

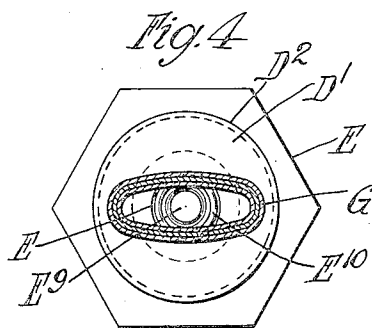
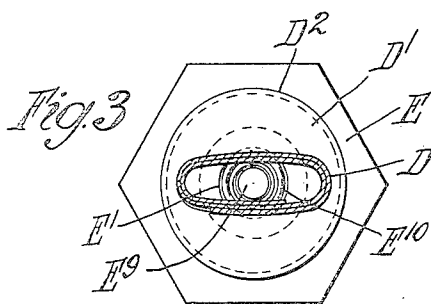
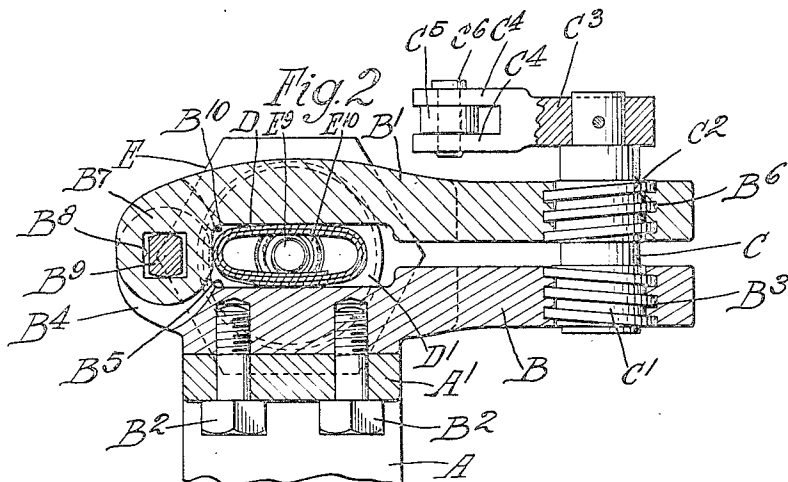
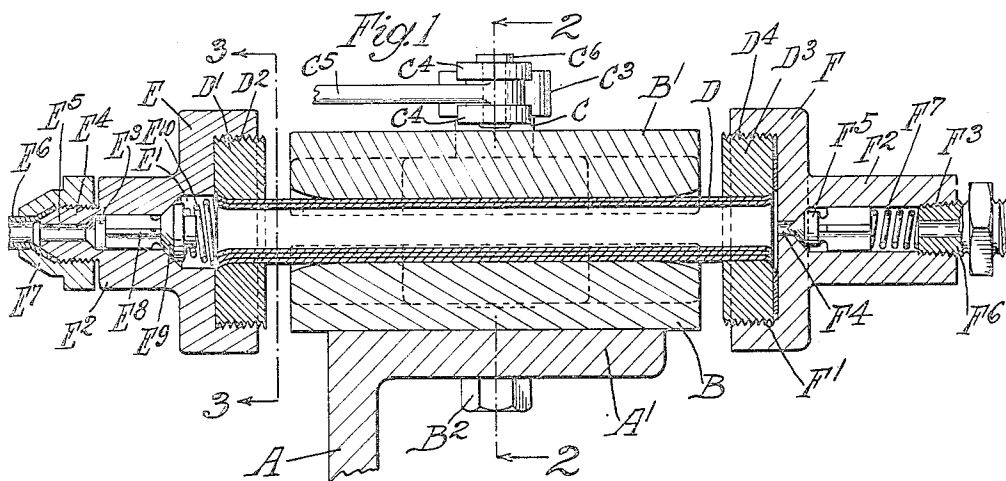
July 3, 1934.

P. L. SCOTT

1,965,006

PUMP

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UNITED STATES PATENT OFFICE

1,965,006

PUMP

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Application October 20, 1930, Serial No. 489,750
Renewed November 22, 1933

19 Claims. (Cl. 103—148)

This invention relates to a pump and particularly to a laminated pump.

It has for one object to provide a pump in which the pumping chamber is formed of laminations and in which the walls of the chamber are de-

formed to alter the volume of the chamber itself. Another object is to provide a pump of this general type in which small quantities of liquid are delivered at high pressures and with great

speed. Another object is to provide a pump actuating means.

Other objects will appear from time to time in the specification and claims.

My invention is illustrated more or less diagrammatically in the accompanying drawing, wherein—

Figure 1 is an axial cross section through a pump;

Figure 2 is a transverse cross section taken at line 2—2 of Figure 1;

Figure 3 is a transverse detailed cross section taken at line 3—3 of Figure 1;

Figure 4 is a view generally similar to Figure 3, showing a modified form of laminated tube.

Like parts are designated by like characters throughout the specification and drawing.

A indicates a base portion upon which the pump body may be mounted. This may be of any suitable form and in the form illustrated herewith the base is provided with a lateral extension or part A¹ to which the pump is attached. The operating means for the pump includes a pair of relatively movable members B, B¹. The member B may be attached to the portion A¹ of the base by screws B². At one end the member B is provided with a threaded perforation B³. The member B at its opposite end is provided with a pair of upwardly extending perforated ears B⁴. The upper or inner surface of the member B is preferably provided with a depression B⁵ within which the pump tube is positioned. The member B¹ is provided at one end with a threaded perforation B⁶. The threads B⁶ of the member B¹ are reversed with respect to the threads B³ of the member B. At its opposite end the member B¹ is provided with a downwardly depending ear B⁷ which is perforated as at B⁸. The portion B⁷, when the parts are assembled, lies between the portions B⁴. B⁹ is a rocker pin extending through the perforations in the member B⁴ and through the perforation B⁸ of the member B⁷. This pin may be rounded, as indicated in Figure 2, and preferably fits snugly within the perforation but is of a shape different

from the perforation so that relative movement of the parts is possible. The inner or lower face of the member B¹ is provided with a hollow portion B¹⁰ within which the pump tube is positioned.

In the operation of the device, the parts B, B¹ are moved toward and from each other. This movement is accomplished by a shaft C. One end of the shaft C is provided with threads C¹ which engage the threads B³ of the member B. Another part of the shaft C is provided with threads C² which engage the threads B⁶ of the member B¹ and are reverse with respect to the threads C¹. At its upper end the shaft C has fixed to it a lever C³ which is formed at its outer or free end into two yoke portions C⁴, C⁴. Between them is movably positioned a connecting rod or link C⁵, a pin C⁶ holding it in position. Any suitable means for moving the member C⁵ backward and forward to rock the shaft C is provided. This rocking movement by means of the relatively reversed threads on the shaft causes the members B and B¹ to be alternately moved toward and from each other. The inner faces of the members B, B¹, that is the faces which contact the pump tube, may be rounded at their outer edges, as shown in Figure 1.

D is a pump tube. It is preferably oval, as shown, and in one form of my invention it is made of a single sheet of material wrapped about itself. At one end it is fastened to and supported in a perforated connection member D¹ which, for convenience, may be made circular and exteriorly threaded as at D². At its opposite end it is attached to and supported in a similar connecting member D³ which is threaded as at D⁴.

Positioned about the member D¹ is an inlet valve housing E which has a cavity or bore E¹ within it. E² is an extension from the member E¹, provided with a reduced bore E³. E⁴ is a further reduced portion provided with a bore E⁵. The portion E⁴ may be exteriorly threaded. E⁶ is a fluid conduit positioned on the member E⁴ and held thereon by a cap E⁷ which engages the threads on the member E⁴. E⁸ is an inlet valve positioned within the bore E³, carrying an enlarged head portion E⁹, lying within the bore E¹. E¹⁰ is a compression spring tending to normally hold the valve seated in the position indicated in Figure 1. The member D³ has mounted upon it an outlet valve housing F which is hollow and preferably interiorly threaded as at F¹. Extending from the member F and preferably formed integrally with it is a reduced hollow portion F² which may be interiorly threaded as at F³. A passage F⁴ leads from

the interior of the pump tube D to the hollow portion of the extension F². An outlet valve F⁶ is positioned within the extension F² and may be seated as indicated in Figure 1. A hollow connecting member F³ is removably positioned in the threaded portion F³ and to it an outlet conduit or connection of any suitable sort may be fastened. A spring F⁷ is positioned in the hollow portion of the extension F² and bears at one end upon the valve F⁶ and at its other end upon the connection F³. It tends normally to hold the valve seated.

In Figure 4 a modified form of the pump is shown. Instead of the tube D shown in the other figures, the laminated pumping tube is built up of a plurality of separate integral tubes G which are positioned one within the other. The mounting of this tube may be the same as the mounting of the form of tube shown in the other figures and the operating means and other parts of the pump assembly may be the same.

It will be realized that whereas I have herewith shown and described a practical operative device, nevertheless many changes might be made in the size, shape, number and disposition of parts without departing from the spirit of my invention and I wish, therefore, that my showing be taken in a sense as diagrammatic.

The use and operation of my invention are as follows:

With the parts in the position shown, it is assumed that the pump tube is filled with liquid. The driving mechanism is put in operation and any suitable power source may be used. The member C⁵ is moved in a direction to rotate the shaft C so that the portions B, B¹ are drawn toward each other. Ordinarily the amount of movement is minute. As the parts B, B¹ move with relation to each other, they tilt about the rocking pin B⁸ and as they are drawn towards each other they compress the tube D, thus reducing its volume and creating pressure within it. When this pressure has reached sufficient proportions to overcome the resistance of the spring F⁷ the outlet or discharge valve F⁶ is unseated and discharge takes place.

Thereafter the movement of the member C⁵ is reversed and the shaft C correspondingly moves in the opposite direction, thus, through the screws upon it, moving the members B, B¹ apart from each other and releasing the pressure upon the pump tube. It is thus caused to expand and the pressure within it is relieved so that the outlet valve F⁶ is seated. The tube when free to do so expands sufficiently to create suction within itself, the inlet valve is thus opened, fluid is drawn in and the pump is again ready to be compressed to cause discharge of fluid. This cycle of operation is repeated so long as the driving force continues.

I claim:

1. In a pump, a hollow laminated metallic spring member, arranged for relative movement of the laminations and defining a pump chamber, and means for changing the shape of the hollow member to change its volume.

2. In a pump, a hollow laminated metallic spring member of oval cross section, arranged for relative movement of the laminations and defining a pump chamber, and means for changing the shape of the hollow member to change its volume.

3. In a pump, a hollow generally tubular laminated metallic spring member, arranged for relative movement of the laminations and defining a pump chamber, and means for changing the

shape of the hollow member to change its volume.

4. In a pump, a hollow laminated metallic spring member, arranged for relative movement of the laminations and defining a pump chamber, and means for changing the shape of the hollow member to change its volume, said hollow member formed of a single part wrapped upon itself.

5. In a pump, a hollow laminated metallic spring member of oval cross section, arranged for relative movement of the laminations and defining a pump chamber, and means for changing the shape of the hollow member to change its volume, said hollow member formed of a single part wrapped upon itself.

6. In a pump, a hollow generally tubular laminated metallic spring member, arranged for relative movement of the laminations and defining a pump chamber, and means for changing the shape of the hollow member to change its volume, said hollow member formed of a single part wrapped upon itself.

7. In a pump, a hollow laminated metallic spring member, arranged for relative movement of the laminations and defining a pump chamber, and means for changing the shape of the hollow member to change its volume, said means including a compression device formed of a plurality of relatively movable members.

8. In a pump, a hollow laminated metallic spring member of oval cross section, arranged for relative movement of the laminations and defining a pump chamber, and means for changing the shape of the hollow member to change its volume, said means including a compression device formed of a plurality of relatively movable members.

9. In a pump, a hollow generally tubular laminated metallic spring member, arranged for relative movement of the laminations and defining a pump chamber, and means for changing the shape of the hollow member to change its volume, said means including a compression device formed of a plurality of relatively movable members.

10. In a pump, a hollow laminated metallic spring member, arranged for relative movement of the laminations and defining a pump chamber, and means for changing the shape of the hollow member to change its volume, said means including a compression device formed of a plurality of relatively movable members, said hollow member formed of a single part wrapped upon itself.

11. In a pump, a hollow laminated metallic spring member of oval cross section, arranged for relative movement of the laminations and defining a pump chamber, and means for changing the shape of the hollow member to change its volume, said means including a compression device formed of a plurality of relatively movable members, said hollow member formed of a single part wrapped upon itself.

12. In a pump, a hollow generally tubular laminated metallic spring member, arranged for relative movement of the laminations and defining a pump chamber, and means for changing the shape of the hollow member to change its volume said means including a compression device formed of a plurality of relatively movable members, said hollow member formed of a single part wrapped upon itself.

13. In a pump, a hollow metallic spring member defining a pump chamber, and means for changing the shape of the hollow member to change its volume, said means including a compression device formed of a plurality of relatively

movable members including co-acting threaded portions, the hollow member being positioned between said last mentioned movable members.

14. In a pump, a hollow metallic spring member, defining a pump chamber, and means for changing the shape of the hollow member to change its volume, said means including a device formed of a plurality of relatively movable members, said members joined at one end by a rocker pin and including co-acting threaded portions.

15. In a pump, a hollow metallic spring member, defining a pump chamber, and means for changing the shape of the hollow member to change its volume, said means including a device formed of a plurality of relatively movable members, said members joined at one end by a rocker pin, and provided at their other ends with means for moving the ends equally toward and from each other.

16. In a pump, a hollow metallic spring member, defining a pump chamber, and means for changing the shape of the hollow member to change its volume, said means including a device formed of a plurality of relatively movable members, said members joined at one end by a rocker

pin, and provided at their other ends with means for moving the ends equally toward and from each other, said hollow member positioned between said relatively movable members.

17. In a liquid moving means, a hollow metallic elastic laminated member arranged for relative movement of the laminations and defining a liquid chamber, and means for acting upon said member to change its volume to cause movement of the liquid within it.

18. In a liquid moving means, a hollow metallic elastic laminated member arranged for relative movement of the laminations and defining a liquid chamber, and means for acting upon said member to change its volume to cause movement of the liquid within it, said laminated member being formed of a single part wrapped upon itself.

19. In a pump, a hollow metallic laminated member arranged for relative movement of the laminations and defining a pump chamber, inlet and outlet means therefor, and positive mechanical means for changing the shape of the hollow member, by compression upon it, to change its volume.

PHILIP LANE SCOTT.

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