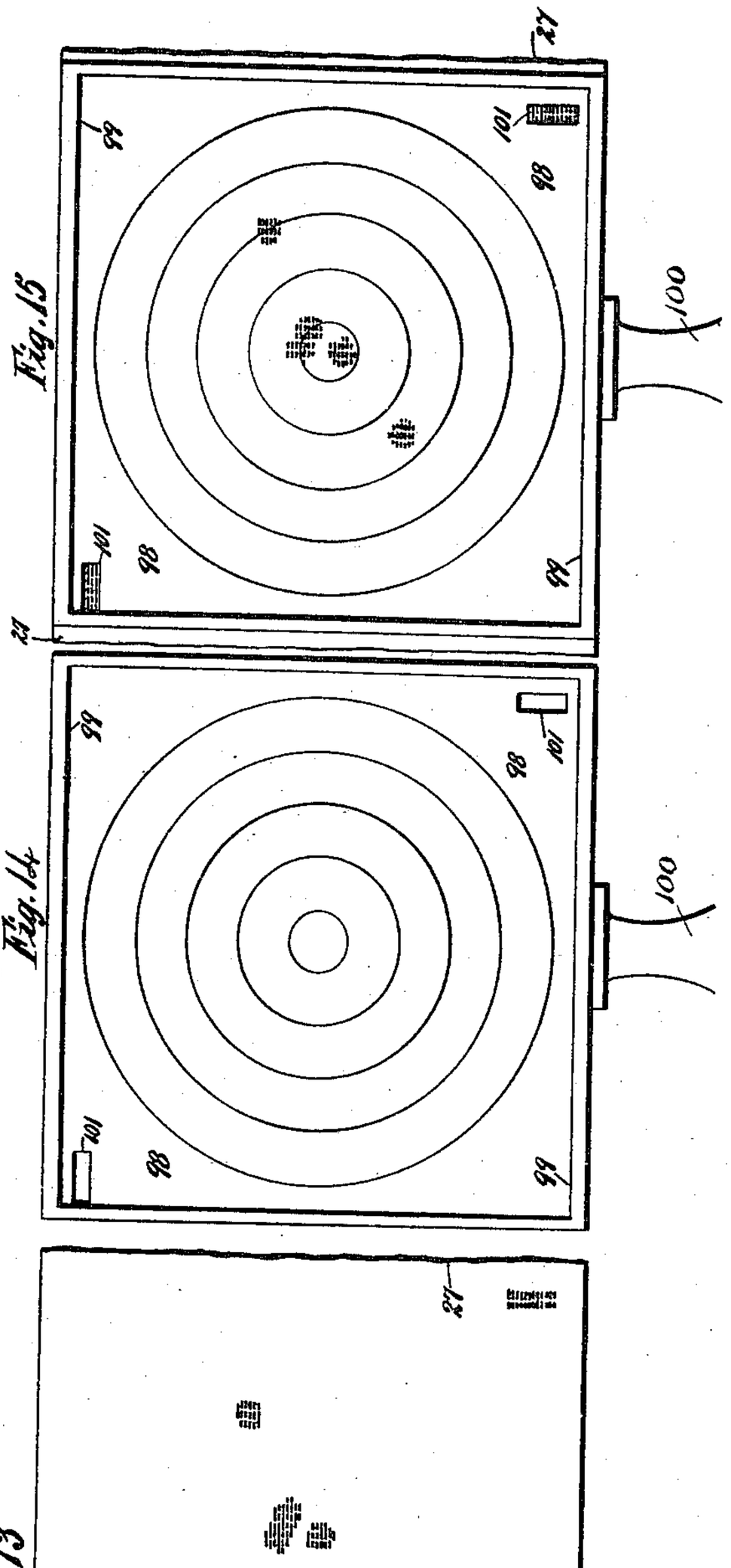

Fig. 15.

Fig. 14.

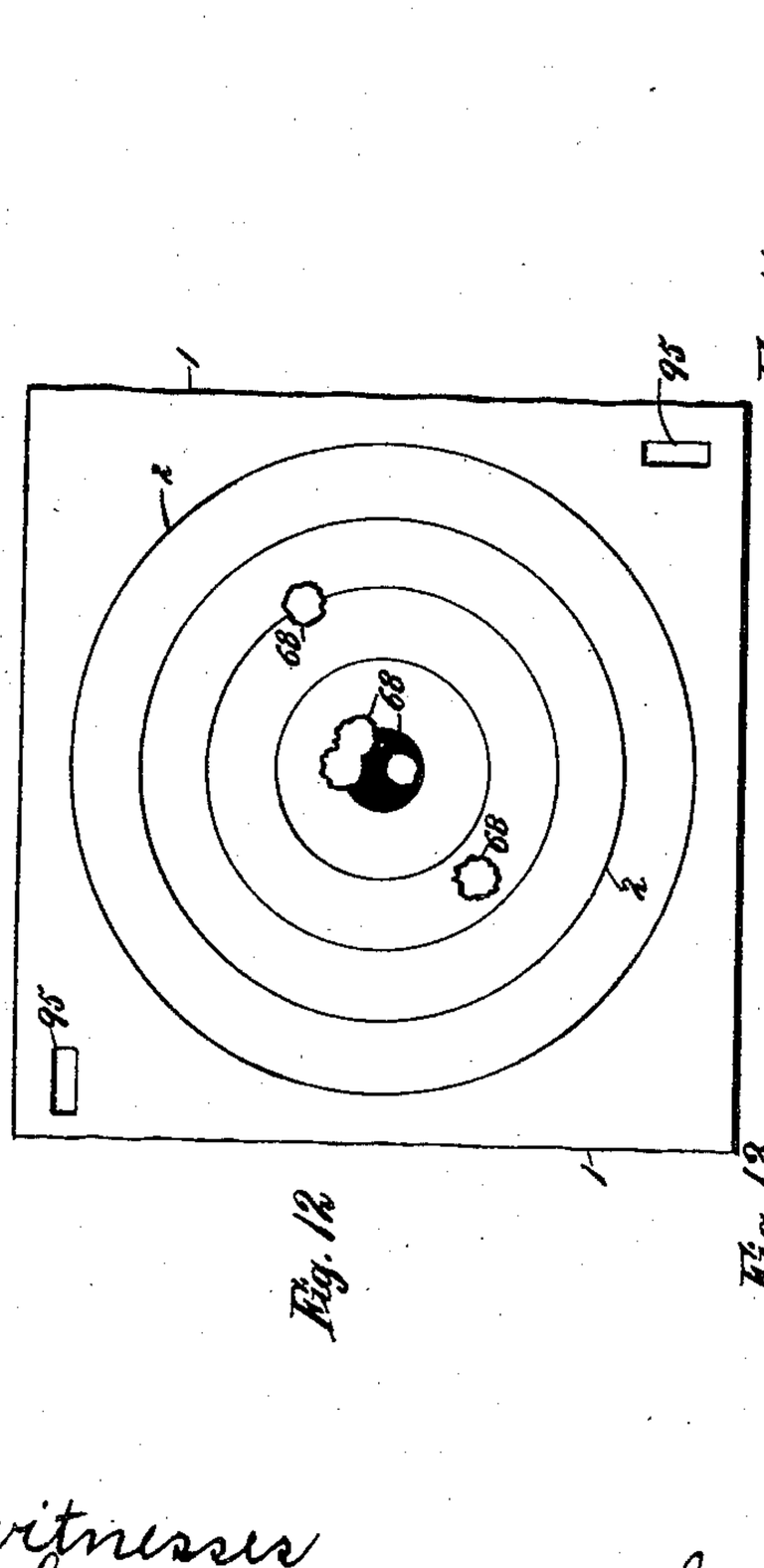

Fig. 12.

Fig. 13.

Witnesses
L. Lang
C. Helymann

Inventor
Sydney Aston Mersey Rose
by B. Singer Attys

S. A. M. ROSE.

RECORDING TARGET.

APPLICATION FILED AUG. 3, 1908.

966,361.

Patented Aug. 2, 1910.

6 SHEETS—SHEET 6.

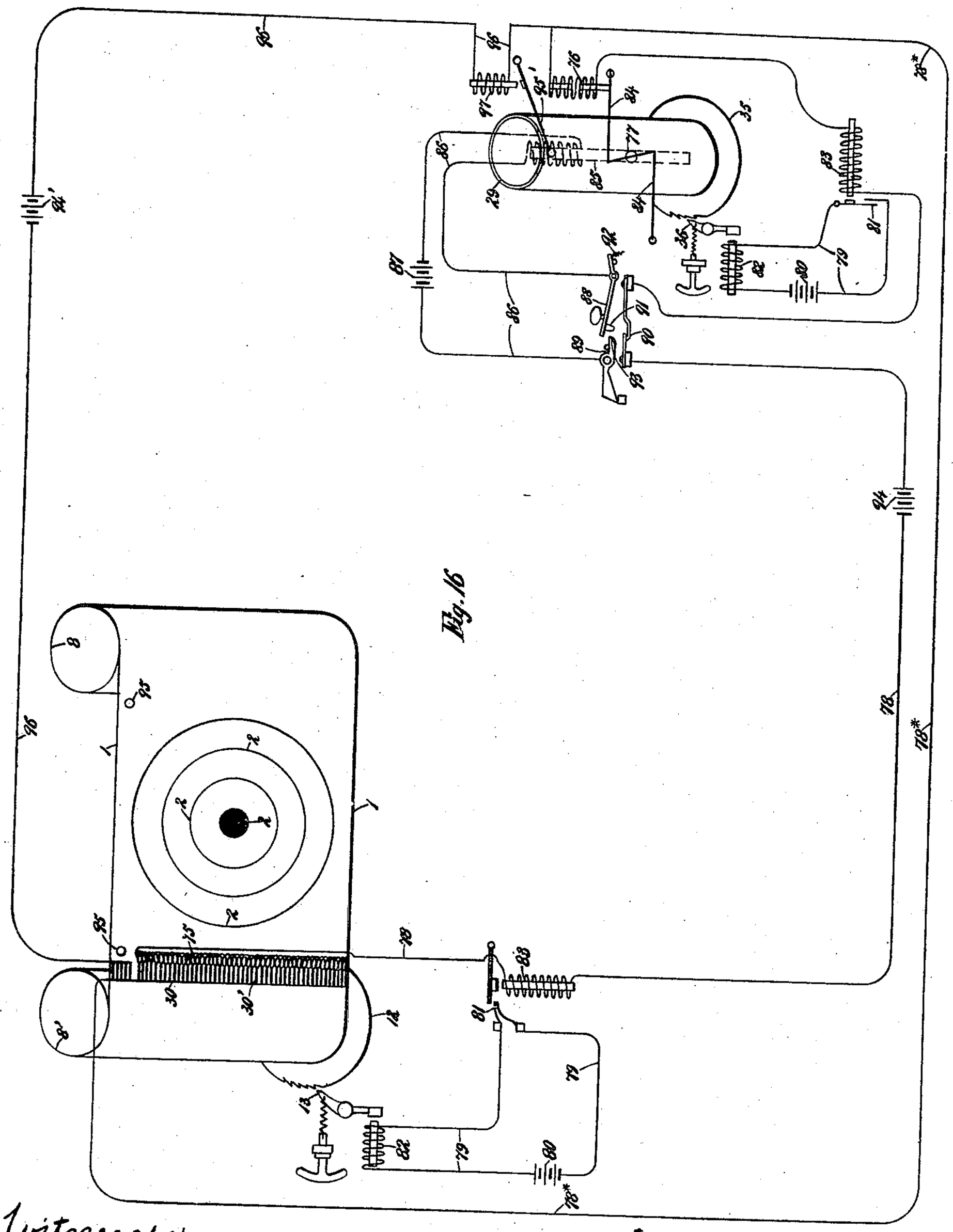

Fig. 16

Witnesses
L. Lang
C. Heymann

Inventor
Sydney Aston Mersey Rose
by B. Singer atty

UNITED STATES PATENT OFFICE.

SYDNEY ASTON MERSEY ROSE, OF RICHMOND, NEAR MELBOURNE, VICTORIA, AUSTRALIA.

RECORDING-TARGET.

966,361. Specification of Letters Patent. **Patented Aug. 2, 1910.**

Application filed August 3, 1908. Serial No. 446,794.

To all whom it may concern:

Be it known that I, SYDNEY ASTON MERSEY ROSE, a subject of the King of Great Britain, of 633–641 Church street, Richmond, near Melbourne, Victoria, Australia, electrical engineer, have invented a new and useful Improvement in or Relating to Recording-Targets, of which the following is a specification.

This invention relates to recording targets adapted for employment in connection with company or volley firing and in connection with individual firing, or the firing of single shots, and it has more particular reference to electrical targets which indicate or record automatically the result of a volley, snap, or single fire.

Various devices and apparatus have been constructed heretofore for recording company or individual firing by the closing of an electric circuit upon the bullet or projectile striking a target after passing through a length of material such as paper, canvas, or the like, superimposed thereover. This length of paper, canvas or the like has been variously arranged, but preferably forming part of a continuous roll suitably marked at intervals of its length with bull's-eyes or other figures, such as men, depicted in different colors, and being adapted to be traversed in one or both directions by suitable mechanical means.

Devices or apparatus of the type above referred to have involved mechanism of a more or less complicated nature with the result that the accuracy of record, or the indication of each shot, has depended to a great extent upon the maintenance of the said mechanism in perfect working order, while the electric installations have been of a complex nature, expensive to construct and liable to get out of order when the apparatus is exposed to open air conditions.

The object of my invention is to provide an electric recording target simple in construction, cheap to manufacture and install, not likely to get out of order, reliable in action, and which furthermore gives a rapid and accurate record at the firing point as well as at the target in an efficient manner.

To this end, the invention consists essentially in providing an apparatus comprising a traveling target adapted for continuous or intermittent operation in one or both directions and a miniature replica thereof situated at the firing point the movements whereof synchronize with those of the aforesaid target, combined with means, which, when the target proper is actuated, will simultaneously produce upon the replica an accurate marking of the "hits" whereby the value of each individual or company fire can at once be seen and tested at the firing point.

A further feature of my invention resides in the general construction, arrangement and combination of parts hereinafter fully described and particularly pointed out in the appended claims.

In order that my invention may be the better understood and carried into practical effect I have illustrated two practical embodiments thereof by the accompanying sheets of drawings.

Figure 1 is an elevation of my improved target showing the operating mechanism for bringing each separate length of paper into position. Fig. 2 is a plan of the same. Fig. 3 is an end view of the miniature replica or recorder which is located at the firing point. Fig. 4 is a front view of the same. Fig. 5 is an end elevation to an enlarged scale of the miniature target marking mechanism. Fig. 6 is a front elevation of Fig. 5. Fig. 7 is a sectional plan of one form of contact making device used in connection with my improved recording target. Fig. 8 is a part elevation of the same. Fig. 9 is a broken away end view of Fig. 7. Fig. 10 is a sectional plan of a slightly modified form of the contact making device illustrated by Fig. 7. Fig. 11 is an end elevation of the paper target operating mechanism shown by Figs. 1 and 2. Fig. 12 is a plan of a length, or part, of the paper target hereinafter fully described, and showing several perforations or "hits." Fig. 13 is a plan to an enlarged scale of a length, or strip, of the replica paper torn from the recorder at the firing point and showing the marks produced thereon by the mechanism exemplified in Figs. 5 and 6. Fig. 14 is a plan of a transparent gage to be used in connection with my improved target for ascertaining, at sight, the relative value of each individual snap or company fire. Fig. 15 is a similar view to Fig. 14 but showing a length or part of the miniature replica arranged thereunder. Fig.

16 is a diagrammatic view of a modified form of the present invention as adapted especially for single shot or individual firing.

Hereinafter, like reference numerals designate the same or similar parts in the several illustrations.

According to this invention the target, which may be of the sectional or any other desired type, is constituted by, or formed upon, a traveling band of paper or other suitable material adapted for being operated continuously or intermittently by appropriate mechanism arranged for actuation by mechanical or electrical means preferably controlled from the firing point.

Apparatus adapted for accomplishing the objects of my present invention may comprise a band 1 having thereon a series of succession of targets 2 said band 1 being composed of paper, paper covered canvas or other suitable material. The aforesaid band 1 is conveniently mounted on rollers 3, 4, so as to be capable of movement, preferably intermittently, from the one roller 3 to the other 4. The operation of the band 1 of successive targets 2 may be effected by electrical or mechanical means as shown actuated by suitable appliances situated at the firing and recording point.

In Figs. 1, 2 and 11 I have shown a preferred form of mechanism for actuating and controlling the movements of the target band 1 from the one roller 3 to the other 4.

5, 6, are respectively cases or boxes for the operating mechanism, the former, 5, for example, containing the roller 3 from which the paper is unwound after each individual or volley fire, and the latter, 6, the roller 4 upon which said paper is wound up. These cases or boxes 5, 6, are preferably constructed from sheet metal suitably stiffened or strengthened, and they are connected together at a convenient distance apart, for each target 2 to be fully exposed, by angle bars 7, 7, so that the entire target is rendered compact while the paper rolls and mechanism are protected from injury during firing.

8, 8′, are the guide rollers over and between which the length of paper 1 is stretched and 9, 9, are spring controlled tension rollers revoluble freely between movable brackets 10, 10 mounted upon pillars or guide rods 11, 11, rigidly fixed between the top and bottom of the respective cases 5, 6. The guide rollers 8, 8′ are each fitted with a ratchet wheel 12 and detent 13 conveniently arranged at the lower end thereof for preventing any back motion of said rollers.

Mounted upon the vertical spindle 14 which carries the guide roller 8′ is a toothed wheel 15 with which gears a spur wheel 16 keyed to the spindle 17 which extends through the base of the case 6 and has rigidly fixed thereto the main or driving wheel 18, in this instance exemplified as a grooved pulley adapted for revolution intermittently or continuously by means of a rope drive 19.

The paper rollers 3, 4, are preferably mounted between short pintles or bearings 20, 20, the upper of which are provided with tensioning devices, consisting of flat springs 21, 21, adapted for adjustment by locking studs 22, 22, said arrangement being readily understood without further description.

In order to revolve the paper roller 4, to wind up the successive targets 2, 2, I preferably mount it in the following way. 23 is a toothed wheel mounted upon or keyed to the lower pintle or bearing spindle 20, meshing with the toothed wheel 15 hereinbefore described. Immediately above or forming part of the wheel 23 is a disk 24 which supports the lower end of the roller 4 similarly provided with a disk 25, the central projection or lower pintle 20 properly alining the axes thereof. Thus it will be seen that the said roller 4 may be held stationary or moved independently of the driving gear. This independent movement is provided so that as the paper increases on the roller 4, consequently giving same a greater speed, a sufficient slip is insured to take up the slack and obviate tearing.

The roller 4 is made hollow and provided with a lingitudinal slot or groove 26 into which the free end of the paper roll 1 is passed to prevent slipping when starting the apparatus after putting in a fresh roll of targets.

The means described above for moving the succession of targets 2 on the paper roll 1 are adapted to operate synchronously a replica, duplicate, or miniature target 26, Figs. 3 to 6, comprising among other parts a band or roll of paper 27 having a series or succession of targets thereon, or it may be perfectly plain paper as illustrated, and mounted on rollers 28, 29, so as to travel from the one roller 28 to the other 29. This duplicate replica roll 27 may be, as stated, a replica or a miniature of the target proper, above set forth, and by being operated synchronously with the latter in conjunction with the means hereinafter described, a reproduction of the positions of the shots on the target proper is obtained on the said replica or miniature roll 27. At each or either side of the target proper are arranged a series of contact making devices, shown to an enlarged scale by Figs. 7 to 10 inclusive, which contacts may consist of springs 30, 30′ as shown, or levers or other convenient appliances may be employed. These springs 30, 30′ are adapted to be operated by the passage of the punctured target material 1 when the latter is moved at the end of an individual or a volley or company firing operation.

Each contact making device 30, 30′ may

be in electrical connection by means of a separate wire, not shown, with a marker 31, Figs. 3 to 6, such as a pencil, pen or other device. Each marker 31, corresponds with one of the aforesaid contact making devices 30 or 30′ so that, as the result of the operation of one of the contact making devices 30, 30′, the latter, by means of an electromagnet 32 or other suitable device, effects the actuation of its corresponding marker 31. This marker 31 is thereby caused to make an impression upon the duplicate or roll 27, the impression or impressions so made thereon constituting a reproduction of the marks made on the target proper 2 by the actual shooting.

According to the form of my invention illustrated by Figs. 3 and 4, the replica or miniature target 26 consists of a frame or casing 33 furnished with lugs 34 by which it can be fixed in position to any convenient standard or other suitable fixture. On this frame or casing 33 are rigidly secured brackets 34′ between which the paper roller 28 is revolubly mounted, and at one end of the spindle thereof is keyed a ratchet wheel 35 with which engages a detent or pawl 36 for preventing back motion. 37, 37, are similar brackets for supporting the roller 29, and 38 is a tension roller mounted in bearings formed in swinging arms 39, 39, hinged to the aforesaid brackets 37, 37.

40, 40 are the tension springs, and 41 is an additional tension roller engaging the roller 38 and between which and the said roller 41 the free end of the paper 27 is drawn or paid out.

42 is a cutting knife or edge extending across the paper 27 for severing off any desired record or length of records.

43 is a spur wheel secured to the spindle of the roller 29 engaging with a toothed wheel, carried by a spindle 45, revolubly mounted beneath the replica 26 in any of the well known ways; and 46 is a grooved wheel over which passes the endless band or cord 19 above referred to and by means of which both the target proper as well as the miniature 26 are operated synchronously.

As an additional precaution against the paper 27 slipping I may provide a tension roller between the aforesaid rollers 28, 29 as indicated in Fig. 3 by dot and dash lines 47.

48 is a protecting plate for covering in the marking devices 31, 31, now to be described, said plate being conveniently supported by pillars 49, 49, from the miniature carrying frame 33, and it is slotted transversely at 50 to permit the marking devices 31, 31 to make contact with the paper 27.

32, 32, are electro-magnets or solenoids mounted at the back of a plate 51 fixed to, or forming part of, the frame 33, each vertical row of electro-magnets or solenoids 32 being bound in place by a binding strip 52.

53. Fig. 3, is a board carrying the terminals 54 to which the wires—not shown—from the main or target proper are connected in the well known way, said terminals being in electrical communication with the electromagnets 32 as will be readily comprehended.

32′ is a terminal for the common return wire for the entire series of electro-magnets 32.

55, Figs. 5 and 6, are the cores of the solenoids or electromagnets 32, to the outer ends of which are hinged links 56 uniting with the outer ends of the marking devices 31, in this case exemplified as levers pivoted to brackets 57, furnished at their inner or free ends with rounded noses 58, for impressing the paper 27. Instead of forming the noses 58 as described I may provide each lever 31 with a pencil or other suitable marking pointer, and to further insure that a distinctive mark be produced upon the paper 27 of the miniature 26 I preferably longitudinally or otherwise serrate finely the surface of the roller 29, as by this arrangement of arranging the serrations at right angles to the marking devices 31 sharply defined impressions are produced.

The contact making device, hereinbefore referred to is conveniently constructed as shown most clearly by Figs. 7, 8 and 9, and it consists of a hinged frame 59 supported at its ends by short pivots or projections 60, 60, fitting into sockets provided for the purpose, in the upper and lower walls of the case or frame 6 of the target proper. This frame 59 may be locked in its operative position in any of the well known ways, as by a thumb screw or screws 61 and it is arranged to be swung about its pivot pins 60, 60 in the direction of the arrow 62 shown on Fig. 2, for the purpose of threading the paper 1 through the opening or slot 63 on to the rollers 8′ and 4, as above described, when the apparatus is started, or in other words, when a fresh roll of targets is inserted.

Arranged vertically at one side of the frame 59 and rigidly secured thereto is a strip or bar of insulating material 64 furnished at its edges with saw-cuts or grooves 65 in which are firmly embedded the contact springs 30, 30′ above referred to, each pair being preferably arranged at alternate edges of the said bar 64 and they are furnished with lugs 66 to which the conducting wires are attached.

Each wire from the lugs 66, 66, is led, or carried in any of the well known ways, but preferably underground, to one of the electro-magnets or solenoid bobbins 32. In order to complete the circuit through any of the contacts 30, 30′ I arrange in juxtaposition to the frame 59 an angle bar or strip of suitable conducting material 67 with which said contacts 30, 30′ are adapted to engage

whenever the punctures in the target material 1 are drawn thereover, as will be readily seen on reference to the drawings, in which 68, (Figs. 7 to 10) represent a shot hole and 69 the angular part of the contacts 30, 30′ passed therethrough.

70, 70 are insulating strips for closing in or completely insulating the springs 30, 30′ from the frame 59, and 71, as shown in Fig. 2 is a hinged door to the casing 6 for giving access thereinto for inspection, and the connecting up of the several parts when a new roll of targets is inserted. Similar provision is provided for giving access to the casing 5 and 72 is a vertical slot for the passage of the paper targets therefrom. 73 is a contact strip against which the ends of the springs 30, 30′ abut or rest when dropped through the shot holes or perforations in the targets on to the contact maker or circuit closer 67 which is arranged parallel therewith and insures proper closing of each individual circuit. Or the angle bar 67 may be made adjustable and simply employed as a stop or guide piece to keep the paper in position and to prevent it tearing. I may arrange the springs 30, 30′ to make contact with a bar 74 (Fig. 10) carried by the aforesaid frame 59, said arrangement permitting greater compactness and being readily comprehended without further explanation or illustration.

I wish it understood that the form of contact maker exemplified is by way of example only as any other make and break contact device giving the necessary flexion and certainty of action may be equally well applied.

When using the target in connection with individual firing or in connection with the firing of individual shots, and as shown diagrammatically by Fig. 16, the contact making devices 30, 30′ may be conveniently arranged in conjunction with a variable resistance 75 adapted to control a solenoid 76 which in turn operates a marker common to all the contact making devices. Thus a considerable reduction in the quantity of wiring necessary for the operation of the apparatus is effected. In this case I preferably arrange in connection with the main circuit 78 auxiliary and independent circuits for actuating the entire mechanism with the exception of the means above described for moving the target proper. 79, 79 are independent circuits provided with batteries 80, 80, fitted with suitable make and break contact devices 81, 81, and electro-magnets or solenoids 82, 82, for operating the detents or pawls 13, 36, which prevent back motion of the rollers 8′ and 29 respectively.

By reference to the Fig. 16 it may be noted that the pawls 13 and 36 are connected to a tension spring, which normally holds them out of engagement with the ratchet wheels 12 and 35 respectively. As long as that part of target 1, which is not covered with shot-holes, is moved over the contact springs 30, the pawls do not act upon their ratchets; but as soon as the springs 30 make contact through the shot-holes, the pawls 13 and 36 engage their ratchets and allow therefore only a movement in one direction.

83, 83, are electromagnets or solenoids for operating the make and break contacts 81, 81.

The marking device 77 is preferably carried by a parallel motion 84 arranged in close proximity to the replica paper roller 29 but not normally in engagement therewith. This parallel motion 84 is so arranged and proportioned as to permit the marker 77 to be moved up and down in a vertical line by means of the solenoid 76 which is more or less effected by the variable resistance 75 aforesaid as will be readily understood by those skilled in the art, and it is caused to swing toward the roller 29 when it has been brought into the requisite position to correspond with the puncture upon the target proper by means of an electro-magnet 85. This electro-magnet 85 is axially located within the hollow roller 29 and is energized by the closing of an independent circuit 86 in which is arranged a battery 87. 88 is a spring controlled pivoted key lever which, when the marker 77 is moved into position, is depressed by the operator and engages a pivoted contact 89 and thereby closes the circuit 86 to the electromagnet 85, whereupon, said marker 77 is attracted and a record produced.

When the target 1 is advanced after the same has been pierced by a bullet, one of the contact devices 30, 30′ will through the shot hole engage a certain portion of the resistance 75 and a circuit will then be closed which includes the following members: contact 30, resistance 75, relay 83, conductor 78, current supply 94, contact 90, relay 83, marking electro-magnet 76, conductor 78× and back to the contact device 30, 30′. It will be noted by reference to Fig. 16 that the gaging apertures 95 will be indicated by means of wire 78× extending from the respective contact device for the gaging aperture and leading to the electro-magnet 97, wire 96 and current supply 94′. As soon as the circuit inclosing the battery 94 and the relays 83 is closed, said relays will close contact 81 and will thereby also close a local circuit including the batteries 80, the electro-magnets 82 and wires 79. Electro-magnets 82 will attract their armatures, which are attached to the pawls 13 and 36 respectively, which will enter between the teeth of the ratchet wheels 12 and 35 respectively. The energization of the electro-magnet 76 causes

a displacement of the marker 77, which is provided with the guiding levers 84 and which is adapted to move parallel to the axis of the roller 29. As soon as the operator stationed near the roller 29 notices a displacement of the marker 77 he depresses the key 88 until contact between 88 and the lever 89 is closed. By this means a circuit including the electro-magnet 85 is closed and the roller may be swung against the marker 77 which then may indicate with a permanently remaining mark on the roller 29 a place which corresponds with the shot hole on the target 1. It is obvious that the movement imparted to the roller 29 is only so small that the ratchet wheel 35 does not leave the pawl 36. When the operator desires to open the circuit, so that the target may be advanced again, he depresses key 88 until the pin 91 interrupts the contact 90. By this means the electro-magnet 76 and relays 83 are deënergized and the pawls 13 and 36 respectively will be disengaged from their respective ratchet wheels 12 and 35.

In the upward movement of the key 88, which is caused by the spring 92 the front end of the key does not engage a metallic part of the lever 89, but the insulated portion 93 at the lower face thereof, so that the circuit which includes the battery 87, wires 86 and electro-magnet 85 is only closed by depression of the key.

For convenience in operation I arrange the parallel motion 84 so that in its normal situation the marker 77 occupies a position at the bottom of the width of the paper.

The result of the arrangement above referred to is such that the marker 77, which is arranged in juxtaposition to the miniature or duplicate target 26 and which is common to all the contact making devices 30, 30′ pertaining to the target proper, is operated in accordance with the amount of resistance inserted at the target proper. This amount of resistance is regulated by the movement of the contact maker or makers 30, 30′ which has or have been operated by the perforation in the target proper 1.

Each target length 2 of the paper roll 1 is preferably provided with a hole or with holes or perforations 95, 95, Figs. 1, 12 and 16, adapted to serve in conjunction with a lever or levers or other suitable device to facilitate regular movements in synchronization with the miniature target while the latter and the target proper are in the act of changing their positions. In the form of my invention shown in Figs. 1 and 2 these holes 95, 95 pass over a few of the springs 30, 30′ at the extreme outer edges or edge of the contact making device.

In the modified form of my invention shown by Fig. 16 I employ a separate marking device 95′ for indicating the position of each gage hole or holes 95 upon the miniature paper target, said marker 95′ being operated by a synchronizing circuit 96 in which is situated a solenoid 97, and a battery 94′.

78ˣ is the common return wire for the entire apparatus.

The miniature target may be a blank band of paper and the positions of the firing mark obtained by superimposing a transparent representation of the target circles or sections 2. Such a transparent representation is shown in Figs. 14 and 15 and which consists of a mica or celluloid piece 98 mounted in a hand frame 99, fitted with a handle 100 and marked with gage holes 101, 101 and arranged to correspond with the holes 95, 95 on the target 2. The use of this transparent gage will be self evident from Figs. 12 to 15 without further elucidation or description. The target proper may be of any desired color or of the color best suited to the service for which it is destined for use. Figures such as men or other objects may be depicted on the target by means of perforations in conjunction, or not, with suitable colors and the target may be subjected to movement so as to constitute a moving target or the firing may take place during the aforesaid changing movement, thus providing a suitable movement for snap shooting records.

From the foregoing description the many advantages of my improved recording target will be apparent, while its simplicity, reliability and easy operation can be comprehended at a glance without further explanation. Furthermore those skilled in the particular art to which my invention appertains will understand that the details of construction can be considerably varied without in any way departing from the nature of my invention and I wish it clearly to be understood the foregoing forms thereof are by way of example only.

What I claim as my invention and desire to secure by Letters Patent, is:—

1. In a recording device of the class described, the combination, with a target, of a replica of said target, and electrical means for indicating with permanent marks on said replica the places, where bullets struck said target.

2. In a recording device of the class described, the combination, with a target, of a replica of said target and means for indicating with permanent marks on said replica the places, where bullets struck said target, said means being adapted to be actuated by movement of said target.

3. In a recording device of the class described, the combination, with a target, of a replica of said target, means for indicating

on said replica the places where bullets struck said target, said means being adapted to be actuated by movement of said target and means for imparting motion to said target and said replica.

4. In a recording device of the class described, the combination, with a target, of a replica of said target, means for indicating on said replica the places where bullets struck said target, said means being adapted to be actuated by movement of said target and means for imparting synchronous motion to said target and to said replica.

5. In a recording device of the class described, the combination, with a target, of a replica of said target, electrical means for indicating with permanent marks on said replica the places where bullets struck said target, and a plurality of members adapted to actuate said means, said members being also adapted to project through the shot-holes in said target.

6. In a recording device of the class described, the combination, with a target, of a replica of said target, electrical means for indicating with permanent marks on said replica the places where bullets struck said target and a plurality of resilient members adapted to actuate said means, said members being also adapted to project through the shot holes in said target.

7. In a recording device of the class described, the combination, with a target, of a replica of said target, electrical means for indicating with permanent marks on said replica the places where bullets struck said target, a plurality of members adapted to actuate said means, said members being adapted to project through the shot holes in said target, and a metallic element adapted to be engaged by the members projecting through said holes.

8. In a recording device of the class described, the combination, with a target, of a replica of said target, electrical means for indicating with permanent marks on said replica the places where bullets struck said target, a plurality of members adapted to actuate said means, said members being also adapted to project through the shot holes in said target, and a metallic element adapted to be engaged by the members projecting through said holes, said element serving as a guiding means for said target.

9. In a recording device of the class described, the combination, with a target, of a replica of said target, electrical means for indicating with permanent marks on said replica the places where bullets struck said target, a plurality of members adapted to actuate said means and a frame for said members.

10. In a recording device of the class described, the combination, with a target, of a replica of said target, electrical means for indicating with permanent marks on said replica the places where bullets struck said target, a plurality of resilient hooks, the bent portions of said hooks being in alinement with each other and being adapted to project through shot holes in said target, a metallic member adapted to be conductingly connected to said hooks, when the same project through the shot holes of said target, and a frame for said hooks and said member.

11. In a recording device of the class described, the combination, with a target, of a replica of said target, means for indicating on said replica the places where bullets struck said target, means for imparting synchronous motion in one direction to said target and to said replica, and means for preventing a return motion of said target and said replica.

12. In a recording device of the class described, the combination, with a target, of a replica of said target, means for indicating on said replica the places where bullets struck said target, a pair of rollers, said target and said replica being adapted to be wound up on said rollers, a ratchet wheel connected with each of said rollers and a pawl adapted to engage said ratchet wheel.

13. In a recording device of the class described, the combination with a target, of a replica of said target, a plurality of electro-magnets, a plurality of armatures for said electro-magnets, said armatures being provided with portions adapted to produce marks on said replica and electrical means for actuating said electro-magnets.

14. In a recording device of the class described, the combination, with a target, of a replica of said target, means in co-action with said target for closing electrical circuits, said means being adapted to be actuated by imparting motion to said target, a plurality of electro-magnets, a plurality of movable armatures for said electro-magnets, said armatures being provided with portions adapted to produce marks on said replica, said electro-magnets being adapted to be actuated by said circuit closing means in co-action with said target.

15. In a recording device of the class described, the combination, with a target, of a replica of said target, means for indicating on said replica the places where bullets struck said target, a roller serving as a support for said replica, means for winding said replica off said roller, and means for keeping the wound-off part of said replica under tension.

16. In a recording device of the class described, the combination, with a target, of a replica of said target, means for indicating on said replica the places where bullets struck said target, a roller serving as a support for said replica, means for winding said replica

off said roller, and resilient means for keeping the wound-off part of said replica under tension.

17. In a recording device of the class described, the combination, with a target, of a replica of said target, means for indicating on said replica the places where bullets struck said target, a roller serving as support for said replica, means for winding said replica off said roller and means for separating the wound-off part portion of said replica from the remaining portion.

18. In a recording device of the class described, the combination, with a target, of a replica of said target, said target being provided with aiming marks, and a means for indicating corresponding aiming marks on said replica.

19. In a recording device of the class described, the combination, with a target, of a replica of said target, said target being provided with aiming marks with gaging apertures, and a means for indicating corresponding aiming marks on said replica, said means being provided with corresponding gaging marks.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

SYDNEY ASTON MERSEY ROSE.

Witnesses:

ALFRED T. BRATTON,

J. O. FARRER.