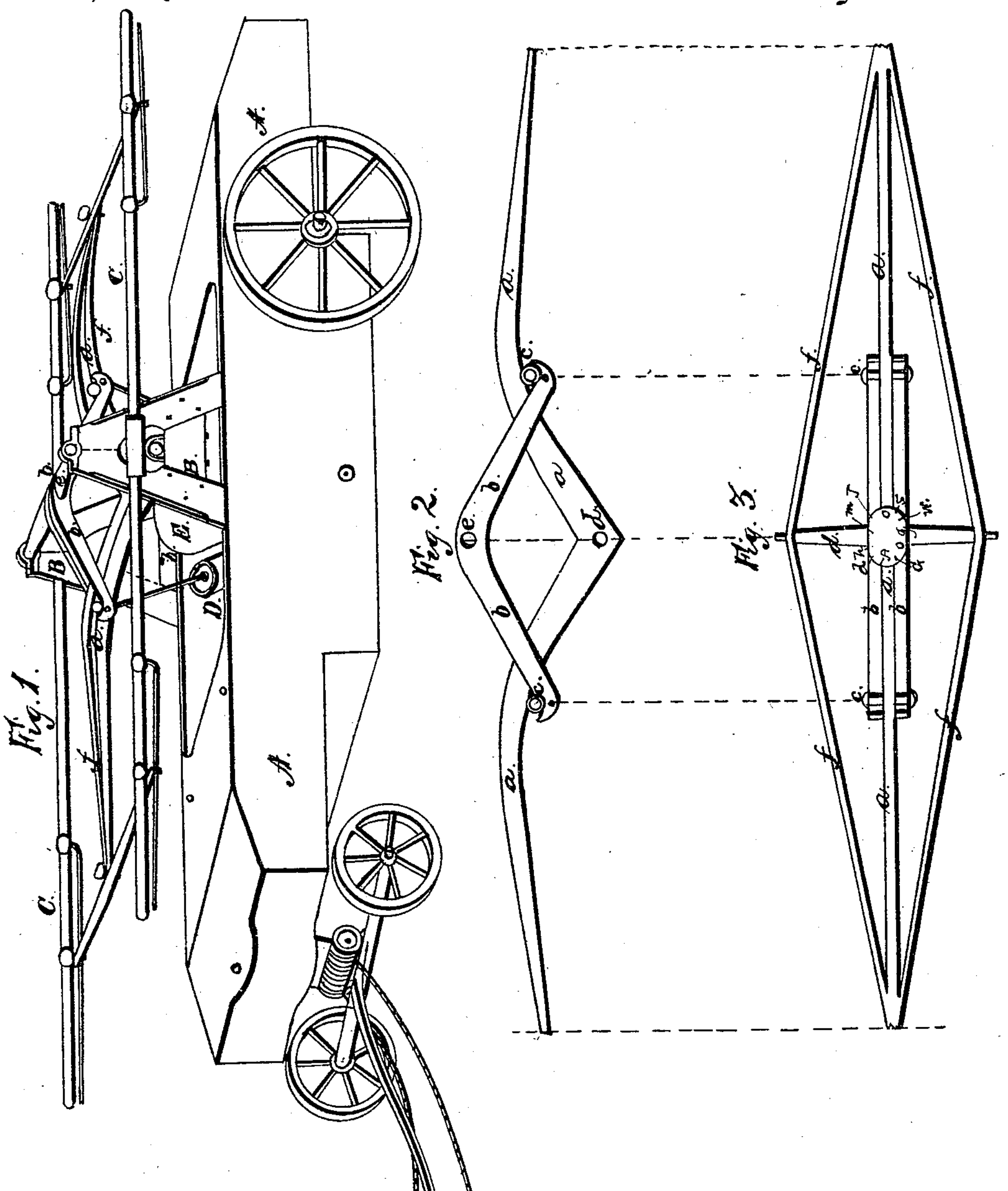
O. G. Adkins.

Fire Engine,

No. 9,127.

Patented July 20, 1852



N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ORVILLE G. ADKINS, OF OSWEGO, NEW YORK.

FIRE-ENGINE.

Specification of Letters Patent No. 9,127, dated July 20, 1852.

To all whom it may concern.

Be it known that I, ORVILLE G. ADKINS, of Oswego, in the county of Oswego and State of New York, have invented a new and Improved Combination of Levers for Working Fire-Engines and for other Purposes; and I do hereby declare that the same is described and represented in the following specification and accompanying drawings.

It is well known that the common fire engines, as well as most of the different species of forcing pumps have an air chamber attached to them and that the force of the stroke is directly applied to the compression of the air therein confined, its elastic reaction raising or forcing out the water; and as the elastic force of compressed air is exactly proportionate to the amount of compression, or, in other words, inversely proportionate to the space it occupies it is evident that for each stroke of the piston the resistance to be overcome is continually increasing from the beginning to the end of it. On the other hand in the case of the fire engine when the moving power is commonly the strength of man (and also in some other cases) the position of the lever arms toward the end of the stroke is much less favorable for the application of the power and consequently the efficiency of the force or power in operation may be said to be continually diminishing from the beginning to the end of the stroke. It is, doubtless, to this inverse ratio between the resistance and the efficiency of the power by which it is to be overcome, that the well known wearing and exhausting effect of working a fire engine is in great measure due; the vigor of the stroke being wasted before the strongest resistance is met a severe and exhausting effort is required to overcome that resistance and complete the stroke. To remedy this inconvenience and serious evil I have invented a combination of levers so connected and arranged that as the stroke progresses the relation between the lengths of the long and short arms of the main lever is continually changing by the motion of the point at which the resistance is met, the long arm or that to which the power is applied becoming longer and the short arm shorter: thus speed is given to the first part of the stroke and to the latter part the efficient force required.

To enable others skilled in the art to make and use my invention I will proceed to describe its construction and operation referring to the drawings above mentioned in which the same letters indicate like parts in all the figures.

Figure 1 is a perspective view of a fire engine to which my improved combination of levers is applied; Fig. 2 is a side elevation of the levers detached; Fig. 3 is a plan of the same.

A, A is the body of the engine supported by a carriage as represented and containing the pumps and their appendages; B, B is a frame to support the axes of the levers and C, C are arms by which they are worked; D is one of the pump cylinders and E the air chamber all which parts may be constructed and arranged in the usual manner or otherwise; *a*, *a* is a double lever strengthened by the side braces *f*, *f* and vibrating on the axis *d* which rests in suitable bearings in the frame B, B; *b*, *b* is a short lever with equal arms vibrating on the axis *e* which rests in bearings so placed that it may be parallel to the axis *d;* each arm of the short lever is divided vertically by a space sufficient to allow an arm of the long lever to work freely between the two divisions, and at the end of the arm a friction roller *c* extends across these two divisions or from one to the other upon which the arm of the long lever rests. The axis *e* is placed above the axis *d* as represented in the drawing and both levers have a bent or curved form so that each arm of the long lever *a*, *a* may pass between the two divisions of an arm of the short lever *b*, *b* and act against the friction roller *c*. The pump rod *h* is connected to the short lever *b*, *b* and is hung in a cavity in the piston (within the cylinder D) by a pin passing through it so as to allow it to vibrate and accommodate itself to the curvilinear motion of the point of connection on the lever *b*, *b*. Now as the axis *e* is placed above the axis *d* it is evident that as an arm of the lever *a*, *a* descends the roller *c* must move along that arm toward the fulcrum or the axis *d;* thus the long arm of the descending half of the double lever *a*, *a* is becoming longer and the short arm (from *c* to *d*) shorter during the descent and consequently the force with which it acts is continually becoming greater in proportion to the power by which it is acted upon during the whole descent of the arm or from the beginning to the end of the stroke while ac-

cording to a well known principle of mechanics the motion of the point of resistance or of the arm of the lever *b*, *b* is at the same time and at precisely the same rate becoming less rapid in proportion to that of the moving power. The important advantages arising from these results have been already pointed out. During the ascent the motion of the roller *c* or of the point of resistance along the lever *a*, *a* is of course the reverse of what has been just described and it will be seen that if the levers are so adjusted as to bring the long lever in contact with both rollers when it has a horizontal position as in Fig. 2 and it is designed that it shall remain in contact with both, the curves on the lever *a*, *a*, on the opposite sides of each roller, must be similar curves; and that by varying the distance between the axes *e* and *d* and the form of the curves on the lever *a*, *a* the extent of the motion of the roller *c* along *a*, *a* and its rate at different points and consequently the extent and rate at different points of the change in the effective force of the levers may be varied at pleasure. This in some cases would be an important advantage and I contemplate the application of my improved combination of levers to pumps, steam engines and to all purposes to which the same shall be found to be advantageously applicable.

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

The mode herein described of drawing the resistance toward the fulcrum of the lever to which the power is applied through its entire descent; thereby lengthening the long arm and shortening the short arm of the lever substantially as described.

In testimony whereof, I have hereunto signed my name before two subscribing witnesses.

ORVILLE G. ADKINS.

Witnesses:

A. F. ALLEN,

O. C. BLOFE.