2 Sheets—Sheet 1.

J. B. EADS.

GUN CARRIAGE.

No. 93,691. Patented Aug. 17, 1869.

Fig. 1.

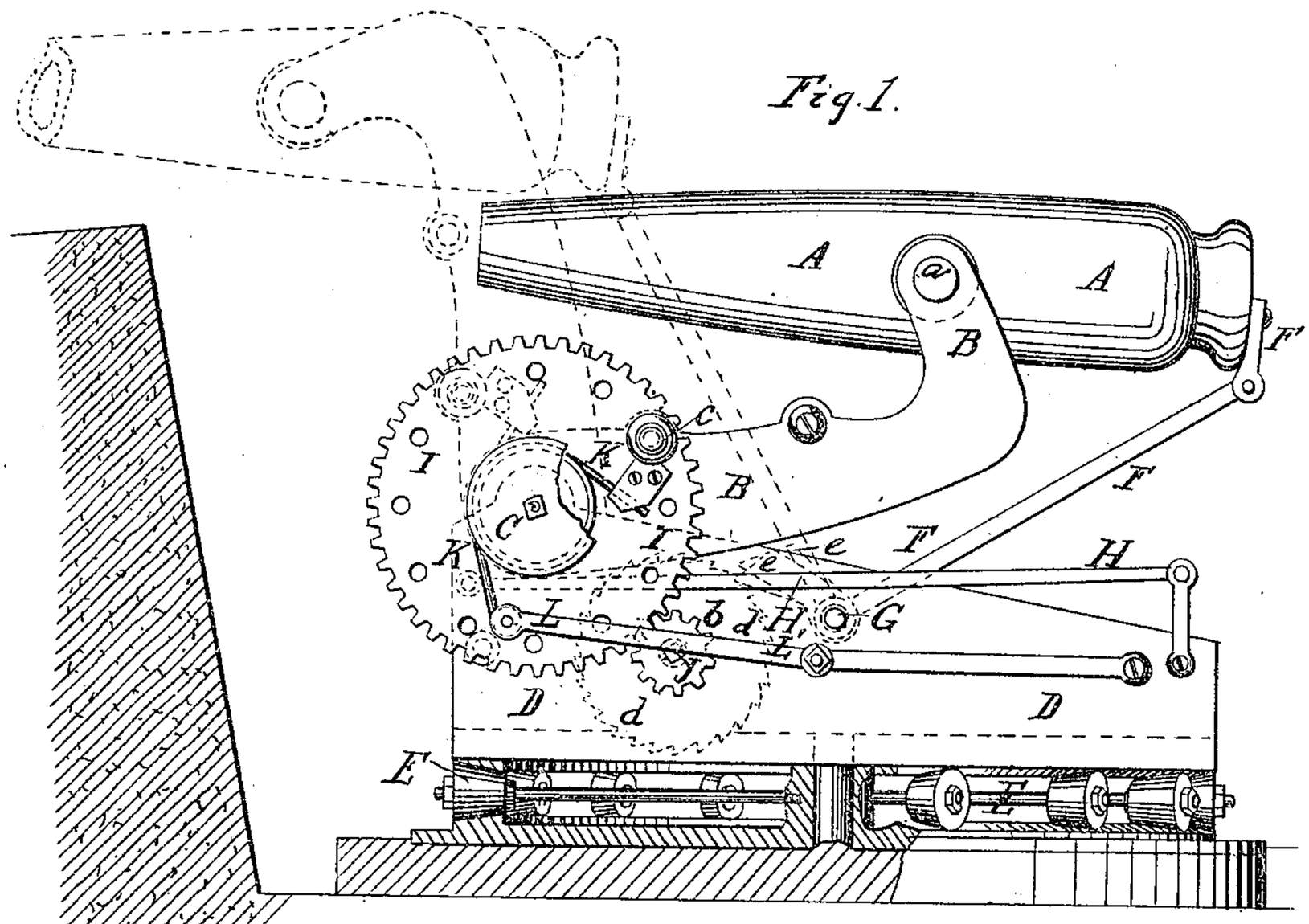
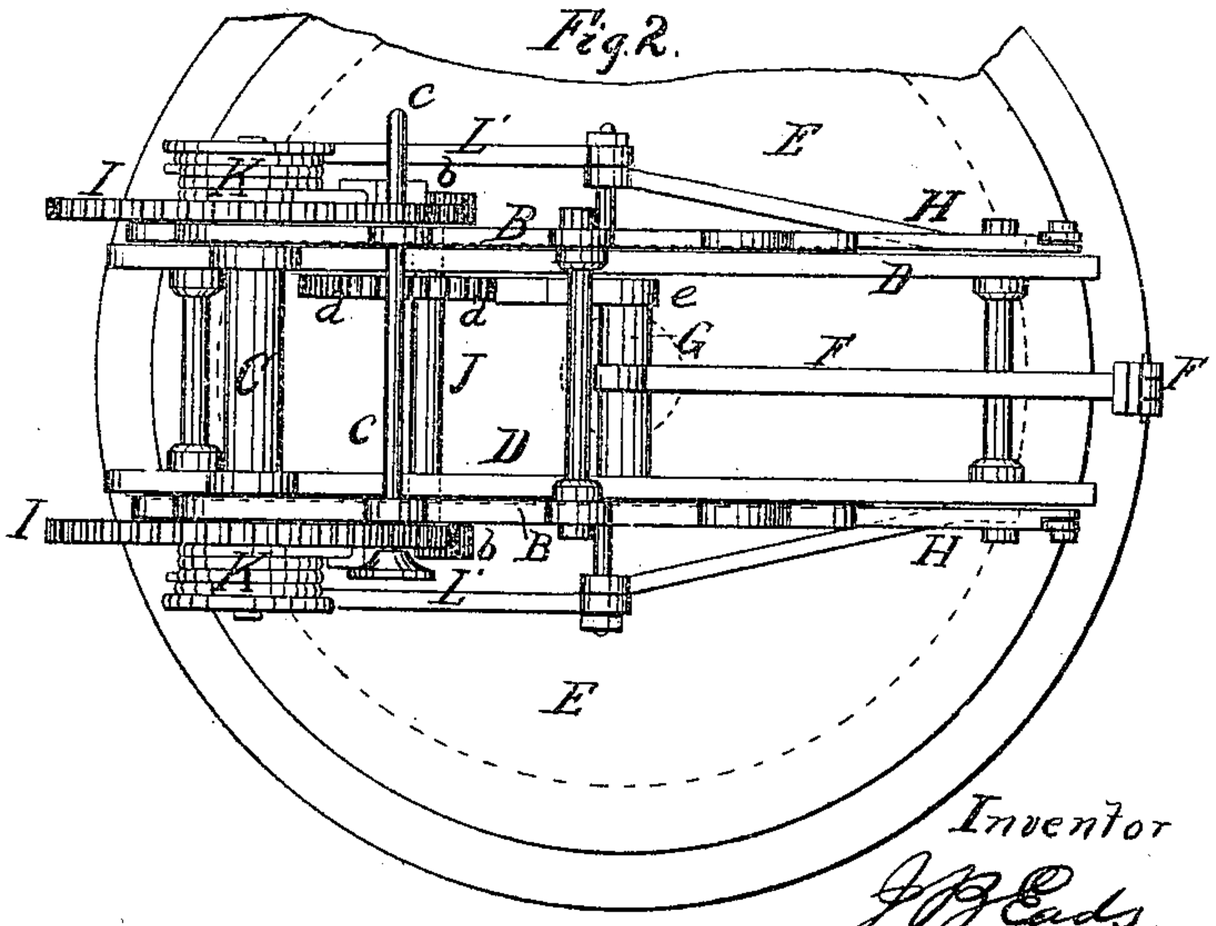


Fig. 2.



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2 Sheets—Sheet 2.

J. B. EADS,

GUN CARRIAGE.

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Fig. 3.

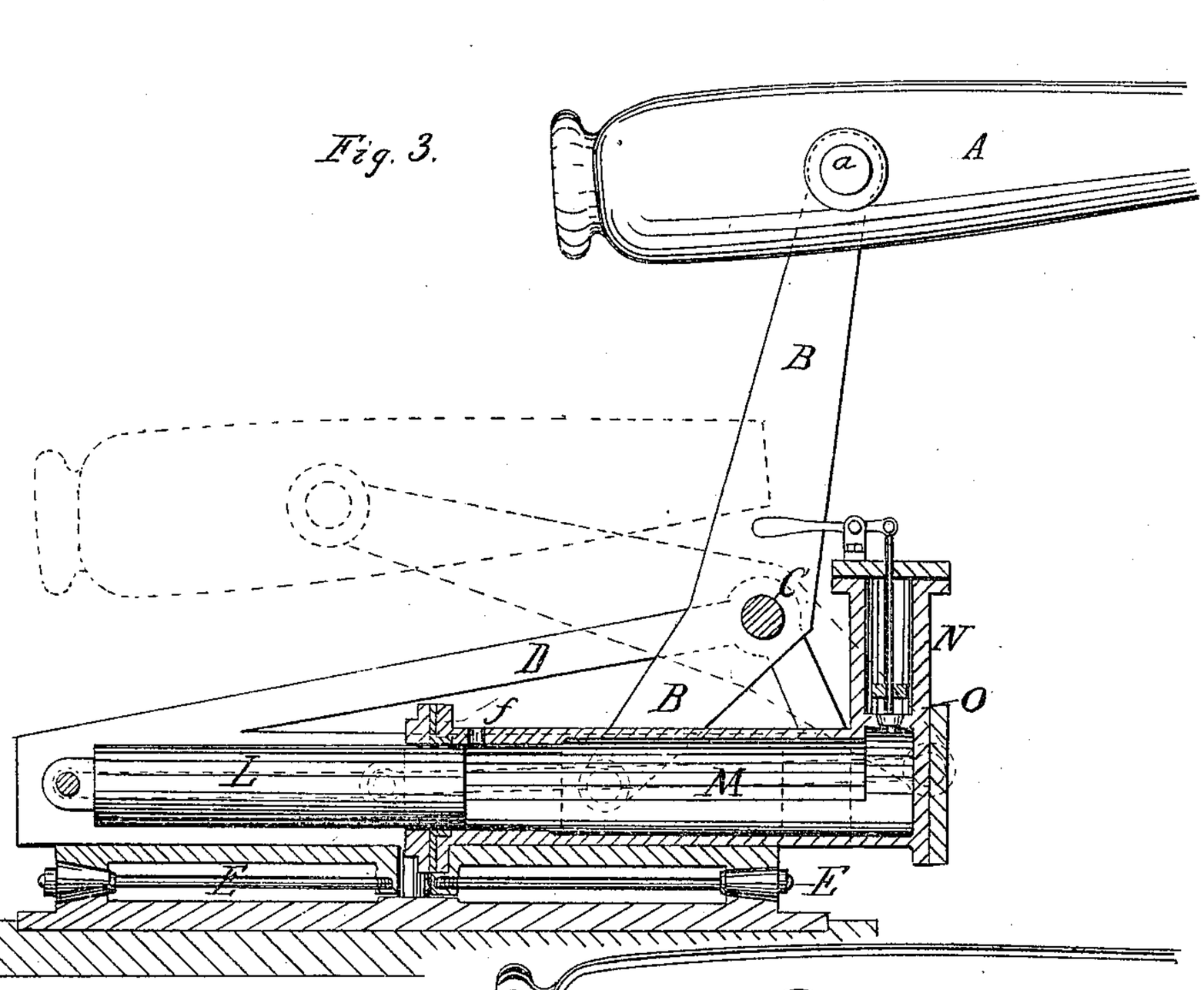
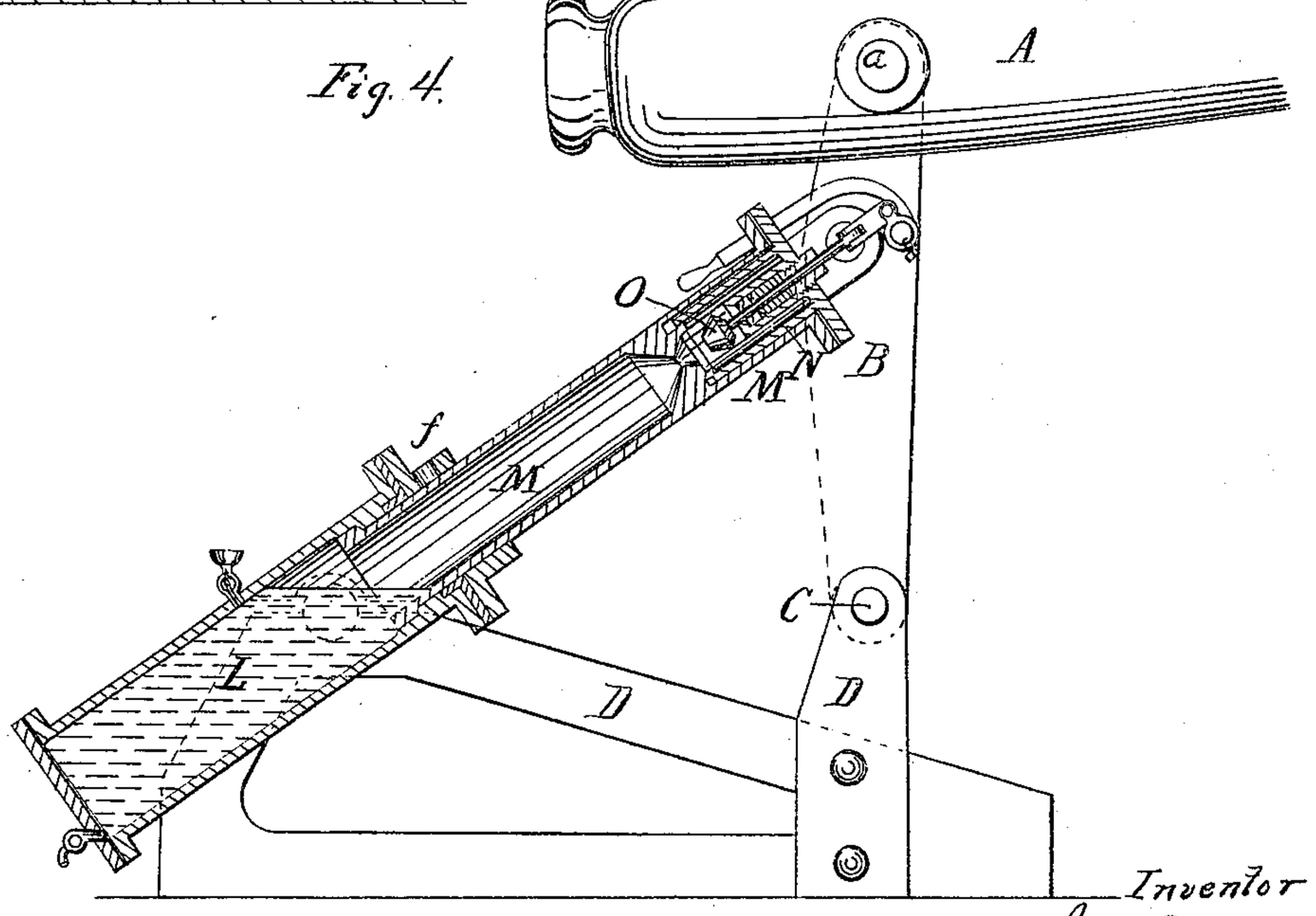


Fig. 4.



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United States Patent Office.

JAMES B. EADS, OF ST. LOUIS, MISSOURI.

Letters Patent No. 93,691, *dated August* 17, 1869.

IMPROVEMENT IN GUN-CARRIAGES.

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, JAMES B. EADS, of St. Louis, in the county of St. Louis, and State of Missouri, have invented a new and improved Device for Storing Up and Utilizing the Recoil of Heavy Guns; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

Figure 1 represents a side elevation, partly in section, of my improved device for storing up and utilizing the recoil of heavy guns.

Figure 2 is a plan or top view of the same.

Figures 3 and 4 are sectional side elevations of modifications of the same.

Similar letters of reference indicate corresponding parts.

This invention relates to storing up the power developed in the recoil of large guns, so that it may be afterward utilized, at the will of the operator, to run the gun into battery or to raise it above a parapet or other defence, to admit firing over the same.

The invention consists principally in causing the force of the recoil to compress an elastic substance or material, such as metallic or other springs, so that such compressed article or substance will, when allowed to expand, run the gun forward or elevate it, as aforesaid, to bring it into position for firing. The force of the recoil is so considerable, that leaving sufficient allowance for loss by friction, it will be powerful enough to elevate the gun to its original position before firing. This can be proved by causing a pivoted frame in which the gun is hung to strike an elastic cushion during the recoil. The cushion, being compressed by the concussion, will at once expand, and throw the gun forward. In fact, the power accumulated by a falling body will alone suffice to re-elevate it to its original position, if it was not for the resistance of the air and other friction to which it may be subjected. The reacting force of the explosive compound in the gun is, therefore, not the only motor, but is an auxiliary means for obtaining the desired result.

In order to carry my invention into operation, many different methods may be employed, of which three are illustrated in the drawings. That one shown in figs. 1 and 2 represents the application of spring power, while in figs. 3 and 4 a mechanism is illustrated by means of which the compression of liquid or gaseous matter is made use of for elevating the gun or throwing it forward.

Many other mechanical devices may, however, be used to carry the same invention into effect, and with equal results, and I do not confine myself to those herein described.

In figs. 1 and 2, the gun A, which is of suitable form and construction, is represented as being hung with its trunnions *a*, in a frame, B, which is, at its lower end, pivoted by a cross-shaft, C, to the front part of a frame, D. This frame D can be made stationary, or can be placed upon a rotating platform, or rollers, E, to allow the gun to be pointed in either direction.

The breech end of the gun is, by means of a jointed rod, F, connected with a suitable cross-bar, G, of the frame D. This cross-bar may be arranged up and down adjustable, to regulate the inclination of the gun in the firing position.

When the gun is in its firing position, as indicated by red lines in fig. 1, the frame B is in a vertical or forward inclined position. When the gun is fired, the power of the recoil forces it, with the frame B, backward, causing it to swing on the shaft C.

The force of the recoil throws the frame B upon two spring cushions, H H, which are arranged on the sides of the frame D and which prevent injury of parts by too violent concussion.

The cross-shaft C carries, at or near its ends, toothed wheels I I, which mesh into pinions *b b*, that are mounted on the ends of a transverse shaft, J, which has its bearings in the frame D.

When the frame B is, by a transverse pin, *c*, or otherwise, connected with the wheels I, it will, when swung back by the recoil, turn said wheels backward, and thereby revolve the axle J.

On the latter is mounted a ratchet-wheel, *d*, into which a pawl, *e*, pivoted to the frame D, falls.

K K are coiled springs. Each of them is with one end fastened to one of the wheels, I, and with the other to a pivoted lever, I′, or to some other part of the frame D, and is wound around a drum formed on the end of the cross-bar C, as shown.

As the gun is thrown back by the recoil, the springs are wound up by the turning of the wheels I, and are then locked in the wound-up position by the ratchet-pawl *e*. The pawl then serves to retain or store up the force of the recoil, by holding the springs in the wound-up position.

At any time, whenever the gun is loaded and ready for action, the power thus stored up can be utilized, by raising the pawl off the ratchet-wheel, when the springs will unwind and throw the cannon forward.

The same principle of compressing elastic substances can be utilized by using a liquid or air-compressing apparatus, as shown in figs. 3 and 4.

In these there is a cylinder, L, pivoted or fastened to the carriage D, and a plunger-cylinder, M, is connected with the frame B, so that when the gun recoils, the cylinder M will be forced around or into L, while it will be drawn out when the cannon is swung up for firing.

The lower cylinder L is to be more or less filled with

air or other elastic fluid, and when the gun is elevated, air is, through an aperture, *f*, freely admitted into the cylinder M. When the gun recoils, this aperture is closed by sliding into the cylinder M, and the air in M is compressed.

In the upper part of the cylinder M, I propose to arrange a separate chamber, N, which has a valve, O. As the gun recoils, the compressed air is all forced into the chamber N, and it is confined therein, and keeps the valve closed, so that it will not act upon the cylinders L M. When the gun is to be elevated, the valve is raised off its seat, and lets the compressed air escape into the cylinder L. The air will, as it expands, force the cylinder M out of L, and will thereby elevate the gun, placing the cylinders back into position for forming another expanding air-cushion by compression.

The cylinders may, as in fig. 3, be arranged horizontally below the gun, to be operated upon by the lower part of the frame B, in which case the chamber N may form a vertical extension of the cylinder M, or they may be arranged in an inclined position, as in fig. 4, in which case the cylinder M is connected with the upper part of the frame B, as shown.

However, any other method and device may be applied with equal effect for storing up and utilizing the force of the recoil.

The part L may be made solid, if desired, and not hollow, to act on air or other elastic fluids, in substantially the same manner.

Having thus described my invention,

I claim as new, and desire to secure by Letters Patent—

1. The improved device, above described, or its equivalent, for utilizing the recoil of heavy guns, consisting of the vibrating frame B, shaft C, gears I I, springs K K, pinions *b b*, shaft J, ratchet *d*, and pawl *e*, all substantially as shown and set forth.

2. The above device, in combination with the spring cushions H H, arranged on the frame D, as and for the purpose specified.

The above specification of my invention signed by me, this 26th day of April, 1869.

JAS. B. EADS.

Witnesses:

JOHN A. UBSDELL,

THO. SADLER.