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M. D. HALSEY.

FIRE ENGINE.

No. 285,259. Patented Sept. 18, 1883.

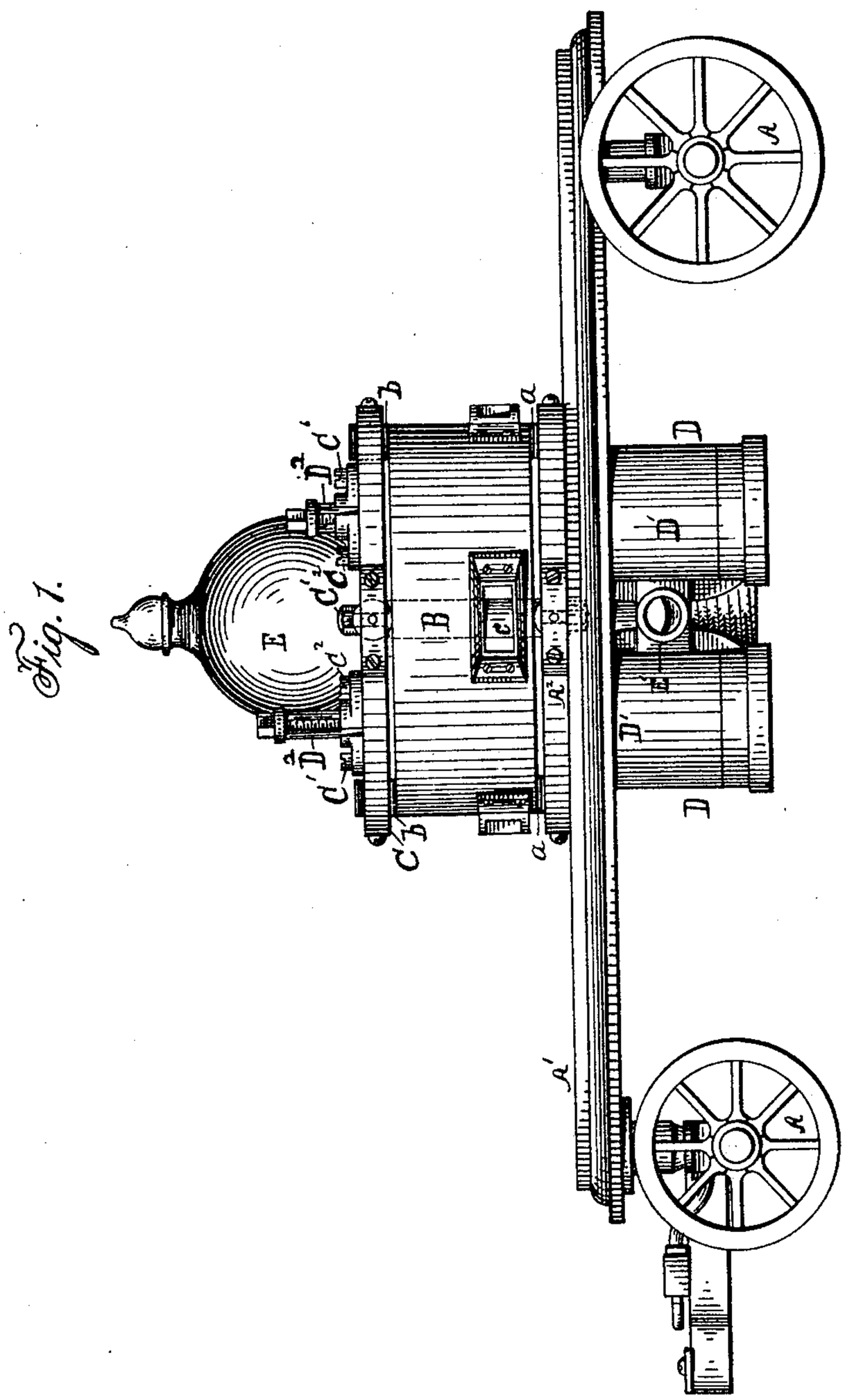

Fig. 1.

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Fig. 2.

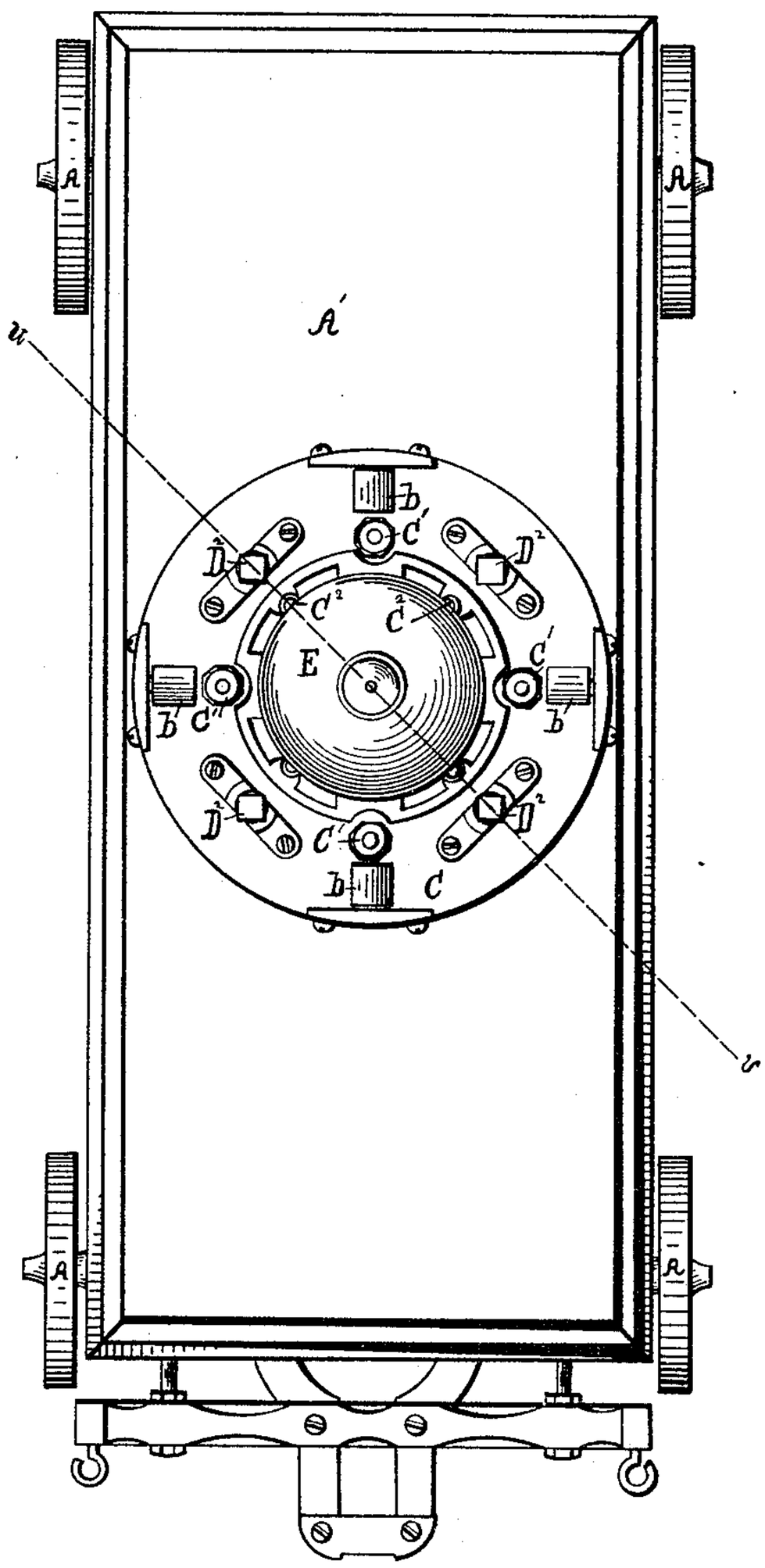

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Fig. 3.

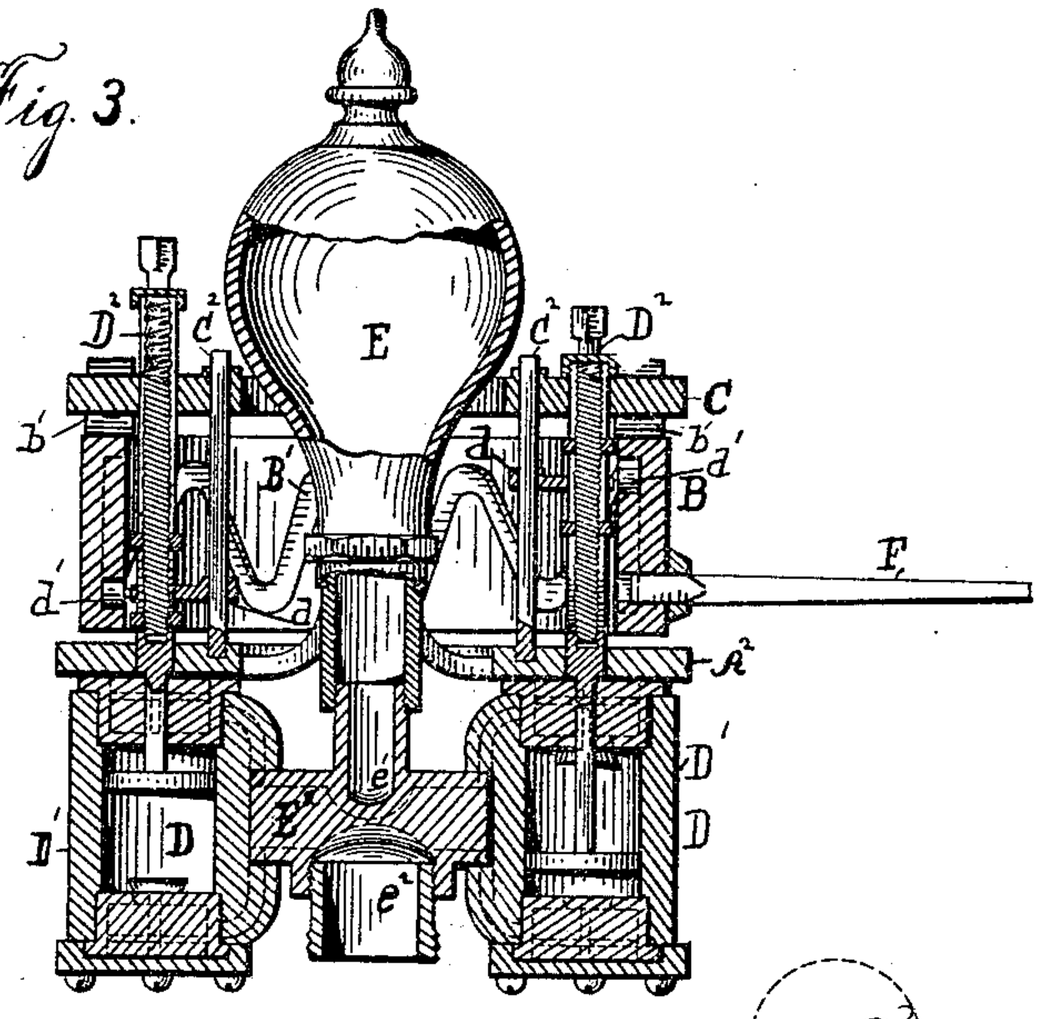


Fig. 4.

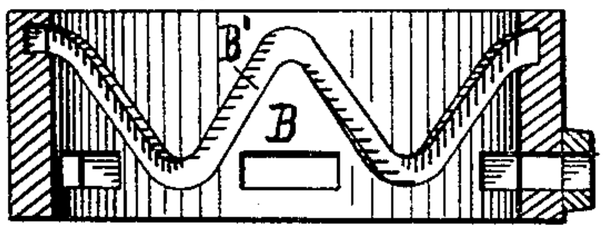


Fig. 5.

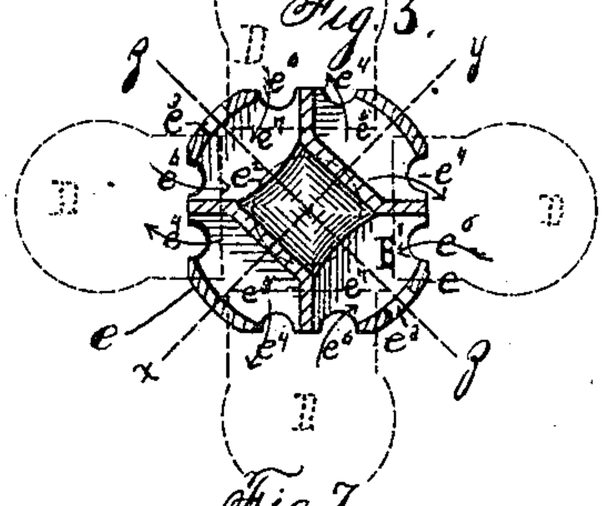


Fig. 6.

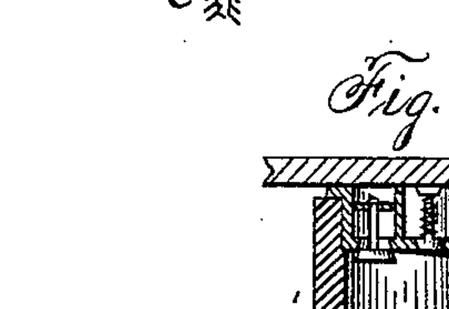


Fig. 10.

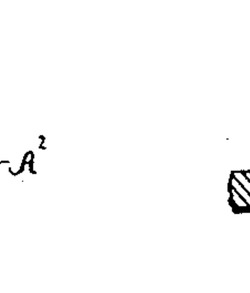


Fig. 7.

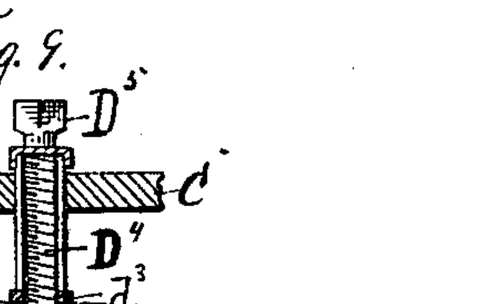


Fig. 8.

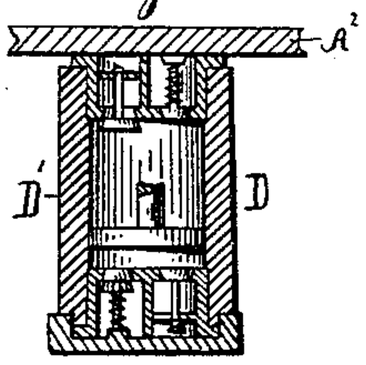
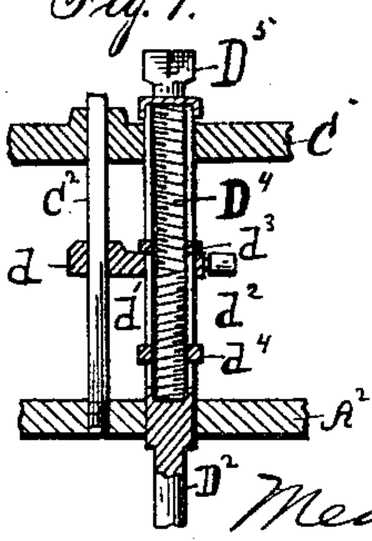


Fig. 9.



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UNITED STATES PATENT OFFICE.

MENZO D. HALSEY, OF DETROIT, MICHIGAN, ASSIGNOR TO THE HALSEY FIRE ENGINE COMPANY, OF MICHIGAN.

FIRE-ENGINE.

SPECIFICATION forming part of Letters Patent No. 285,259, dated September 18, 1883.

Application filed November 21, 1882. (No model.)

To all whom it may concern:

Be it known that I, MENZO D. HALSEY, of Detroit, county of Wayne, State of Michigan, have invented a new and useful Improvement in Fire-Engines; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form a part of this specification.

My invention consists in the combinations of devices and appliances hereinafter specified, and more particularly pointed out in the claims.

In the drawings, Figure 1 is a side elevation of a fire-engine embodying my invention. Fig. 2 is a plan view of the same. Fig. 3 is a vertical section along the line *u v*. Fig. 4 is a section of the crown-wheel, showing the construction of its interior. Fig. 5 is a plan view of the diaphragm with the top removed. Fig. 6 is a vertical section of the diaphragm along the line *x y*. Fig. 7 is a vertical section of the same along the line *z z*. Fig. 8 is a vertical section of one of the pump-cylinders. Fig. 9 is a side elevation of the regulating mechanism. Fig. 10 is a horizontal section.

It is frequently found very desirable in the use of fire-engines that means should be provided by which pumps shall be driven by man or horse power, as well as by steam-power, and that such means should be simple and economical.

It is the object of my invention to provide such a fire-engine which shall be driven by man or horse power or by steam, in which the pumps shall be operated by means of a crown-wheel provided on its interior circumference with a groove or channel having an alternate ascent and descent, in which an arm of the piston of the several pumps rides up and down, said crown-wheel revolved by suitable gearing or by sweeps either attached directly thereto or by intervening gearing by which its speed can be increased.

In carrying out my invention, A represents the trucks; A′, the platform upon which the device is supported.

A^2 is the bed-plate.

B is a crown-wheel provided with a groove or channel, B′, extending around its interior circumference, with alternate angles of ascent and descent arranged to engage with the pistons of any desired number of pumps located within the crown-wheel.

C is a top plate over the crown-wheel B. It is supported upon posts C′.

C^2 C^2 represent guides to the piston-rods D^2 of the pumps.

a represents anti-friction rollers, secured in any proper manner either to the bed-plate A^2 or to the posts C′, upon which the crown-wheel B revolves.

b represents anti-friction rollers secured to the plate C, underneath which the crown-wheel B revolves.

c are anti-friction rollers secured in the exterior of the posts C′, bearing upon the interior of the crown-wheel B.

D represents any suitable pumps, preferably double-acting pumps, in any desired number, extending down through the platform A′.

D′ is the cylinder.

D^2 is the piston-rod.

C^3 represents guides extending parallel with the piston-rod.

d represents cross-heads with anti-friction rollers *d′* secured to the piston-rod D^2, and to the guides C^3, said cross-heads adapted to ride in the grooves B′. The guides are intended to steady the operation of the cross-heads, and to keep the rollers *d′* from oscillating or binding in the groove B′.

E is an air-chamber extending down through the platform A′. The air-chamber is provided with a diaphragm, E′, at its lower end. I prefer to construct said diaphragm in the form shown in Figs. 5, 6, and 7, in which *e* is the case; *e′*, the connection with the air-chamber; e^2, the connection with the suction-hose. e^3 represents a desired number of connections with the distributing-hose. e^4 represents water-ports for supplying the pumps, and having connections with the suction-hose, as shown by the arrows in Fig. 5, through the chamber e^5, located within the diaphragm. e^6 represents ports communicating with the pump and the air-chamber. These ports admit the water

from the pumps to the chambers e^7, which are connected with the air-chamber and the distributing-hose, as shown by the arrows in Fig. 7.

It is evident that when all the pumps are in full operation a maximum power is required to run them; but it is often desirable to so limit their stroke and the amount of water thrown that should a limited power only be at hand the capacity of the machine may be so regulated as to adapt it for use by different amounts of power. To accomplish this end I provide opposite sides of a screw, D^4, at the upper end of the piston-rod D^2, with segmental sections d' d^2, Figs. 9 and 10, which are screw-threaded on their interior, one end being formed with a right and the other end with a left hand screw-thread. The screw D^4 at the upper end of the piston-rod is provided at one end with a right and the other end with a left hand screw-thread adapted to the screw-threads of the segmental sections. Upon these sections are arranged two collars, d^3 d^4, which are provided with interior projections, d^5 d^6, Fig. 10, which fit in the spaces between the vertical edges of the segmental sections, and are threaded to fit the screw D^4, so as to be moved up and down, as hereinafter explained. The collar d^4 is arranged below and the collar d^3 above the cross-head d, as shown in Fig. 9. It will be obvious that by turning the head D^5 of the screw D^4 in one direction the collars d^3 d^4 will be moved away from each other, while by turning the screw in the opposite direction the collars will be caused to approach each other, the collars in such movements being accurately guided by the vertical edges of the segmental sections d' d^2. When the collars are moved apart, the cross-head d must, of course, move a greater distance before it strikes the upper collar than when the collars are moved toward each other—that is, if the collars are adjusted away from each other, the cross-head must move upward along the groove B′ a greater distance to strike the upper collar than when the collars are adjusted nearer to the cross-head. In this manner the stroke of the piston can be varied at will, either when the machine is at rest or in motion. The rotation of the crown-wheel B will communicate the power to the pumps D by means of the anti-friction rollers d', secured to the piston-rods which ride up and down in the groove B′.

The pumps may each be so arranged as to be readily disengaged from the crown-wheel B, so that the force of one or more shall be continuously applied to the stream in the lower portion of the air-chamber.

To drive the crown-wheel B, any desired number of sweeps F may be secured directly thereto; but, if found desirable, the sweeps may be secured to any intervening gearing of a suitable nature to propel the crown-wheel B, without departing from the essence of my invention.

Instead of providing the interior of the crown-wheel with a cam-shaped groove, as explained, for engaging the pump-pistons, there may be an outstanding cam-shaped flange for effecting said engagement; and instead of locating the cam upon the interior of the wheel, it may be located at its upper or lower edge, or may be located on the outside of said crown-wheel, in such position as to be out of the way of the sweeps if they are connected directly with the crown-wheel. In the latter case the pumps might be located outside of and adjacent to the crown-wheel, and in this latter case the crown-wheel might be journaled directly upon a central post, or about the neck of the air-chamber.

It is evident, also, that the cam-groove B′ may be made of chilled metal; or the surface of the groove may be faced with removable wearing-plates, which may be replaced in case of excessive wear.

What I claim is—

1. In a fire-engine, the combination, with a crown-wheel provided interiorly with a cam, of one or more pumps having piston-rods, devices connecting said rods with the cam, and a sweep for rotating the crown-wheel, substantially as described.

2. In a fire-engine, the combination, with a crown-wheel provided interiorly with a cam, of one or more pumps having piston-rods, devices connecting said rods with the cam, and an air-chamber projecting into the crown-wheel and communicating with the pump or pumps, substantially as described.

3. In a fire-engine, the combination, with a crown-wheel provided interiorly with a cam, of one or more pumps having piston-rods, devices connecting the said rods with the cam, and a top plate supported from the interior of the crown-wheel and provided with guides for the piston-rods, substantially as described.

4. In a fire-engine, the combination of a crown-wheel provided interiorly with a cam, one or more pumps having piston-rods, devices connecting the rods with the cam, and friction-wheels located beneath and within the crown-wheel for sustaining the latter on its bearing, substantially as described.

5. The combination of four adjacent pumps having piston-rods with an air-chamber common to all the pumps, a chambered diaphragm located under and communicating with the air-chamber and connecting with said pumps, a crown-wheel provided interiorly with a cam, and means connecting the piston-rods of the pumps with said cam, substantially as and for the purpose described.

6. The combination of a series of pumps having piston-rods, a crown-wheel provided with an interior cam, a series of guide-posts projecting vertically through the crown-wheel, and yokes connected with the piston-rods and capable of sliding on the guide-posts, said yokes connecting with the cam of the crown-wheel, substantially as described.

7. The combination, with the pumps having

piston-rods, of the crown-wheel having an interior cam, a screw connected with the end of each piston-rod, collars adjustable toward and from each other by the screw, and yokes located between the collars and connecting with the cam of the crown-wheel, substantially as described.

8. The combination, with the pumps having pistons, the crown-wheel having an interior cam, and yokes connected with the pump-pistons and the cam, of collars located on opposite sides of the yokes, and mechanism for adjusting the collars toward and from each other to vary the stroke of the pistons, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

MENZO D. HALSEY.

Witnesses:
N. S. WRIGHT,
SAMUEL E. THOMAS.