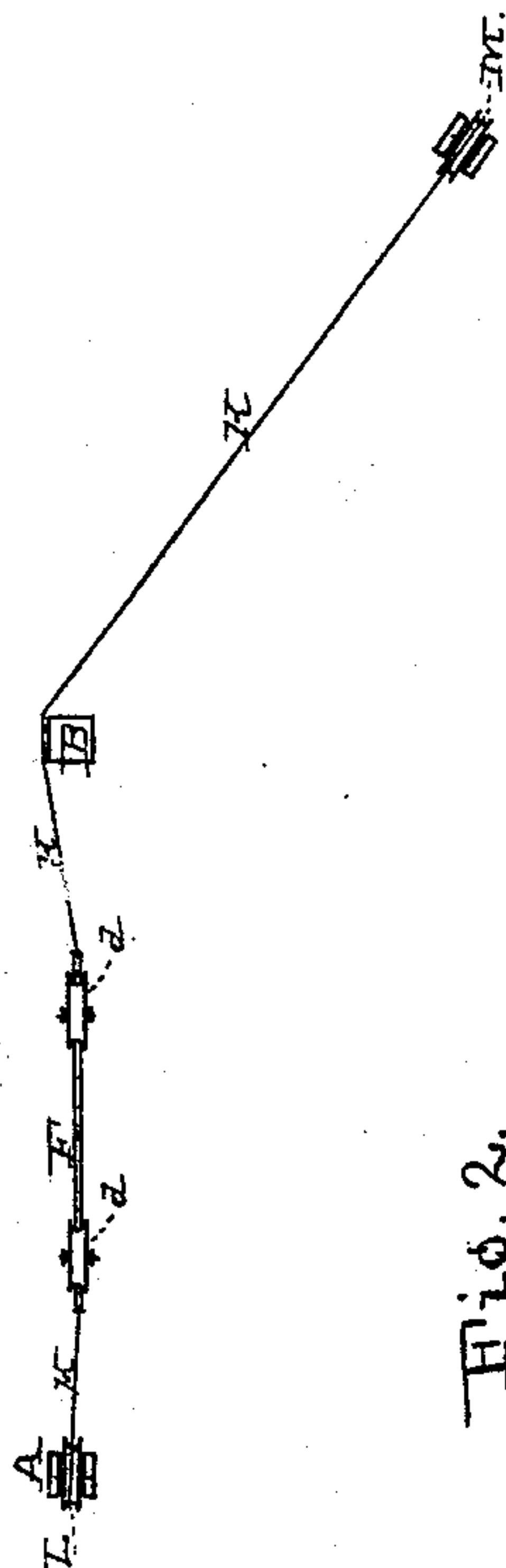
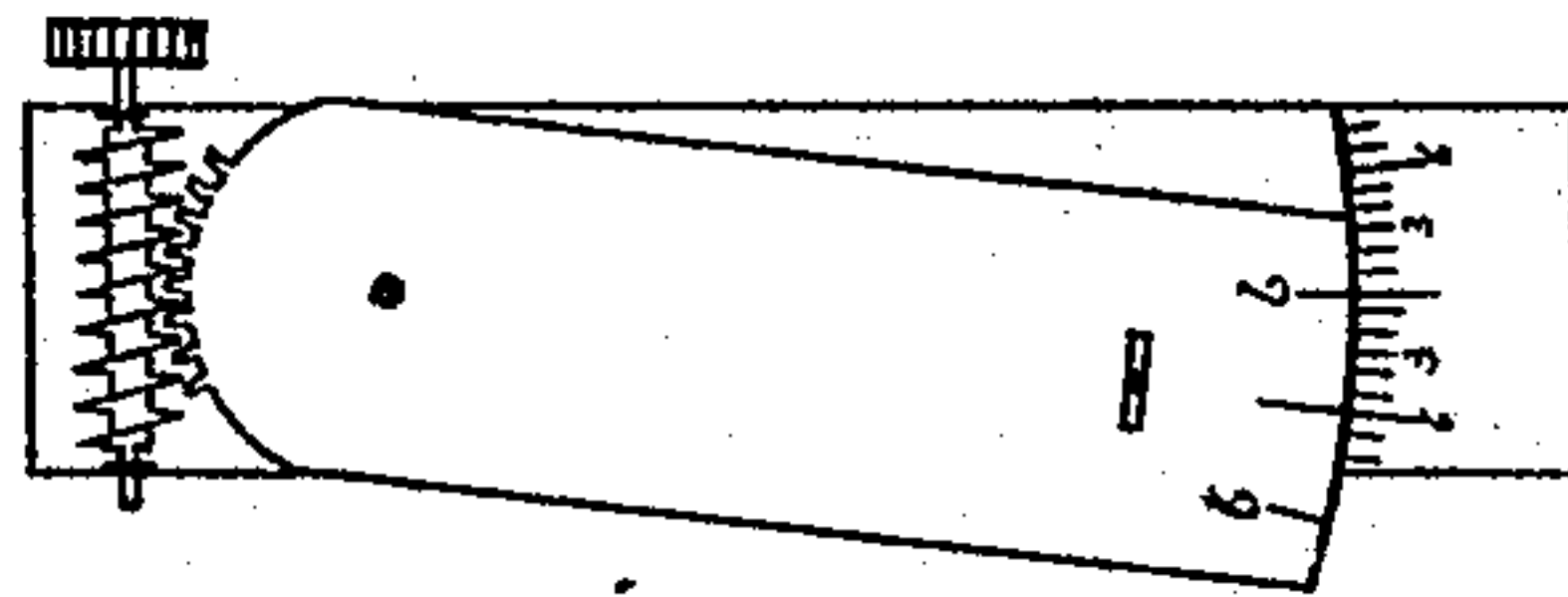
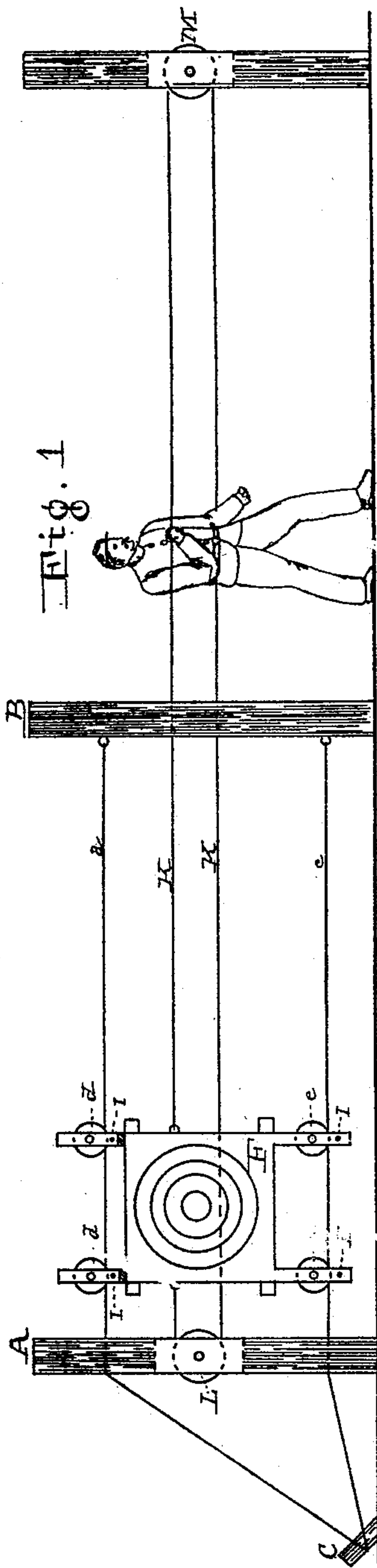


(No Model.)

J. M. RICE.
METHOD OF TARGET PRACTICE.

No. 495,371.

Patented Apr. 11, 1893.



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UNITED STATES PATENT OFFICE.

JAMES M. RICE, OF PEORIA, ILLINOIS.

METHOD OF TARGET PRACTICE.

SPECIFICATION forming part of Letters Patent No. 495,371, dated April 11, 1893.

Application filed November 6, 1891. Serial No. 411,045. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. RICE, a citizen of the United States, residing in the city and county of Peoria and State of Illinois, have invented a certain new and useful Improvement in Target Practice and Mechanism Therefor, of which the following is a specification, which will enable others skilled in the art to which it belongs to make and use the same, reference being had to the accompanying drawings and the letters of reference marked thereon, which form a part of this specification.

The object of the present invention is to provide an efficient means for improving and perfecting militia-men and others in the use of small arms in firing at moving objects such as men on foot or horse back, and consists in the mode, herein pointed out, of applying and using certain apparatus which, though novel in some respects are for the greater part old.

The essential appliances required in practicing this invention are, a movable target, means for moving the target at definite and controllable speeds transversely to the line of fire, and a rifle or other small arm having a horizontally adjustable rear sight, and a scale whose graduations represent different angles of deflection, corresponding to the distance of the target and its rate of transverse movement. The object immediately in view, and the result attained by the present invention, is that in carrying on the target practice in accordance with this system, sight is taken directly at the moving target (instead of in advance thereof) the rear sight being first set at an angle calculated from the rate of movement and distance (actual or assumed) of the target. This revolutionizes and reduces to a system the method of target practice, since each shot is a test of the angle of sight, and a means of correction and adjustment thereof, until exactness is attained; whereas, according to the old method, the repeated firing ahead of the target was a mere trial for general results, and afforded no means of determining the proper angle.

Inasmuch as, in military operations, the only objects for the infantry fire are men, a foot or on horse back, and inasmuch as the motion of such objects can be approximated to a normal or definite rate the angles of adjustment

for such objects at different distances, can by this invention be learned with a close approximation to accuracy; and for the purpose of attaining this result with greater certainty and ease, the target is drawn or moved in sight of the marksman by the object (man or horse) whose rate of movement is being simulated. This is an important practical feature of the invention, for, as will be readily understood, each of the objects which it is the effort of the soldier to hit in actual service, becomes identified in practice with the normal gait peculiar to that object. The same purpose may be served (though not to the same useful degree) by associating with the target the representation or image of the object whose rate of movement is being simulated.

In order that the invention may be practically carried into effect, it is essential that the target be lightly suspended, and movable by means which can be operated by a man in motion, without checking or retarding his natural gait. To this end, my improved target comprises a light frame, supported at top and bottom by horizontal wires, constituting a track or runway, the target being hung from grooved sheaves running on these wires, and being moved by a pull cord extending from the side of the target, and adapted to be conveniently grasped and drawn in either direction by a man in motion.

In the annexed drawings, Figure 1 represents my moving target. Fig. 2 represents the ground plan of the same with the firing point marked X, and showing the direction in reference to the shooter, in which the wire or rope attached to the target is drawn, so as to enable the shooter to judge of the rapidity of the motion of the target, by observing that of the man, &c., by whom the wire is drawn; and Fig. 3 represents the horizontally adjustable sight.

I am aware that sights movable from side to side on a graduated scale have long been in use for the purpose of changing the line of fire so that the bullet when acted upon by the wind will strike at the place upon which the sights are directed at the time of firing.

In this invention I employ a graduated scale on the sight, by which the vertical plane of the line of fire may be brought far enough to one side of the line of sight to compensate

for the distance that the object will move during the time occupied by the flight of the projectile, so that the shooter may aim directly at the moving object where it is at the time of firing, and hit it where it will be when the bullet shall have traversed the length of the range. This graduation may be used for my purpose at the same time it is used for the old purpose, by adding or subtracting the necessary number of points to compensate for the motion to the necessary number of points to overcome the effect of the wind, and this use of the graduated scale is generally preferable to having a separate scale for each purpose, and any fire arm now supplied with a sight movable from side to side on a graduated scale may be used also to more or less advantage for the purpose of overcoming the effect of the motion in moving objects.

I use a sight construction as shown on the accompanying drawings, in Fig. 3. It is the same as the Buffington sight now used on the United States military rifle, except that in addition to the one notch on the revolving base of the sight, there is also a notch marked *b*, six points from the center on each side, so that in revolving this part of the sight when the center notch has passed the six points on the solid base of the sight the shooter then commences to count from this side notch, and turns it the required number of points which added to the six which it is from the center will give the number of points that is required. This modification in the sight is made desirable by the fact that in adjusting the sight to overcome the moving of the object, a wide lateral motion is often necessary, and when this is added to the necessary points for the wind, the Buffington sight would sometimes fail to give the desired lateral adjustment of the sight.

I remodel the hammer of the breech-loading Springfield rifle by grinding off the top of the hammer so that when the sight is turned toward the right and the gun is at full cock the point of the hammer will not obstruct the sight when elevated for five hundred yards, or I grind off the left side of the hammer so that when the sight is set at the elevation of four hundred yards it can be turned to the right six points and the hammer when at full cock will not obstruct the sights. In manufacturing a new gun, it would be better to make the hammer not so high and farther to the right.

The Springfield breech-loading rifle with the hammer constructed as at present can be used without modification for the long ranges, and also for the mid and short ranges when the object is moving toward the left and the wind is blowing from the left. It can also be used when the object is moving toward the right at not more than five miles an hour and the wind is not also blowing from the right. In these cases the sight can not always be turned far enough to the right to enable the shooter to aim directly at the moving object,

but even then it can be turned far enough to greatly aid the shooter, and he can then hold off ahead of the object enough to equal the additional points required. Whatever variety of sight is used, I prefer such a graduation that one point of the graduation scale will give a change of five minutes in the line of fire, and make my rules and tables for this graduation.

Rules and tables made for one graduation of sights may be used for another by taking such a number of points as will give an equal number of degrees; or rules and tables and calculations can be made in the requisite number of minutes' change in the angle, and can be used with any known graduation of sights. The number of minutes' change in direction will depend on the proportionate velocity between the moving object and the projectile in its flight and the calculation must be so made that the course of the projectile will be so far to one side that the moving object and the projectile will arrive at the same place at the same time. With the Springfield breech-loading rifle, caliber 45, now in use in the United States Army, and in the National Guard of most of the States, with the service ammunition of five hundred grain ball and seventy grains of power, the amount of change of direction to overcome the motion of a man walking briskly at three and one-half miles an hour at a distance of five hundred yards or less from the shooter, is fifteen minutes, one-fourth of a degree, and this is equal to three points on the wind-gage on the Buffington sights now used on these military rifles. With the same arm, ammunition and sights, the allowance for a man walking slowly is ten minutes of a degree, or two points on the motion-gage; for a soldier marching in double time about twenty-five minutes, or five points; for a man running or a horse trotting one-half a degree, or six points; for a horse galloping three-fourths of a degree or nine points. In case of a change of arm or ammunition increasing or decreasing the velocity, the number of minutes in the angle may be decreased or increased proportionately, and if the speed of the moving object be increased or decreased, the number of minutes' angle must be increased or decreased in proportion.

I construct the target in this wise: Where sufficient back stops exist, I erect two poles or timbers marked "A" and "B," four inches square, set in the ground deep enough to make them stand firmly or brace them laterally with wires or cords. They extend generally nine feet above the ground, and are about one hundred to one hundred and fifty feet apart. On these I stretch two wires, marked "a" and "c." I use No. 8 wire gage hard Bessemer steel wires coppered, and let them run past the upright at one end, and be fastened to firmly set posts or anchors in the ground, "C," and draw them tight in any convenient way, the lower wire being about two feet from the

ground and the upper one about nine. I use ordinary fence wire stretchers to tighten the wires. On these wires a light frame target "F" of any desired size is made to run. I use principally frames six feet square made of two by two inch light first quality pine fastened securely at the corners and projecting above and below a sufficient distance, generally about eight inches, to carry the sheave wheels, "d," "e," on which the targets run. On these frames cotton drilling or muslin is tacked, and on it a paper target of any desired pattern may be pasted. For military purposes I prefer the target known as "A" target in the United States Army, or a "B" or "C" target, depending upon the length of the range. If preferred, figures of any desired shape, as of a man running, or a horse or an antelope, may be pasted on this cloth. If desired the cloth may be omitted and one or more figures of any kind may be set in the frames and be held in place by springs so that when struck by a bullet they will fall out. In the projections above and below the target frame, light running sheave wheels "d," "e," "e," are placed to run on the wire, and the pins "I" are driven in to keep the sheave wheels from jumping off the wire. A light cord, "K," is passed around a sheave wheel "L" on one of the upright posts "A," and running back is passed around a pulley "M" at the other extremity, and brought back and the two ends fastened together. This light cord should be carried out to one side of the target far enough to make it safe for a man to take hold of it and by walking or riding cause the rope to move around the pulleys, and in this manner move the target which is fastened to this movable rope. The rope should be so attached that the man moving the target will move in the same direction the target moves, and it should be extended far enough away from the target so that the man will be out of danger of being hit by the bullets, and this should ordinarily be from one-fifth to one-tenth as far to one side as the shooter is from the target, depending upon the greater or less degree of skill and care exercised by the shooter. For purposes of illustration I have shown in Fig. 1 the representation of a man drawing the target at a walking gait. Where it is intended that the shooter shall exercise his skill in judging of the speed at which the target moves, as well as exercise his art of shooting, the cord in passing the upright post "B" may if desired be passed around a pulley on the post "B," so as to bring the man who carries the cord for moving the target, nearer to the shooter, so that his line of march may be at about right angles to the shooter's line of vision. Where sufficient pits exist for the protection of the markers, the targets may be erected over these pits, and the hits on the target be marked or signaled by the marker, and the bullet holes pasted up in the usual way by markers protected in these pits, using

long handled markers and paste brushes. These targets should be constructed to move a distance of from seventy five to one hundred and twenty five feet, owing to the velocity with which it is intended they should move in order to give the amount of time desired for the shooter to adjust his sight and shoot. Where it is intended to move only at the rate of a man walking, seventy five feet of motion in the target would give him sufficient time. In the case of a horse trotting or galloping, and when it is intended to have the target start up in a direction previously unknown to the shooter, the runway of the target should be as much as one hundred and twenty-five or one hundred and thirty feet. Where the upright posts are one hundred and twenty-five or one hundred and fifty feet apart, and the targets move over markers' pits, two targets may be placed on the wire at the same time, and fastened to the moving rope twenty-five feet apart, and different sets of men may shoot at each target. Where rifle ranges are large enough to justify it, three or four targets of this kind may be erected by carrying the cords for the moving of the targets a proper distance to one side to secure the safety of those who move the target. When it is not desired to have the shooter see the man who moves the target for the purpose of estimating his speed in marching, the targets may be moved by a man walking in the markers' pits, or by passing the cord around a pulley wheel turned by a crank in the markers' pits, or better if possible by some available motive power. In this case care must be exercised that the targets are moved at some agreed and uniform rate of speed. This can be done by practice, by timing the man who moves the targets, and letting him learn the rate of speed in this way.

When motion-gage moving target practice is had in the armory, drill hall or shooting gallery, if the velocity of the bullet is reduced, it is best to reduce the velocity of the target in proportion, so that the same motion-gage and tables may be used as are used on the range or in actual military service in the field.

I am aware that sights have been made movable from side to side on a graduated scale for the purpose of overcoming the effect of wind, and I do not claim the movable sight, except as hereinafter stated.

I claim—

1. In the art of target practice with small-arms having horizontally adjustable sights, the improvement consisting in imparting to the target a definite rate of motion such as is normal to a naturally moving object, and simultaneously moving in sight of the marksman in the same direction with the target and at the same speed the figure or object whose rate of movement is simulated, substantially as and for the purpose described.

2. That improvement in the art of target

5 practice which consists in attaching to a movable target a naturally moving object, and causing the latter by its movement to impart motion to the target, the said object and target simultaneously moving in sight of the marksman and at the same speed, substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JAMES M. RICE.

Witnesses:

CHAS. A. CORNWELL,
C. E. SNELLING.