J. T. Gilbert,

Motor.

No. 113,417. Patented Apr. 4. 1871.

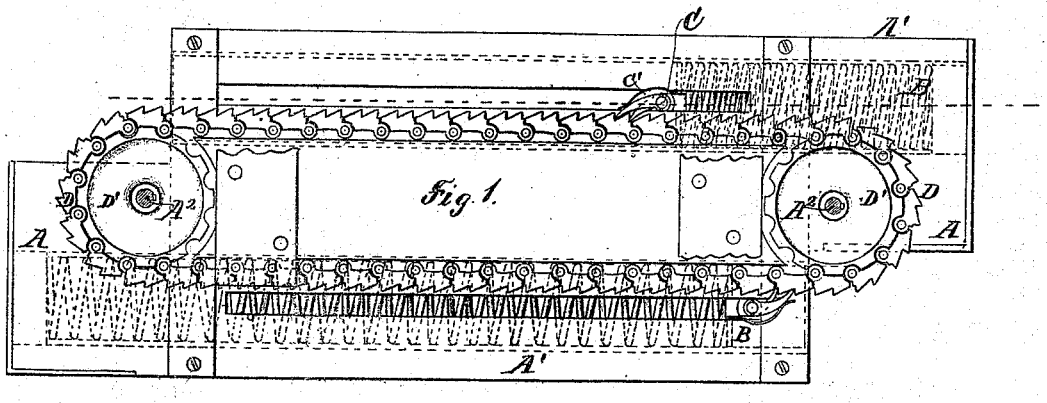
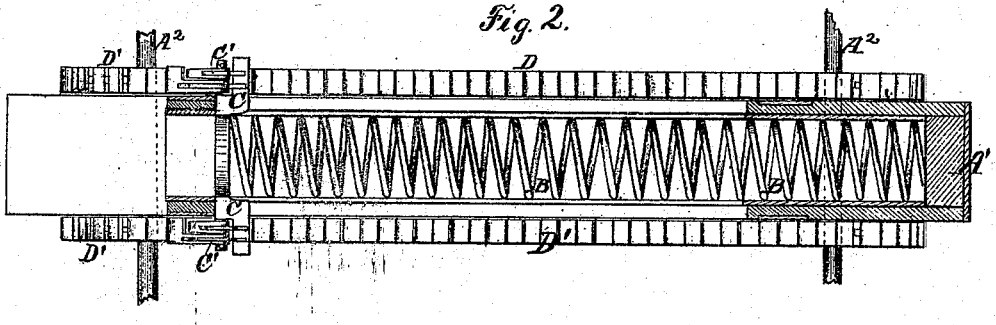


Fig. 2.



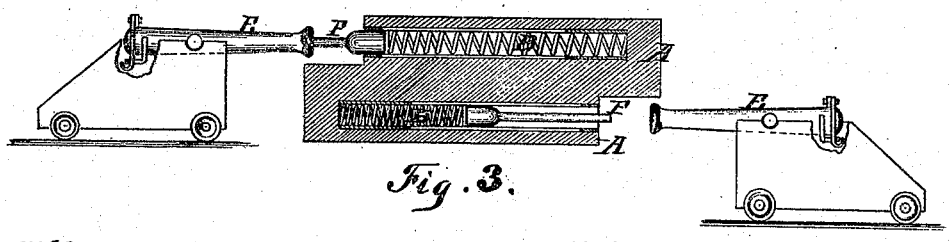


Fig. 3.

Witnesses.
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JOHN T. GILBERT, OF ASBURY, ILLINOIS.

Letters Patent No. 113,417, dated April 4, 1871.

IMPROVEMENT IN MOTIVE-POWER APPARATUS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JOHN T. GILBERT, of Asbury, in the county of La Salle and State of Illinois, have invented an Improved Method of Utilizing the Force of Explosive Substances in Propelling Machinery; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the annexed drawing making part of this specification, in which—

Figure 1 is a side elevation of one form of a machine for utilizing the force of explosive substances, in which are shown springs made of wire, which serve to receive the force consequent upon the explosion of the material and transfer it to the moving parts of the machine.

Figure 2 is a transverse section on line $x\,x$ of fig. 1, showing a spring which receives the impact of the explosive substance, or of any substance which may be put in motion by the explosion of such substance, the pawls which communicate such motion to the machine, and the endless ratchet which passes around the driving-pulleys.

Figure 3 is a longitudinal vertical section of a portion of the device, showing in elevation one method of communicating the force caused by the explosive materials to the springs, to be by them utilized in propelling machinery.

Corresponding letters refer to corresponding parts in the several figures.

This invention relates to a method of storing up and utilizing the force generated by the explosion of gunpowder, gun-cotton, nitro-glycerine, and other similar explosive substances, including the various kinds of detonating powders; and

It consists in causing the impact of such substances, when exploded, to be received by or upon a spring or springs, or other elastic substance or substances, and there held in reserve for use in giving motion to any kind of machinery that it may be desirable to move with it; or it may be immediately expended in propelling such machinery, as in the example shown in connection herewith.

I am aware that the impact of explosive substances has heretofore been used in connection with unyielding but movable substances, as in hammers and pile-drivers for raising the hammer or the weight which drives the pile; but I am not aware that previous to the date of my invention such force has ever been utilized by being first received by or upon springs or other elastic substances, and by them transmitted to the moving parts of machines as the motive force with which to propel such machines.

I do not therefore limit myself to the form of machine shown in the drawing which accompanies this specification, or to any other particular form of construction; but regard my invention as consisting in the method of utilizing or applying the impact of the various explosive substances rather than in any particular form of machine for effecting that purpose.

Regarding the view above expressed as the correct one, I have filed the drawing which accompanies this specification in compliance with the law requiring all applicants to show and describe the best means within their knowledge of putting their inventions into practice, and not as embodying my invention; or, at least, not as embodying all of such invention.

To enable those skilled in the art to use my invention, I will describe one device for applying it.

The machine shown herewith consists of a frame, A, which should be of metal, and so constructed as to furnish bearings for the shafts A^2 A^2, which pass through it near its ends, as shown in figs. 1 and 2. The length of this frame may be varied to suit the different kinds of substances used to receive the impact of the explosive substances.

Upon the top and bottom of this frame when it is placed horizontally, or upon its edges when it is placed vertically, tubes or boxes A^1 A^1 are placed, into which a spiral spring, B, or some other elastic substance is placed, for the purpose of receiving the impact of the explosive substances and transmitting it to the moving parts of the machine.

These tubes or boxes are constructed with one open and one closed end, the open end being for the purpose of permitting the plunger F, which acts upon the spring, to enter, and the closed end being for the purpose of forming an abutment for the end of the spring which remains stationary to rest against.

That portion of the spring which is capable of moving within the tube or box has attached to it a cross-head, C, the central portion of which serves as a piston to receive the end of the spring and guide it through the tube or box.

To the outer ends of the cross-head pawls C′ C′ are attached, in such a manner that, as an explosion takes place and the cross-head is carried into the tube, they will be raised up and caused to pass over the projections upon the endless ratchet until the force of the explosion has been expended in compressing the spring or in compressing other elastic substances, when said pawls will drop into the notches upon the ratchet and against the vertical sides, and the force stored up in the elastic substance will be utilized in propelling machinery, such force being transmitted to the shafts A^2 A^2 by means of the endless ratchet or belt D.

Upon the shafts A^2 A^2, and outside of the frame A, sprocket-wheels D′ D′ are placed, the projections upon

their peripheries being so formed as to pass into the spaces between the joints in the endless ratchet or belt D, and thus the rotation of the wheels is secured, and the possibility of the slipping of the belt is prevented.

It will be observed that there are two springs and two cross-heads and pawls for connecting them to the belts D, one above and one below the center of the sprocket-wheels, the lower pawls being held in contact with the ratchet or belt by means of springs. This belt or endless ratchet is constructed with a series of links, which are so joined or pivoted together as to form a joint between each link, so that as it passes around the sprocket-wheels it may accommodate itself to their peripheries. The outer surfaces of the links of the belt or ratchet are serrated, as shown in the drawing, in order that the pawls may fall into such serrations at any point in its length.

At fig. 3 is shown one method of contracting a spring by the use of the force generated by the explosion of powder, it consisting of a small cannon, E, having a swinging breech-piece so arranged that it may be moved to one side and thus allow the explosive material to be inserted at the rear end of the gun, when, by returning the breech-piece to the position shown in the drawing, and causing the explosion of the material within the gun by any of the known means, the plunger F will be shot out of such gun and into the tube or box which contains the spring, thus contracting the spring, as shown.

When the force of the exploded material has been communicated to the spring it may be at once utilized in propelling the machinery, or it may be retained in the spring for future use by the addition of any suitable device for that purpose, such as a pawl working upon a ratchet-wheel secured to one of the shafts A^2, so arranged as to hold the wheels from turning when in gear.

Owing to the fact that there are two of these springs, one above and one below, upon opposite sides of the belt or endless ratchet, a continuous rotary motion may be maintained by allowing one of the springs or elastic substances to expand while the other is being contracted.

The device here shown is capable of being applied to any kind of machinery where continuous rotary motion may be required, and also to such devices as require only a reciprocating motion, and it is regarded as particularly applicable to street cars to assist in starting them when in a state of rest.

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

1. The method herein described of utilizing the force resulting from the explosion of substances by means or any equivalents thereof substantially such as herein described.

2. The combination of the endless belt or ratchet, having upon its outer surface serrations for the pawls to fall into, and the sprocket-wheels around which it passes.

3. The combination and arrangement of the spring or springs B, the cross-head C, belt or ratchet D, and the sprocket-wheels D′, their arrangement with reference to each other being such as to cause the expansion of the springs to give a rotary motion to the sprocket-wheels substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN T. GILBERT.

Witnesses:
WESTEL W. SEDGWICK,
WILLIAM BRODIE.