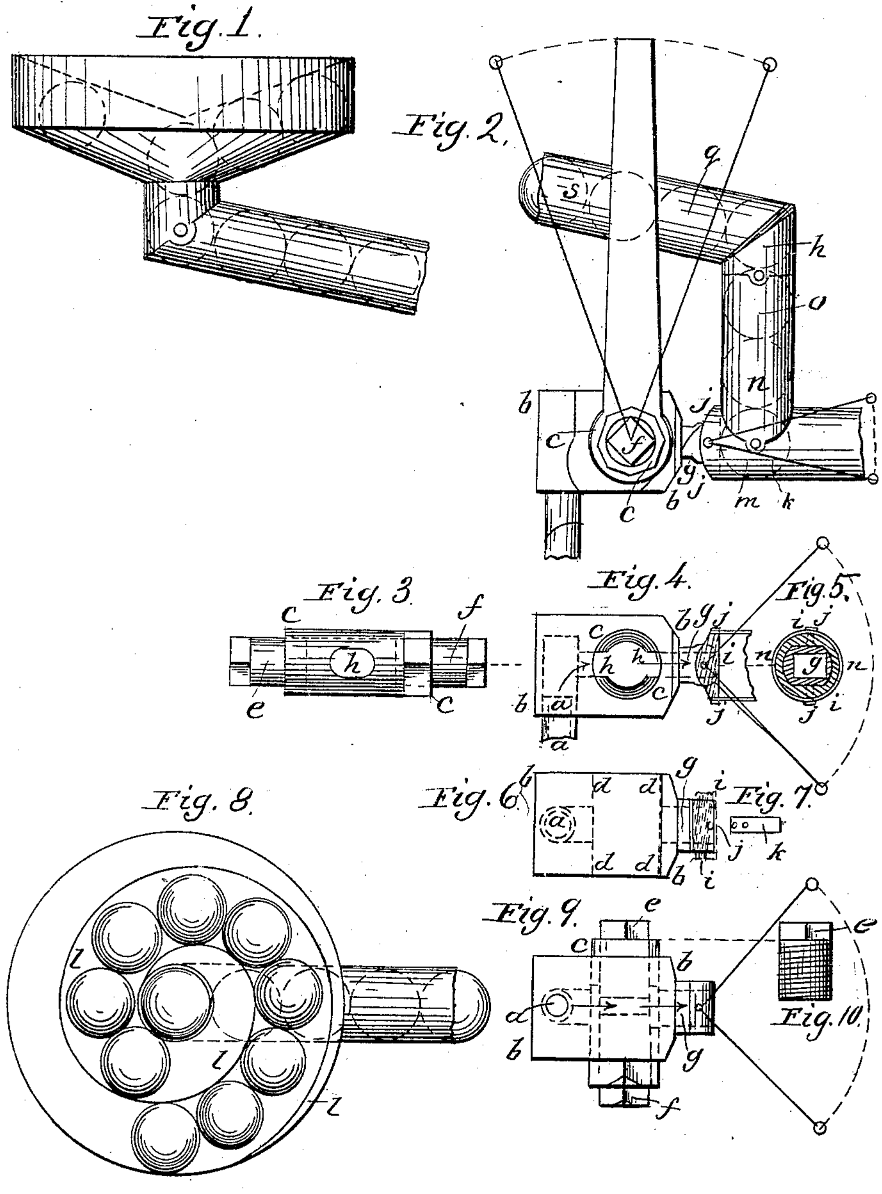
F. G. SMITH.

Steam Gun for Driving Stock from Railroad Tracks.

No. 51,229. Patented Nov. 28, 1865.



Witnesses:
Robt D Smith
Wm D Smith.

Inventor.
F. G. Smith.

UNITED STATES PATENT OFFICE.

FRANKLIN G. SMITH, OF COLUMBIA, TENNESSEE.

IMPROVEMENT IN STEAM-GUNS FOR DRIVING STOCK FROM RAILROAD TRACKS.

Specification forming part of Letters Patent No. **51,229**, dated November 28, 1865.

To all whom it may concern:

Be it known that I, FRANKLIN G. SMITH, of Columbia, in the county of Maury and State of Tennessee, have invented a railroad-gun to enable the engineer of a locomotive to keep the track clear of all animals which might endanger a moving train; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

I make use of two guns for each locomotive-engine, attaching one to each side of the boiler, and placing them so far back that the engineer, using a gun, may not be incommoded by the jet of steam when he makes a shot. The guns should be not far from the level of the upper side of the boiler, and should be placed as far outward as practicable, so as to have a better command of the track while the train is on a curve.

The engineer is not necessarily to take aim, as in firing a rifle—it will be better that he direct the piece by means of a rod reaching down to the muzzle of the gun—the intention being to use white balls of clay of two or three inches in diameter, which, on being thrown two or three hundred yards will be quite visible, the engineer thus being able to watch their flight, and as he is to send from three to six per second he can easily direct them by observing their course and range.

I would have the iron tube (of the same style as the gas-pipes,) which conveys the explosive power to my guns inserted into the sides of the boiler somewhat below the middle, so that bubbles of ascending steam within the boiler cannot enter the iron pipe. This injection-tube is shown at *a*, Figures 2, 4, 6 and 9. As drawn in these figures, it has an exterior diameter of one inch and a bore of three-fourths of an inch, my diagrams being of one-half the lineal size of the actual mechanism on a scale of one inch to two inches. If the metal of the locomotive-boiler is thought to be too thin and weak to admit of an inch-hole being cut through it, I would begin by riveting on an extra thickness of boiler-plate before cutting the hole to receive the lower end of the tube *a*. The upper end of this injection-pipe is screwed into a block of brass, called the "cylinder-seat," shown between *b* and *b* in Figs. 2, 4, 6 and 9,) the bore for receiving *a* being carried upward beyond the middle of the brass block, (the cylinder-seat,) as shown in Fig. 4. If the works connected with the steam-gun were likely to need frequent adjustments, (by taking the parts of the gun asunder, while the steam is up,) I would certainly put a stop-cock in the tube *a*, (just below the brass block,) by means of which the flow of hot water through the pipe would be arrested, so that the parts of the gun could be taken off; but the mechanism of the gun is so simple, and the locomotive is so sure of an opportunity of resting after its daily task is done, that I think such a stop-cock is not called for.

Besides the vertical bore for receiving the injection-pipe *a*, the brass block has two perforations in a horizontal direction at right angles to each other. The larger of the horizontal bores is of two inches diameter, and receives the cylinder *c*, Figs. 3, 4 and 9, while the limits of the bore are shown in plan, Fig. 6, by the letters *d d d d*. The other horizontal bore in the brass block extends from and through the projection *g*, Figs. 2, 4, 5, 6 and 9, on the right-hand end of the block (to which the gun is attached) to the cavity over the injection-pipe. (Seen very distinctly in Fig. 4.) A perforation is made through the cylinder (see *h*, Figs. 3 and 4,) answering to the second horizontal bore in the block, allowing (when a ball is to be thrown) a free passage for the hot water along the ways indicated by the arrows in Figs. 4 and 9.

The cylinder *c c* is bored in two directions; the larger bore to receive the screw-plugs *e* and *f*, and another bore from side to side, as seen in Figs. 3 and 4. In Fig. 9 the screw-plugs are shown set near to each other, while in Fig. 3 they are run out farther from each other. These plugs are of but little use when the gun is worked by a lever, Fig. 2, as shown in these plans, but will be indispensable whenever the lever is exchanged for a pulley, (one of the side holes of the cylinder being closed,) and a shot given every time that the cylinder brings its one side hole to open into the barrel of the gun, whatever water was then in the chamber of the cylinder bursting into the gun in steam. With such a pulley on the end of the cylinder we have a shot for each revolution of the pulley; with the lever we have a shot for every push or pull. Fig. 2 shows the cylinder with the lever attached; Figs. 4 and 9 have the lever off.

While the two plugs must be kept in their places firmly, (for they are liable to be blown out by the explosive power of the contents of the boiler,) I would have the cylinder rather loosely fitted to the large bore of the brass block, so that the lever shall be worked by the engineer with great facility. The cylinder is virtually a stop-cock. If there were a little "weeping" around it the effect would still be beneficial by causing a slight ascent of hot water in the tube *a*, so that the first shot made by the gun on any danger presenting itself would be by a cylinder of very hot water, rather than of water cooled by being kept some time within the cylinder. If its duty required it to work steam-tight, the cylinder should be conical, but I am convinced that such a form is not necessary. It merely requires pins (not shown, to prevent confusion in the drawings) to keep it at its place within the brass block.

The projection *g*, to which the gun is fastened, is shown in elevation at Figs. 2 and 4, (which are side views,) and also in Fig. 5, an end or front view. Fig. 4 shows distinctly the curves of the upper and under sides of the projection, making those faces cylindrical. In order to give the gun a suitable play in every direction, (vertically, as shown by the sweep in Fig. 2, and horizontally, as in Fig. 9, the sweep in Fig. 4 being a blunder,) a gimbal, as in the mariner's compass, is introduced between the projection and the inner surface of the gun. In Figs. 4, 5, and 6 the gimbal *i i* is drawn in red ink, for greater distinctness. In Fig. 5 the side views *n n* attach the gimbal to the projection *g*, and enable the gun to be deflected vertically, while the top screws, *j j*, fasten the gun to the gimbal, Figs. 2, 4, 5, and 6. The screws *n n* confine the gimbal to the projection, while *j j* fasten the gun to the gimbal, constituting a universal joint. The projection might be spherical, receiving over its front end the hinder part of the gun, made suitably concave to fit the spherical face; but the gimbal seems the simpler mode and perfect in its action.

The gun turning at its breech on the gimbal-pins *nn* and *j j*, I have not thought it worth while to figure any device by which the engineer will raise, lower, or deflect the mouth of his gun on wishing to drive an animal from the track. Perhaps a simple rod reaching down to the gun will give him a sufficient command over his artillery. My intention is that his balls shall go in a somewhat continuous stream, and not more than fifty or eighty yards apart, so that instead of taking aim at his object he will only have to watch the motions of his balls, and turn the muzzle accordingly.

The spring *k*, Figs. 2 and 7, acting as a wad, is of indispensable importance. It retains the ball (which has just dropped into the chamber of the piece) firmly in its place until the engineer wishes to make a shot. Especially, it enables him to fire down the slope of a high embankment without fear that the ball will roll out of the gun before he can let on the explosive power.

In selecting a missile for the railroad-gun, it should be borne in mind that my object is simply to frighten all intruders—not to destroy or even wound. At times the gun may have to be directed against heedless persons as well as animals, it being far better that a man should get a smart bruise than to be run over by the passing train. I select clay as the preferable material, the balls (of some two or three inches diameter) to be shaped in cast-iron molds and sun-dried instead of being burned. To render them more visible they should have tenacity enough to keep their shape on being shot out of the gun, but should crumble on hitting the object aimed at. Perhaps hair had better be mixed in with the clay.

Each gun is to have a magazine, placed over the engineer's head, (shown in Figs. 1 and 8,) several feet in diameter, and holding several hundred of the clay balls. The curved hoop-iron (seen edgewise in Fig. 8, at *l*) winding round and round on the bottom of the funnel-shaped magazine, gives the balls a continuous descent toward the central opening into the delivering-tube. A concave cover of the magazine keeps the balls from being thrown out of their place by the jerks of the locomotive, while its constant agitation insures the regular descent of the balls, even though the inclination be but slight, so long as the train is moving. Boxes of these clay balls containing each one charge for a magazine should be kept at all railroad-stations.

The ball to be discharged is seen at *m*, Fig. 2, in the chamber of the gun, resting upon the spring *k*. On letting in a blast may not the ball *n* just over it (in the delivering-tube) be as likely to be blown upward through the tube as that *m* shall be blown outwards. This is prevented by the nearly rectangular turn in the delivering-tube in the elbow occupied by the ball *p*. But for this short turn in the tube the balls immediately over *m* might be thrown backward and upward through the delivering-tube; but on the plan figured that cannot happen.

To permit an easy motion of the gun the delivering-tube is seen to be hinged, and not inflexibly fastened to it.

On a danger being discovered the engineer will naturally seize the lever of the gun that has the best command of the field, while an assistant will work the other, if a chance presents itself. The object being to throw comparatively light balls and with moderate velocity, the recoil from these guns must be so trifling as to require no mechanical devices for resisting it.

Instead of the universal joint above described, I may take two elbows, such as are used in gas-fittings, and by cutting screws upon their ends (making the smaller fit into the larger, and connecting one with the pipe leading from the boiler and the other with the breech of the gun) secure a simple and effective universal joint.

Instead of the funnel-shaped reservoir for holding the clay balls, straight tubes may be arranged on each side of the engineer's cab, producing the same effect; and instead of the stop-cock a simple valve may be equally serviceable.

I claim—

The self-loading railroad steam-gun, with its arrangements of stop-cock for the explosive jet, spring-catch for holding the ball in the chamber of the piece so that it cannot roll out, and tubes for containing the clay balls, substantially as shown and described,

FRANKLIN G. SMITH.

Witnesses:

ROBT. D. SMITH,

FRANK H. SMITH.