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L. W. EGGLESTON.
PNEUMATIC PUMPING APPARATUS.

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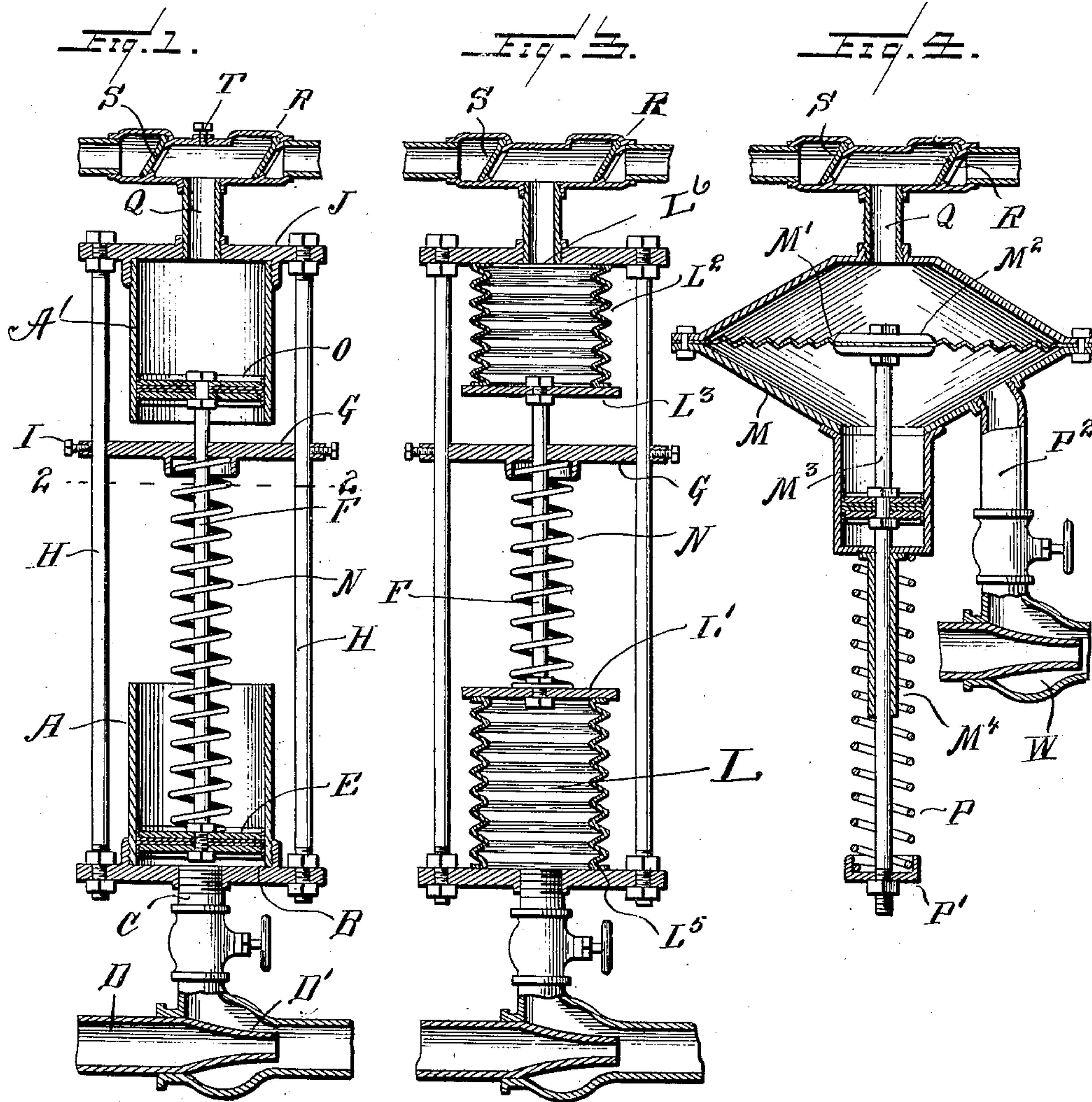
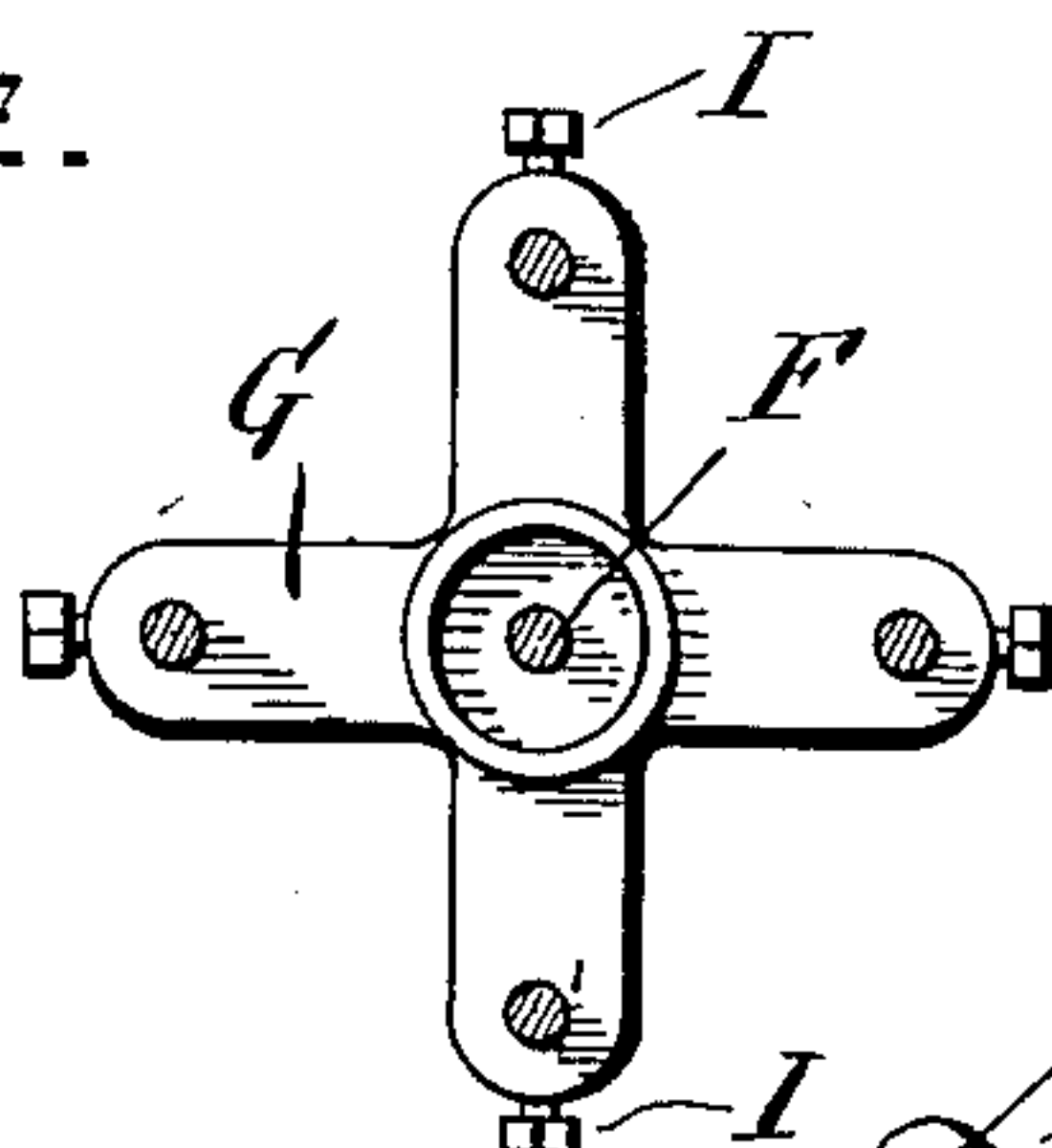


Fig. 4.



WITNESSES:
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PNEUMATIC PUMPING APPARATUS.

No. 862,867.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, LEWIS WATSON EGGLESTON, a citizen of the United States, residing at Appleton, in the county of Outagamie and State of Wisconsin, have invented certain new and useful Improvements in Pneumatic Pumping Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in pneumatic pumping apparatus adapted to be actuated by the varying pressure in water mains, thereby forming a means adapted for maintaining a vacuum upon a steam heating plant or for other purposes, the pumping apparatus being actuated by the pressure in the mains incident to the drawing of water through spigots connected with the mains or with the varying pressure of the pump which forces the water through the mains.

My invention consists further in various details of construction and in combinations and arrangements of parts which will be hereinafter fully described and then specifically defined in the appended claims.

I illustrate my invention in the accompanying drawings, in which:—

Figure 1 is a vertical sectional view through a cylinder, showing the features of my invention. Fig. 2 is a cross sectional view on line 2—2 of Fig. 1. Fig. 3 is a sectional view through a modified form of the pumping apparatus in which diaphragms are employed instead of pistons, and Fig. 4 is a sectional view through a still further modified form of my invention.

Reference now being had to the details of the drawings by letter, A and A' designate cylinders, the former of which has an apertured bottom B through which a pipe C leads and into an elbow of which the service pipe or main D enters, a nozzle D' at the end of said pipe opening into the space in the manner illustrated in the drawings, whereby the varying pressure upon the water which passes through the main may be exerted through the pipe C and upon the piston E therein. Said piston has a stem F connected thereto, and G designates an adjustable plate having apertures to receive the bolts H which pass through registering apertures in the bottom B of the cylinder A and the top J of the cylinder A'. Set-screws I are mounted in the arms of said plates and are adapted to hold the plate G in an adjusted position. A spring N is interposed between the piston E and said plate G, the tension of which is regulated by the plate G. O designates a plunger which is mounted upon the upper end of the stem F and has a play in the cylinder A'. Said top J is provided with a central aperture

through which a pipe Q passes, which latter branches at its upper end and has laterally projecting passageways, one of which contains an inlet check valve R and the other, an outlet valve S. T designates a plug filling an aperture through which oil may be fed to the cylinders.

In Fig. 3 of the drawings, I have shown a modification of my invention in which I dispense with the cylinders and employ a diaphragm L which is fastened to the disks L' upon the piston F, the lower end of said diaphragm being connected to the disk L⁵, while a similar diaphragm L² is fitted to a disk L³ upon the stem F, and the upper end of the diaphragm L² is fastened to the disk L⁶. By this construction, the plunger and piston are dispensed with and the diaphragms substituted therefor.

In Fig. 4 of the drawings, I have shown a still different modification of my invention in which a diaphragm casing M, made up of two complementary parts held together, contains a diaphragm M' having a disk M² connected to said diaphragm and also to a stem M³ which has a reciprocating movement in the guide extension M⁴. A spring P has a bearing between a washer P' and the shoulder upon the casing M, and serves to return the diaphragm M' to its normal position after having been acted upon by pressure from the main through the pipe P² with which the water main W has communication.

The operation of the form shown in Fig. 1 is as follows. The pneumatic pumping apparatus being in connection with the main in the manner shown, any varying pressure which may come upon the latter, either by the pump which forces the water into the main or by opening the faucets connected to the main, will cause a corresponding pressure to be imparted to the piston E to move longitudinally the stem F carrying the plunger O, thereby forcing any air in the upper cylinder through the outlet pipe S to any suitable location. When the pressure is equalized, the spring will have a tendency to throw the piston E to its lowest limit, and air will be drawn through the check valve R to replenish the supply in the upper cylinder. This operation is continuous and automatic in its action, depending entirely upon the varying pressure, as described.

In Figs. 3 and 4 of the drawings, it will be noted that diaphragms which are substituted for the piston, plunger and cylinders, will cause the same movement to be imparted to the piston stem F, whereby the same result may be accomplished.

From the foregoing, it will be noted that a simple and efficient apparatus is afforded which may be operated without expense, whereby a vacuum may be maintained upon a steam heating plant, or for other purposes, and affording means whereby "water hammer", so commonly present in radiators, may be obviated.

While I have referred to my invention as being

adapted especially for use in connection with steam heating plants for forming a vacuum, it will be understood that the apparatus may be adapted equally as well for pumping liquids.

5 What I claim is:—

1. A pneumatic pumping apparatus comprising, in combination with a water main, a cylinder having a communicating pipe leading therefrom to said main, a piston in said cylinder, an inverted air-compression cylinder, a valve-regulated pipe communicating with the latter, rods connecting the flanges and the ends of said cylinders, an adjustable plate having apertures through which said rods pass and set screws for holding the plate in adjusted position, a spring interposed between said plate and one of
10 said pistons, as set forth.

15 2. In combination with a cylinder having an apertured

end and pipe leading therefrom and provided with a chambered portion, a main having a nozzle end opening into said chambered portion at right angles to the communicating passage leading to said cylinder, a piston in said cylinder, an air-compression cylinder, a valve-regulated air pipe communicating with said air-compression cylinder, a piston mounted in each of said cylinders, a stem connecting said pistons, rods connecting the flanges and the ends of said cylinders, an adjustable plate mounted upon said rods and a spring interposed between said plate and one of said pistons, as set forth. 20 25

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

LEWIS WATSON EGGLESTON.

Witnesses:

HERMANN C. ROEMER,
CHRIS ROEMER.