No. 805,543. PATENTED NOV. 28, 1905.

J. HAYES.

SPARRING MACHINE.

APPLICATION FILED FEB. 1, 1905.

3 SHEETS—SHEET 1.

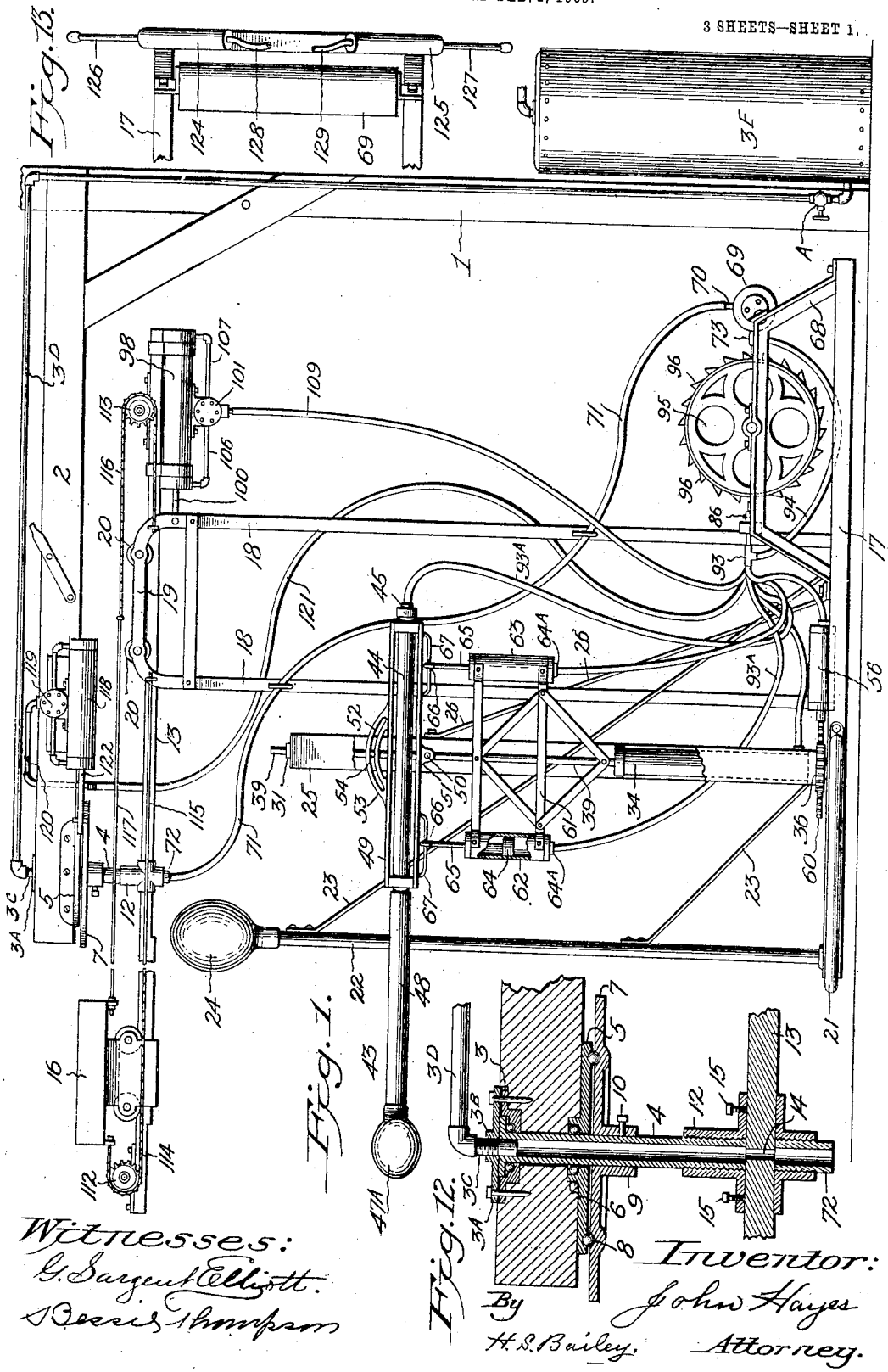

Fig. 1.

Fig. 12.

Witnesses:
G. Sargent Elliott.
Bessie Thompson

Inventor:
John Hayes
By H. B. Bailey. Attorney.

No. 805,543. PATENTED NOV. 28, 1905.

J. HAYES.

SPARRING MACHINE.

APPLICATION FILED FEB. 1, 1905.

3 SHEETS—SHEET 2.

Fig. 9.

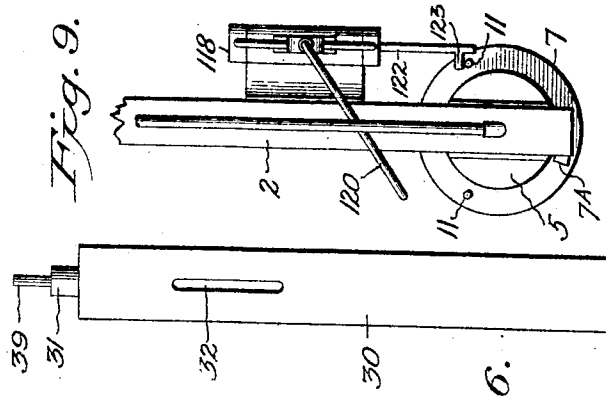

Fig. 10.

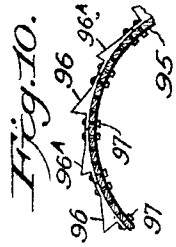

Fig. 6.

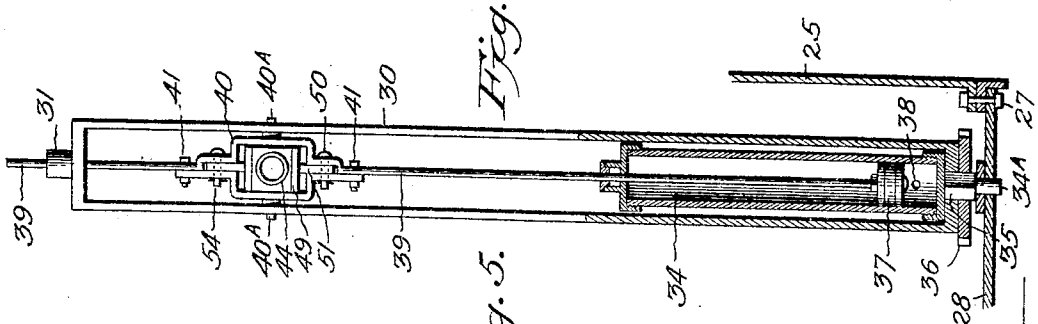

Fig. 5.

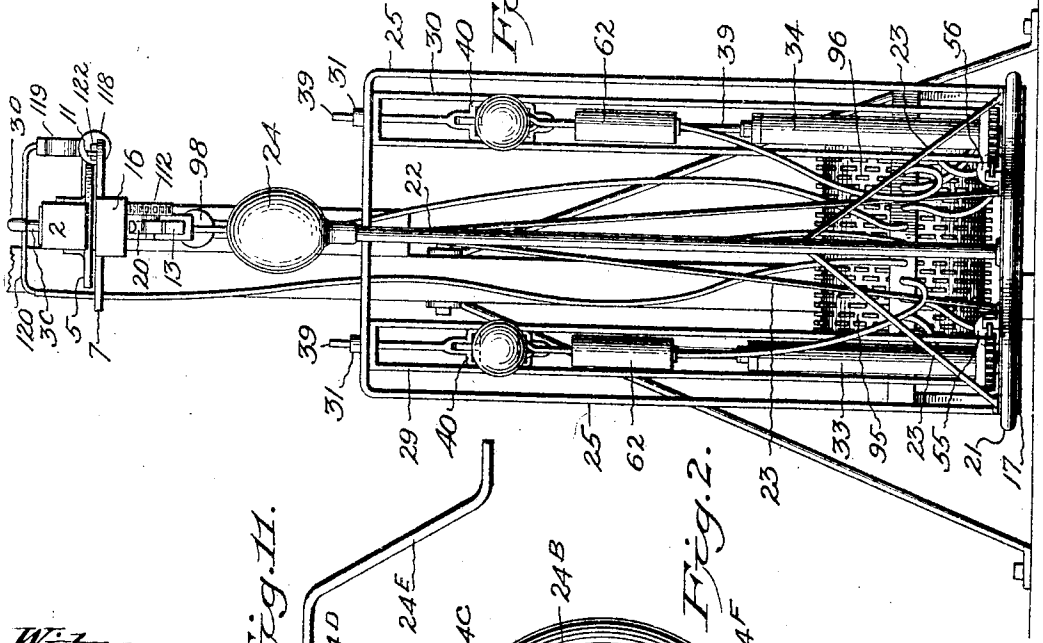

Fig. 11.

Fig. 2.

Witnesses:
G. Sargent Elliott.
Bevis Thompson

Inventor:
John Hayes
By H. S. Bailey. Attorney.

No. 805,543. PATENTED NOV. 28, 1905.

J. HAYES.

SPARRING MACHINE.

APPLICATION FILED FEB. 1, 1905.

3 SHEETS—SHEET 3.

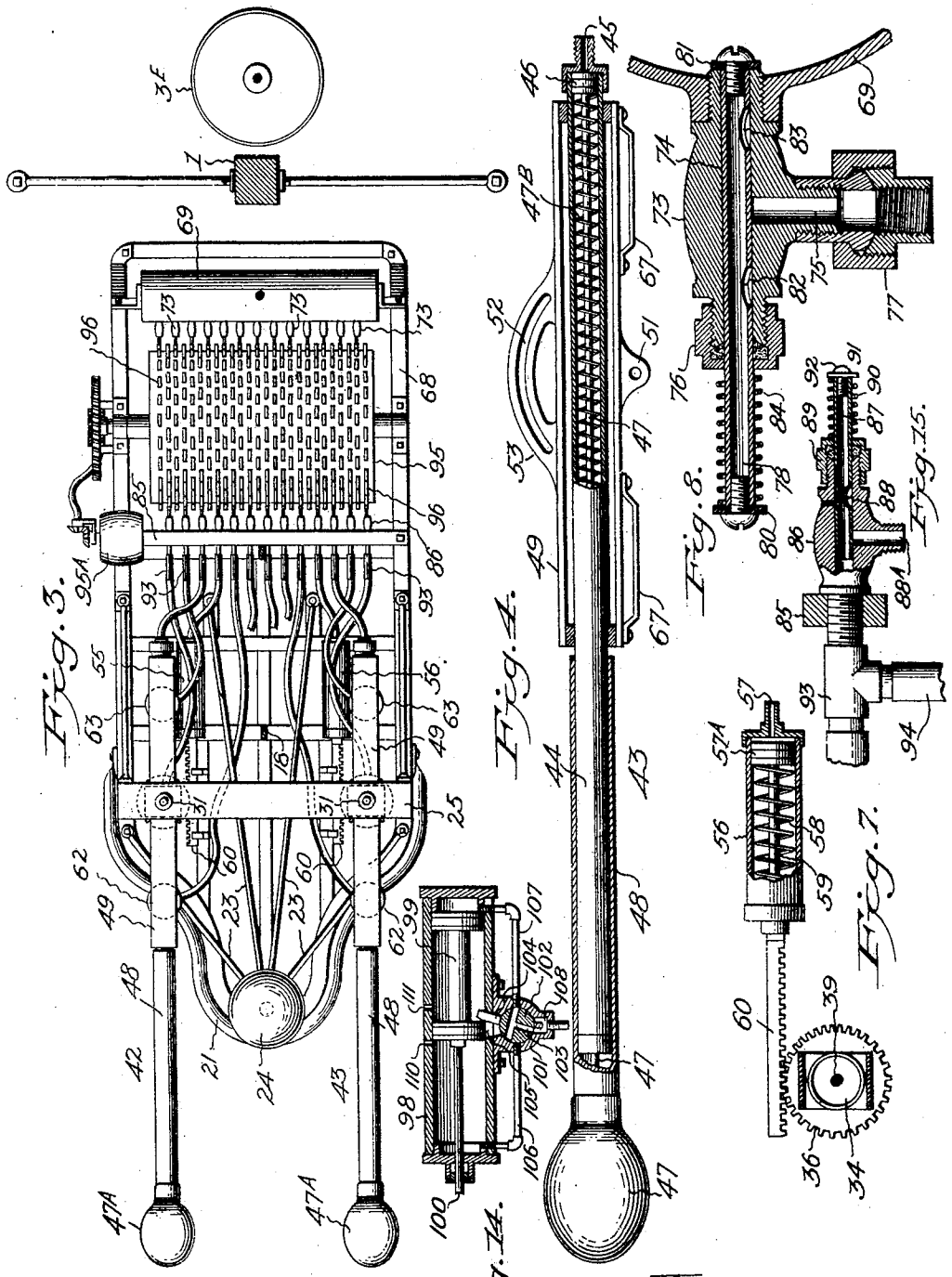

Fig. 3.

Fig. 4.

Fig. 8.

Fig. 15.

Fig. 7.

Fig. 14.

Witnesses:
G. Sargent Elliott.
Bessie Thompson

Inventor:
John Hayes
By H. S. Bailey. Attorney.

UNITED STATES PATENT OFFICE.

JOHN HAYES, OF DENVER, COLORADO.

SPARRING-MACHINE.

No. 805,543. Specification of Letters Patent. Patented Nov. 28, 1905.

Application filed February 1, 1905. Serial No. 243,721.

To all whom it may concern:

Be it known that I, JOHN HAYES, a citizen of the United States of America, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Sparring-Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

My invention relates to apparatus for physical training, and particularly to an improved boxing-machine.

The objects of the invention are, first, to provide a suspended platform which is capable of a variety of horizontal movements and which carries a pair of blow-delivering arms and a dummy for receiving blows, the said arms and platform being operated by a suitable fluid under pressure which is delivered to the machine from a storage-tank, said fluid being controlled by suitable valves which are operated by a toothed drum in such a manner as to permit the fluid to act upon an operating piston or pistons at a predetermined time and to exhaust from said piston or pistons at a predetermined time, said valves and drum also being carried by the suspended platform; second, to provide a machine of the character specified comprising a light suspended platform which is capable of a variety of horizontal movements and which carries a blow-receiving dummy and a pair of striking-arms which are adapted to deliver blows in a variety of directions and from different vertical positions, said arms and platform being operated, preferably, by compressed air, which is conveyed to operating-cylinders having pistons which effect the aforesaid movements of the arms and platform at predetermined periods, the entrance and exhaust of the air being controlled by suitable valves, which are operated by a toothed drum, the teeth of which may be arranged in such a manner as to operate a number of valves simultaneously or in rapid succession, so as to deliver the compressed air to a series of the operating-cylinders and thus effect a combination of movements of the platform and blows from the arms, the said combination of movements and blows being varied as the drum revolves; third, to provide a suspended counterbalanced platform carrying a blow-receiving dummy and a pair of striking-arms, said platform being arranged to counterfeit the backward, forward, and circling movement of a person while boxing, the arms at the same time being arranged to deliver horizontal blows or under and upper cut blows or inward and outward swinging blows, the movements of the platform and arms being similar to those employed in boxing, thus enabling the person exercising with the said machine to acquire the art of delivering and avoiding blows as well as of stepping backward or from side to side to avoid the forward or the swinging movement of the machine, the said movements and blows being effected, preferably, by compressed air, which may be so controlled as to regulate the force of the blows delivered by the arms as well as the rapidity of the movement of the platform.

With these and other objects in view the invention consists in the novel arrangements and construction of parts hereinafter described, and illustrated in the accompanying drawings, it being understood that various modifications in the form and details of the machine may be employed without departing from the spirit of the invention.

In the accompanying drawings, Figure 1 is a side elevation, partly in section, of the improved sparring-machine, the same being supported upon a horizontal track which is pivoted to a suitable supporting structure. Fig. 2 is a front elevation of the machine. Fig. 3 is a plan view thereof, the horizontal member of the supporting structure being omitted. Fig. 4 is a side elevation, partly in section, of one of the striking-arms and parts connected therewith, showing the spring by which the arm proper is returned to its normal position after delivering a blow. Fig. 5 is a front elevation, partly in section, of one of the rotatable supports for one of the striking-arms and for a cylinder having a piston and rod, which rod carries the said striking-arms. Fig. 6 is a side elevation of the rotatable support shown in Fig. 5. Fig. 7 is a sectional plan view of the rotatable support, the pinion at its lower end, and the rack and cylinder by which the support is rotated. Fig. 8 is a sectional view of one of the valves which admit the air under pressure to the several operating-cylinders. Fig. 9 is a plan view of the forward end of the horizontal member of the supporting structure, showing the mechanism by which the machine is swung upon its pivot. Fig. 10 is a sectional view of a fragment of the air-valve-operating drum,

showing teeth of different height secured thereto. Fig. 11 is a side elevation of a head and body blow receiving-dummy which can be used in place of the dummy shown in Figs. 1 and 2. Fig. 12 is a vertical sectional view showing the manner in which the machine is pivotally suspended from the supporting structure and the arrangement of ball-bearings which enable the machine to be quickly and easily turned. Fig. 13 is a plan view showing a portion of the rear end of the platform of the machine and illustrating another manner of turning the machine. Fig. 14 is a vertical longitudinal sectional view through one of a pair of cylinders which are employed to effect the forward and backward and swinging movements of the machine, and Fig. 15 is a sectional view, slightly reduced, of one of the air-exhaust valves.

Referring to the accompanying drawings, the numeral 1 indicates an upright, to which is secured a horizontal arm 2, and this upright and arm constitute the supporting structure for my improved sparring-machine, said structure being strongly braced, so as to withstand vertical and lateral strain, due to the weight and variable movements of the machine. The upper face of the forward end of the arm 2 is provided with a suitable ball-race 3, and upon the balls in said race rests the flanged end of a pipe 4, which extends through the arm 2 and a suitable distance below the same, and to the under side of the arm 2 is secured a plate 5, having a central opening through which the pipe 4 passes and around which a ball-race 6 is formed, having balls which receive the lateral thrust of the pipe. A plate 7 of greater diameter than the plate 5 is secured to the pipe in proximity to the plate 5. This plate is provided with a ball-race 8, having balls which bear against the under side of the plate 5 and is formed with a hub 9, through which a set-screw 10 passes and engages the pipe 4, thus securing the plate to the pipe. Pins 11 project from the upper side of the plate 7, the object of which will hereinafter appear. The pipe 4 forms a pivotal support for the entire machine, and the bearings above described will permit the pipe to turn freely, as the amount of friction is thereby reduced to a minimum. The lower end of the pipe 4 is threaded, and a cross 12 is screwed thereon. This cross supports a horizontal bar or track 13, which passes through the horizontal member of the cross and which is provided with a vertical aperture 14, which registers with the bore of the pipe. This track is secured within the cross by set-screws 15. The ball-race 3 at the upper end of the pipe 4 is covered by a plate 3^A, having an interiorly-threaded hub 3^B, into which is screwed a nipple 3^C, the lower end of which is smooth and extends a short distance into the upper end of the pipe 4. This nipple is provided with an elbow into which one end of an air-supply pipe 3^D is screwed, the other end of which connects with a storage-tank 3^E.

The track 13 carries at its forward end a counterbalancing-weight 16, and from its rear end is suspended a frame or platform 17, which carries the operating mechanism of the improved sparring-machine. The platform is provided with uprights 18, which are connected by a horizontal member 19 at their upper ends. The member 19 is provided with rollers 20, which ride upon the track 13, and thus allow the machine to be moved back and forth, the platform 17 being positioned a slight distance above the floor. The mechanism for moving the platform back and forth for revolving the same and for operating the counterbalancing-weight will be hereinafter fully set forth.

The platform 17 comprises a metal frame having thin metal cross-bars at points where it is desired to secure the several parts of the machine, as well as the brace-rods, the object being to have the platform as light and at the same time as strong as possible. The forward end of the platform is reduced in width, as clearly shown in Fig. 3, and around this reduced end is secured a rubber tube 21, which is preferably inflated with air to form a cushion which will prevent injury to the ankles of the person exercising with the said machine. Upon the forward end of the platform is a post or upright 22, which is braced by rods 23 and which preferably consists of a piece of light tubing which is firmly secured to the platform at its lower end, while its upper end carries either a stuffed or an inflated head 24, as may best meet the requirements, and this head constitutes a dummy which receives the blows of the person exercising. At a suitable distance in rear of the dummy is secured a rectangular metal frame 25, which is of the same width as the platform and about as high as the shoulders of a man of average height. This frame is suitably braced by rods 26, and the lower ends of its side members are secured to the platform by bolts 27, which also secure a cross-bar 28, which extends from one side of the platform to the other. (See Fig. 5.) This cross-bar supports the lower ends of a pair of narrow vertically-disposed rotatable frames 29 and 30, which are formed at their upper ends with hubs 31, that extend through circular openings in the top of the frame 25. Each of the frames 29 and 30 comprises side members which are provided with vertical slots 32 near their upper ends and which are connected at top and bottom by short horizontal members. These frames carry vertical cylinders 33 and 34, the lower heads of which have integral projections 34^A, which are squared at 35, as shown in Fig. 5. These squared portions 35 pass through corresponding openings in the bottoms of the frames and through pinions 36, which abut

against the lower ends of the frames, and the ends of the projections 34[A] beyond the squared portions are round and of less diameter than the squared portions and pass through openings in the cross-bar 28. Thus when the pinions are turned the frames and cylinders will move in unison therewith.

The cylinders 33 and 34 are provided with pistons 37, which are normally positioned a short distance above the bottoms of the cylinders, and air-inlets 38 are formed in the cylinders just below the pistons. The pistons are provided with rods 39, which extend through the upper cylinder-heads and up through the hubs 31 of the frames 29 and 30. The rods 39 near their upper ends are each formed into a rectangular frame-like support 40, which, as shown in Fig. 2, may be accomplished by bending the rod so as to form one-half of the support and then welding upon the rod a piece of corresponding bend, or, as shown in Fig. 5, by bending the rod as in Fig. 2 and then bolting to the rod by bolts 41 a piece which is bent to correspond to the bend in the rod. The rods 39 are continued above the rectangular supports 40 and pass up through the hubs 31, as previously stated. Within the supports 40 are secured a pair of striking-arms 42 and 43, so as to have a rocking movement therein. These arms comprise operating-cylinders 44, which are provided with inlets 45 at their rear ends, pistons 46, to which are attached rods 47, that extend out through the forward cylinder-heads and are provided with padded or inflated mitts 47[A], helical springs 47[B], which are interposed between the pistons and front cylinder-heads, and cylinders 48, which telescope upon the forward half of the cylinders 44 and are attached at their forward end to the rods 47 and move with them. The cylinders 48 steady the movement of the rods 47 and prevent their being bent, as will presently more fully appear. The supports 40 of the piston-rods 39 are provided with laterally-extending lugs 40[A], which pass through the slots 32 of the frames 29 and 30. These lugs normally lie at the bottom of the slots and prevent the pistons 37 of the cylinders 33 and 34 from closing the inlets 38 in said cylinders. As the piston-rods rise the lugs will also rise in the slots 32 and will serve to maintain the vertical position of the pistons. The rear ends of the cylinders 44 are secured within rock-frames 49, which are held in the support 40 by pivot-pins 50, which pass through apertured lugs 51, which are formed centrally of the under side of the rock-frames. With the pins 50 as centers radial slots 52 are formed in projections 53 upon the upper sides of the rock-frames, and pins 54 pass through the supports 40 and through the radial slots 52 and serve to steady the movement of the rock-frames and arms. The arms operate independently and are designed to have a swinging movement from right to left on a horizontal plane, an up and down rocking movement on the pivots 50, a forward striking movement, and an upward vertical movement. These movements are designed to be effected in rapid succession or in combinations of movements which are effected sumultaneously, such as a swinging, a rocking, and a striking movement, and I accomplish these various movements by cylinders which are supplied with compressed air at predetermined periods and which are provided with pistons having rods which form part of or are connected with the striking-arms and movable supports thereof, so as to effect these movements in the manner which I will now proceed to describe, beginning with the horizontal swinging movement of the arms.

Adjacent to the lower ends of the rotatable frames 29 and 30 are secured cylinders 55 and 56, having inlets 57 at their rear ends. These cylinders are provided with pistons 57[A], between which and the front cylinder-heads are interposed helical springs 58, and rods 59 extend from the pistons through the front cylinder-heads and beyond the heads. These rods are formed with or have secured thereto racks 60, which engage the pinions 36 at the lower ends of the rotatable frames 29 and 30. Thus when air under pressure is admitted to the cylinders 55 and 56 the pistons 57[A] will be thrown forward and will compress the springs 58. The racks 60 will turn the pinions, which will rotate the frames 29 and 30, causing the arms to swing. When the air exhausts from the cylinders, the spring 58 will force the pistons to the rear ends of the cylinders, and the racks, which are carried thereby, will return the frames and arms to their normal positions. When it is desired to raise the arms vertically, air under pressure is admitted to the cylinders 33 and 34 through the inlets 38 and the pistons 37 are moved up, carrying the piston-rods 39, which in turn carry the arms 42 and 43 and the rock-frames 49, to which said arms are attached. When the air exhausts from the cylinders 33 and 34, the arms drop by gravity to their normal position. The arms are rocked either up or down in the following manner: Upon the piston-rods 39 are secured suitable brackets or supports 61, which extend parallel with the rock-frames 49, and upon the outer ends of these brackets are secured cylinders 62 and 63, having pistons 64, which are normally positioned midway between the cylinder-heads and inlets 64[A] in the lower cylinder-heads. The rods 65 of these pistons have eyes 66 formed on their upper ends, which encircle slide-rods 67 upon the under side of the rock-frames 49. Now to tilt the arms up air under pressure is admitted to the cylinders 62, and the pistons 64 are forced up and their rods 65, through their connection with the forward slide-rods 67 upon the under side of the rock-frames, tilt

the said frames on their pivot-pins 50, and at the same time the pistons in the cylinders 63 will be moved to the bottoms of the said cylinders, the arms being returned to their normal or horizontal positions, when the air exhausts from the cylinders 62. The arms are given a downward tilt by admitting air to the cylinders 63, as will be apparent, and as the arms move in the arc of a circle and the piston-rods 65 move vertically the difference in direction of movement at the point of their connection is accommodated by the sliding connection between the piston-rods 65 and the slide-rods 67. The arms 42 and 43 are operated to deliver straight blows by admitting air under pressure to the cylinders 44, which forces the pistons 46 and rods 47 forward, the spring 47^B being thereby compressed between the piston 46 and the front cylinder-heads. As the rods 47 shoot forward the cylinders or sleeves 48, which are attached to said rods, will slide on the forward portions of the cylinders 44 and will serve both to steady the movement of the rods and to prevent their being bent by a blow from the person exercising.

The manner of controlling and delivering air under pressure to the various operating-cylinders at predetermined periods and of exhausting the same at predetermined periods is accomplished by mechanism which I will now proceed to describe.

Upon the rear end of the platform 17 is bolted a pair of standards 68, upon the rear ends of which is bolted an auxiliary air-reservoir 69, which is horizontally disposed. This reservoir is tapped to receive a nipple 70, to which one end of a suitable air-hose is attached, and the other end of this hose is attached to a nipple 72, which is screwed into the lower end of the cross 12 upon the pipe 4 at the outer end of the horizontal member 2 of the supporting structure. Thus air under pressure passes from the tank 3^E through pipe 3^D, nipple 3^C, pipe 4, aperture 14 in track 13, nipple 72, and hose 71 to the auxiliary reservoir 69, and this reservoir is provided with a number of air-outlet valves 73, corresponding with the number of operating-cylinders. These valves are similar in construction and are arranged in line on a horizontal plane along the front portion of the reservoir. Each of the valves 73 comprises a body portion, having a horizontal bore 74, which is intersected about centrally of its length by a vertical bore 75. The rear end of the valve is reduced and threaded, so that it can be screwed into the shell of the reservoir, and the forward end is provided with a suitable stuffing-box 76. The valve is practically in the form of a T, and the extremity of the vertical portion is threaded to receive a suitable pipe or hose coupler 77. A tube 78 is fitted into the bore 74, the forward end of which projects a suitable distance beyond the stuffing-box 76. This tube is closed at both ends in any preferred way, but, as illustrated, by screws 79, between the ends of which and the ends of the tube are interposed flexible washers 80 and 81. The tube is provided within the bore 74 with holes 82 and 83, and a helical expansion-spring 84 encircles the forward end of the tube between the stuffing-box 76 and washer 80 and normally holds the tube in the projected position shown in Fig. 8, so as to prevent the escape of air from the reservoir; but when the tube is forced in, as will presently be shown, the hole 82 will register with the bore 75, while the hole 83 will communicate with the reservoir 69 and permit the air to escape through the bore 75.

Upon the forward ends of the standards 68 is secured a bar 85, having a row of horizontal threaded apertures, into which are screwed exhaust-valves 86. The valves face the valves 73 and are the same in number, but are positioned to alternate with the said valves 73. In construction they are nearly like the air-escape valves, each having a sliding tube 87 in its horizontal bore, which, however, is open at its rear end, and a hole 88, which registers with the vertical bore 88^A of the valve when the tube is pressed in. Stuffing-boxes 89 are provided at the forward end of the valves, and springs 90 hold the valves normally in a closed position, being interposed between the stuffing-boxes and washers 91, which are held upon the outer ends of the tubes by screws 92, which also serve to seal the end of the tube. The tubes 87 may be retained within the bores of the valves by screws 87^A, which pass through the body of the valves and engage slots 87^B in the tubes. To the threaded ends of the valves 86, which extend through the bar 85, are screwed T's 93, to the horizontal bores of which are attached sections of air-hose 93^A, each of which connects at its opposite end with one of the operating-cylinders, as will be clearly seen by reference to Fig. 1. To the vertical bore of each T is attached a section of hose 94, the other end of which connects with the coupler of the opposite air-escape valve 73. Thus when one of the air-valves is opened the air from the auxiliary reservoir passes out through the hose 94, attached thereto, and through a T 93 to the hose connecting with an operating-cylinder, and when the tube 87 of the exhaust-valve connecting with this T is pressed in the hole 88 of said tube will register with the bore 88^A of the valve, which bore opens to the atmosphere, and the air will exhaust through said bore.

It is designed that the valves 73 and 86 shall be operated in combinations, so as to effect a variety of movements of the platform 17 and of the arms 42 and 43 simultaneously, and I accomplish this in the following manner: Upon the standards 68 and midway between the valves 73 and 86 is journaled a drum 95, having circumferential rows of

teeth 96, which extend in individual circles or bands around the drum, said rows of teeth alternately registering with the valves 73 and 86. The teeth are secured to the drum by bolts 97, which pass through holes drilled in the drum, as shown in Fig. 10, and the holes are drilled close together, so as to accommodate a great number of teeth and so that the position of a tooth or of the teeth in one row may be varied with respect to the position of a tooth or of the teeth in any other or an adjoining row, said teeth being adapted to contact with and push in the tubes 74 and 87 as the drum revolves. Thus by setting the teeth to open a combination of valves either simultaneously or in rapid succession and so as to vary the combinations and the successive openings an ever-changing variety of movements and blows is accomplished by the machine, which will compel the person exercising therewith to be constantly on his guard in order to escape the blows of the striking arms or the forward rush or swinging movement of the platform. By reference to Fig. 10 it will be noted that some of the teeth are much shorter than others, and the short teeth 96^A occur in the rows of teeth which operate the valve-tubes 78 of the valves 73. These short teeth will move the tubes only far enough to partially open the valves, which will thus admit only a small quantity of air to the operating-cylinders or a quantity insufficient to accomplish a full stroke or movement, as the case may be, of the mechanism connected therewith, and this partial movement or "feint" is intended to accomplish the same purpose as would a similar movement by a human adversary.

The platform 17 is moved backward and forward in the following manner: To the rear end of the track 13 is secured a cylinder 98, having a double-headed piston 99, the rod 100 of which is connected at its forward end to the rear upright 18 of the platform. The piston 99 is spool-shaped, as shown in Fig. 14, and substantially half the length of the cylinder. To the under side of the cylinder and centrally located thereon is a casing 101, in which is housed an oscillating disk valve 102, having a T-shaped port or inlet 103 and a stem 104, which extends through a slot 105 and projects into the cylinder 98 between the heads of the piston. Pipes 106 and 107 extend from the sides of the casing 101 and connect with nipples which are screwed into the extreme ends of the cylinder. A two-way port 108 is formed in the bottom of the casing 101, and a hose 109 connects this port with one of the T's 93. Exhaust-ports 110 and 111 are formed in the cylinder, and as the piston moves back and forth its heads will alternately strike the valve-stem 104 and oscillate the valve, so as to admit air alternately to the front and rear ends of the cylinder, the air exhausting from one or the other of the ports at each stroke of the piston. In Fig. 14 the valve 102 is in position to admit air to the rear end of the cylinder, and as the piston is moved forward the platform will travel forward on the track 13 and remain in this position until air is admitted to the forward end of the cylinder, when the platform will be restored to its former position. It will be understood that as the air exhausts from this cylinder direct and not through one of the exhaust-valves 86 both movements of the piston 99 are accomplished by a single row of teeth 96, operating the tube of one of the valves 73. When the platform 17 and counterbalancing-weight 16 are in their normal positions, the weight upon each side of the pivotal point of the track is equalized; but the equilibrium would be destroyed when the platform is moved were it not for a corresponding movement of the weight 16 either toward or away from the pivotal point of the track, and this movement of the weight is accomplished in the following way: Adjacent to the ends of the track 13 are mounted sprocket-wheels 112 and 113, and upon the forward end of the weight 16 is secured one end of a section of sprocket-chain 114, which passes around the wheel 112, and is secured at its opposite end to a rod 115, which is attached to the forward platform-standard 18. A section of chain 116 is secured to the rear standard and passes up around the sprocket-wheel 113 and is connected to one end of a rod 117, which is attached to the rear end of the weight 16. Thus as the platform moves forward the weight will be drawn rearward a corresponding distance, and as the platform moves rearward the weight will be drawn forward, and in this way the weight upon each side of the pivotal point of the track is equalized.

It is apparent that the rods 115 and 117 could be dispensed with and chains of greater length employed or even a single endless chain, which would be secured to the weight and to the standards; but the construction illustrated is preferable, in that it does away with rattling and with the swinging motion which would be inevitable in a chain of such length and enables the tension upon the chain-sections to be easily maintained, and thus prevent any lost motion.

The track 13, with the platform and weight, is swung in the arc of a circle by an operating-cylinder 118, in all respects similar to the cylinder 98. For the sake of convenience, however, this cylinder is turned to bring its disk-valve casing 119 uppermost, and the cylinder is firmly secured to one side of the beam 2 of the supporting structure adjacent to the plate 7 upon the pipe 4. An air-supply pipe 120 extends from the inlet of the casing 119 above and to the opposite side of the beam 2, and a hose 121 connects said pipe with one of the T's 93. The upper end of this hose, being near the pivotal point of the track and to

one side of the same, will not be in the way of the track in one direction of its movement and will be moved only a slight distance to one side when the track swings in the opposite direction. The piston-rod 122 of the cylinder 118 has a horizontal projection 123 near its forward end, which is adapted to engage the pins 11 on the plate 7. When the piston-rod moves forward, this projection engages one of the pins 11 and swings the platform toward the right, and as the plate 7 revolves the other pin will come into position to be engaged by the projection as the piston moves rearward, and as it thus pulls upon the said pin the platform will be caused to assume its normal position. In Fig. 13 I have illustrated another way of swinging the platform, and in this modification I employ a pair of cylinders 124 and 125, which are secured upon the rear end of the platform 17, one at each side thereof. These cylinders extend at right angles to the length of the platform and in opposite directions and are inclined toward the floor. These piston-rods 126 and 127 are tipped with rubber, and as air is admitted to one or the other of the cylinders through the pipes 128 or 129 the rods will shoot out and strike the floor, and by successive strokes of this kind with a diminished supply of air the platform may be caused to move around intermittently, or by using the full force of the air it may be swung to its full limit. In order to relieve the platform-operating cylinder of strain when the platform reaches the limit of its movement in either direction, the plate 7 is provided with a stop 7^A, which contacts with the side of the beam 2, as shown in Fig. 9. In practice the track 13 will be suitably braced to prevent sagging or lateral bending.

In Fig. 11 I have illustrated a form of dummy which may be used instead of the one shown in Figs. 1 and 2, which is adapted to receive head-blows only. The dummy shown in Fig. 11 comprises a head 24^A and a body 24^B, which are connected by a stout coil-spring 24^C. The head is further connected by a coil-spring 24^D with a bracket 24^E, which is firmly secured to the top of the rectangular frame 25. A coil-spring 24^F depends from the bottom of the body, and any suitable means, such as a rod, may be attached to this spring and to the platform. This form of dummy admits of both head and body blows, and the springs permit a yielding movement as the blows are delivered.

The operation of the machine is as follows: Compressed air is delivered to the tank 3^B and is supplied to the auxiliary reservoir 69 by pipe 3^D and hose 71. The drum 95 is revolved by a suitable motor 95^A, and the teeth engage and push in the tubes of the valves 73 and 86, admitting air to certain of the operating-cylinders and exhausting it from others, either simultaneously or successively, and the arms 42 and 43 operate in the manner before described, while the platform is at intervals rushed forward or swung in the arc of a circle or given both movements simultaneously. Combinations of movements are given the arms independently of each other—such as an upward swinging, tilting, and striking movement—and this is accomplished by setting the drum-teeth to simultaneously operate the valves, admitting air to the cylinders which effect the movements, or their movements may follow each other successively, while the movement of the other arm may be altogether different. The opponent stands in front of the machine and delivers blows to the dummy, endeavoring meantime to dodge or ward off the striking and swinging blows of the arms and to be prepared for the rush or swing of the platform. The arms may be padded, if desired, to avoid injury, and the inflated rubber tube 21 upon the end of the platform will prevent injury to the ankles. A valve A may be placed in the pipe 3^D to control the supply of air to the auxiliary reservoir. The lugs 40^A, which slide in the slots 32 of the rotatable frames 29 and 30, will not only steady the movement of the pistons 39, but will prevent them from being sprung or bent when a blow is delivered to the opponent.

The machine herein described is admirably adapted to the training of persons in the art of sparring, as all the movements employed by the professional boxer are produced as nearly as can be accomplished by a mere automaton, and to the professional man in training for a contest it affords means for exercising without the liability of injury.

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

1. In a sparring-machine, a horizontally-movable, suspended platform; a dummy on the forward end of said platform; arms adjacent to said dummy supported in vertical, rotatable frames, which arms are capable of a variety of movements, and means carried by said platform for effecting the movement of said arms and frames and platform.

2. In a sparring-machine, a suspended platform capable of a back-and-forth movement, and a right-and-left movement in the arc of a circle; a dummy on the forward end of said platform; variably-movable arms adjacent to the sides of said dummy; vertical, rotatable frames which support said arms; and means for operating said platform, frames and arms independently of each other.

3. In a sparring-machine, a variably-movable, suspended platform, a dummy on the forward end of said platform; an upright frame attached to said platform, rear of said dummy; a pair of rotatable, upright frames, which are pivoted to said frame and platform; variably-movable arms carried by said rotatable frames; and means carried by said platform for effecting the movement of the rotatable frames,

the arms and the platform, independently of each other.

4. In a sparring-machine, a variably-movable, suspended platform, having a dummy on its forward end; an upright frame attached to said platform, rear of said dummy; a pair of rotatable frames bearing in said upright frame and said platform; cylinders carried by the rotatable frames, having piston-rods which extend through and beyond the top of said frames; horizontal cylinders pivoted to said piston-rods having piston-arms which extend beyond the dummy on each side; vertical cylinders carried by said piston-rod, having piston-rods which attach near the ends of the horizontal cylinder; pinions upon the lower ends of the rotatable frames; horizontal cylinders adjacent to said pinions, having piston-rods, the forward ends of which are in the form of racks, which engage said pinions; means for admitting air under pressure to said cylinders independently and at predetermined periods, and means for moving said platform.

5. In a sparring-machine, a striking-arm comprising a horizontal cylinder, having a piston, and a rod secured to said piston which extends beyond the cylinder and carries a padded mitt at its end; means for admitting air under pressure at the end of said cylinder to shoot said piston and rod forward, and means for returning said piston and rod when the air exhausts from said cylinder.

6. In a sparring-machine, a striking-arm comprising a cylinder having an inlet at one end; a piston in said cylinder, having a rod which extends beyond the cylinder and carries a padded mitt; a helical expansion-spring interposed between the piston and the forward end of the cylinder, and means for admitting air under pressure into the cylinder.

7. In a sparring-machine, a striking-arm comprising a horizontally-disposed cylinder, having an inlet at one end; a piston in said cylinder having a rod which extends beyond the cylinder and is provided at its end with a padded mitt, a sleeve having a sliding movement on the forward portion of the cylinder, and which is secured at its forward end to the said rod, and a helical expansion-spring interposed between said piston and the forward end of the cylinder.

8. In a sparring-machine, the combination with an upright, rotatable frame having a vertically-disposed cylinder, and a piston in said cylinder having a rod which extends through and beyond the top of said frame, of a rock-frame pivoted to said rod; a horizontally-disposed cylinder secured in said rock-frame, having an inlet at one end, and a piston having a rod which extends beyond the cylinder and is provided with a padded mitt; a sleeve attached to said rod which telescopes upon the forward portion of said cylinder; an expansive spring interposed between the piston and the forward end of the cylinder, and independent means for rotating said upright frame, for tilting said rock-frame, and for admitting air under pressure to said vertical and horizontal cylinders.

9. In a sparring-machine, the combination with an upright, rotatable frame having a vertically-disposed cylinder and a piston in said cylinder having a rod which extends through and beyond the top of said frame, of a rock-frame pivoted to said rod; a horizontally-disposed cylinder secured in said rock-frame, having an inlet at one end and a piston having a rod which extends beyond said cylinder and is provided with a padded mitt; a telescoping sleeve on the forward portion of said horizontal cylinder which is connected at its forward end to the said rod; an expansive spring interposed between said piston and the forward end of the cylinder; brackets secured to said vertical piston-rod below said rock-frame; upright cylinders at the ends of said brackets having pistons and rods which connect with the ends of said rock-frame; and means for rotating said upright frame and for admitting air under pressure to the various cylinders.

10. In a sparring-machine, the combination with an upright frame having a pinion at its lower end, and a cylinder adjacent to said pinion, having an inlet, a piston and a piston-rod, the outer end of which is in the form of a rack and engages said pinion, of an upright cylinder carried by said frame, having an inlet, a piston and a piston-rod which extends through the top of said frame; a rock-frame pivoted to said rod, carrying a horizontally-disposed cylinder having an inlet, a piston and a rod which extends beyond said piston and is provided at its end with a padded mitt; a sleeve attached to said rod which telescopes upon the forward portion of the said horizontal cylinder, and an expansive spring in said cylinder between the forward head thereof and the piston; upright cylinders secured to said vertical piston-rod, below the rock-frame, having inlets, pistons, and piston-rods, which engage slideways at the ends of the rock-frames, and means for admitting air into the said cylinders independently.

11. In a sparring-machine, the combination with an upright, rotatable, frame, having a vertical slot in each side member, of an upright cylinder having an inlet, a piston, and a piston-rod which extends through the upper end of said frame, said rod being formed into a yoke near its upper end; a rock-frame pivoted in said yoke, and carrying an extensible arm; lugs on the sides of said yoke which extend through the slots in said rotatable frame; compressed-air-operated cylinders which effect the movement of said rock-frame, an extensible arm, and means for independently admitting air to said cylinder.

12. In a sparring-machine, a supporting structure; a track pivotally suspended from said structure; a platform having uprights

carrying trolley-wheels which rest upon said track; a dummy on the forward end of said platform, variably-movable striking-arms at the sides of said dummy; and means for independently sliding the platform upon the track; for turning the same in the arc of a circle, and for operating said arms.

13. In a sparring-machine, the combination with a supporting structure, of a track pivotally suspended therefrom; a platform having a dummy and variably-movable striking-arms, which has a back-and-forth movement on said track; means for moving said platform on said track; means for turning said track in the arc of a circle, and means for equalizing the weight on each side of the pivotal point of the track when the platform is moved.

14. In a sparring-machine, the combination with a supporting structure of a track pivotally suspended therefrom; a platform having uprights carrying trolley-wheels which rest on said track; a counterbalancing-weight movably mounted on the opposite end of the track; a sprocket-wheel at each end of said track; chains which pass around the front and rear sprocket-wheels and which connect with the weight and with the uprights of the platform; means for moving said platform on the track, said movement causing the weight to move a corresponding distance in the opposite direction, and means for moving said track in the arc of a circle.

15. In a sparring-machine, the combination with a supporting structure, of a vertically-disposed tube, revolubly mounted in said structure; a horizontal track secured at the end of said tube; a platform suspended from said track and movable thereon; a weight on the opposite end of said track, and means connected with said weight and platform whereby they are caused to move in unison and in opposite directions; a plate secured to said vertical tube, having upright pins thereon; a cylinder secured to the supporting structure, having a piston and rod, said rod having a projection which engages said pins, and means for admitting air under pressure alternately in front of and to the rear of the piston of said cylinder, and a similarly-operating cylinder, secured to the rear end of the track, the piston-rod of which is connected with the suspending means of said platform, and means for admitting air under pressure thereto.

16. In a sparring-machine, a variably-movable, suspended platform; upright, rotatable frames carried thereby; vertically-disposed operating-cylinders carried by said frame, having pistons and rods, said rods having rock-frames pivoted thereto; operating-cylinders carried by said rock-frames, the pistons of which carry rods having padded mitts; operating piston-cylinders carried by said vertical rods, below the rock-frames, the rods of which have a sliding connection with the ends of the said frames; a compressed-air-receiving reservoir carried by said platform, having air-escape valves thereon; flexible tubes connecting said air-escape valves and said operating-cylinders; exhaust-valves in said tubes, means for opening both sets of said valves at predetermined periods, and a hose for connecting the reservoir, with a compressed-air storage-tank.

17. In a sparring-machine, the combination with a horizontal supporting-beam, having a ball-bearing adjacent to one end, of a flanged tube depending from said bearing and carrying a horizontal track at its lower end; a movable platform suspended from said track, having an air-receiving reservoir at one end, and rotatable supports carrying variably-movable and extensible arms at its other end; operating piston-cylinders connected with said arms and rotatable supports; air-escape valves in said reservoir, sections of hose connecting said valves and said operating-cylinders; valves in said hose which permit the air to escape therefrom; a hose connecting the lower end of said flanged tube and said reservoir; a pipe connecting the upper end of said tube with a source of compressed air, and a revolving drum located between the two sets of valves having teeth which operate said valve, to intermittently admit air into the operating-cylinders and to permit it to escape therefrom; said teeth being set to operate combinations of said valves successively or simultaneously.

18. In a sparring-machine, the combination with a variably-movable suspended platform, of an air-receiving reservoir thereon, connected with a source of compressed air; supply-valves in said reservoir having spring-controlled, sliding tubes, which control the opening of said valves; a blow-striking mechanism comprising rotatable frames supporting arms which are capable of a variety of vertical and horizontal movement; operating-cylinders having pistons and rods which connect with the frames and arms to effect their various movement; flexible tubes connecting said cylinders and said supply-valves; exhaust-valves in said tubes having spring-controlled sliding tubes, which control the opening of said valves, and a revolving drum located centrally between said supply and exhaust valves, having teeth which push said tubes to open said valves, said teeth being set to operate combinations of said valves simultaneously or successively.

19. In a sparring-machine, vertical, operating-cylinders having extended piston-rods; rock-frames attached to said piston-rods having cylindrical arms pivoted thereto; spring-controlled rods in said arms having padded mitts upon their extended ends; operating-cylinders attached to the vertical piston-rods having piston-rods which connect with the ends of the rock-frames; rotatable frames carrying said cylinders and arms having pinions on their lower ends; operating-cylinders hav-

ing piston-rods the ends of which are in the form of racks, which engage said pinions; an air-receiving reservoir connected with a source of compressed air; supply-valves in said reservoir, having sliding vent-openers; flexible tubes connecting said supply-valves and said operating-cylinders, having exhaust-valves provided with sliding vent-openers, and a revolving drum mounted between said supply and exhaust valves, having adjustable teeth which engage said vent-openers at predetermined periods, said teeth being set to open combinations of said valves simultaneously or successively.

20. In a sparring-machine, the combination with a blow-delivering mechanism, and a plurality of compressed-air-operated cylinders, which effect the movements of said mechanism, of means for admitting air to and exhausting it from said cylinders, comprising an air-receiving reservoir, connected with a source of compressed air, a row of valves in said reservoir having sliding, apertured, tubes which apertures communicate with the reservoir and with air-outlets in said valves when said tubes are pushed in; flexible pipes connecting said valve-outlets with said compressed-air-operated cylinders; exhaust-valves in said pipes having sliding, apertured tubes which permit the air to exhaust from said pipes when said tubes are pressed in, and a revolving drum, having adjustable teeth, which are adapted to engage said sliding tubes successively or in combinations simultaneously.

21. In a sparring-machine, the combination with a compressed-air-receiving reservoir, of valves threaded to said reservoir, having bores opening into said reservoir and outlet-passages intersecting said bores; spring-controlled sliding tubes in said bores, having closed ends, and apertures, which normally lie within the bores, the inner ends of said tubes normally closing the entrance to said reservoir, the apertures in said tubes being designed to register with the outlet and with the entrance to the reservoir, when the tubes are pressed in.

22. In a sparring-machine, the combination with a blow-striking mechanism, compressed-air-operated cylinders for operating said mechanism, and air-supply pipes attached to said cylinders, and with a source of compressed air, of exhaust-valves in said pipes having sliding tubes, which are apertured, within the valve, and open at the ends communicaing with the pipes; springs on said tubes for holding them in an extended position, and means for retaining them within the valve, said aperture in the tube registering with an outlet in said valve, when said tube is pressed in.

23. In a sparring-machine, the combination with a compressed-air-receiving reservoir, supply-valves in said reservoir, having sliding, vent-opening tubes, pipes leading from said supply-valves, and exhaust-valves in said pipes having sliding, vent-opening tubes, of a revolving drum located between said supply and exhaust valves, comprising a cylinder having circular rows of bolt-holes, which alternate with said supply and exhaust valves; and rows of teeth of varying heights which are adjustable in said bolt-holes, and which operate the tubes in said valves.

24. In a sparring-machine, a platform having a cushioning medium around its front end; arms supported on said platform having a vertical, a swinging, a tilting and a striking movement; compressed-air-operated cylinders, connected with said arms; an air-receiving reservoir on said platform, having supply-valves; tubes connecting said supply-valves and said cylinders; exhaust-valves in said tubes; a revolving drum for operating said valves to supply the air to, or exhaust it from the cylinders; a swinging track for supporting said platform; means for moving said platform back and forth on said track, comprising a cylinder, the piston-rod of which attaches to said trolley, and a tube connecting said cylinder and air-reservoir, and means for swinging said track.

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

JOHN HAYES.

Witnesses:
G. SARGENT ELLIOTT,
BESSIE THOMPSON.