

(No Model.)

M. RUSSELL.

PUMP.

No. 336,263.

Patented Feb. 16, 1886.

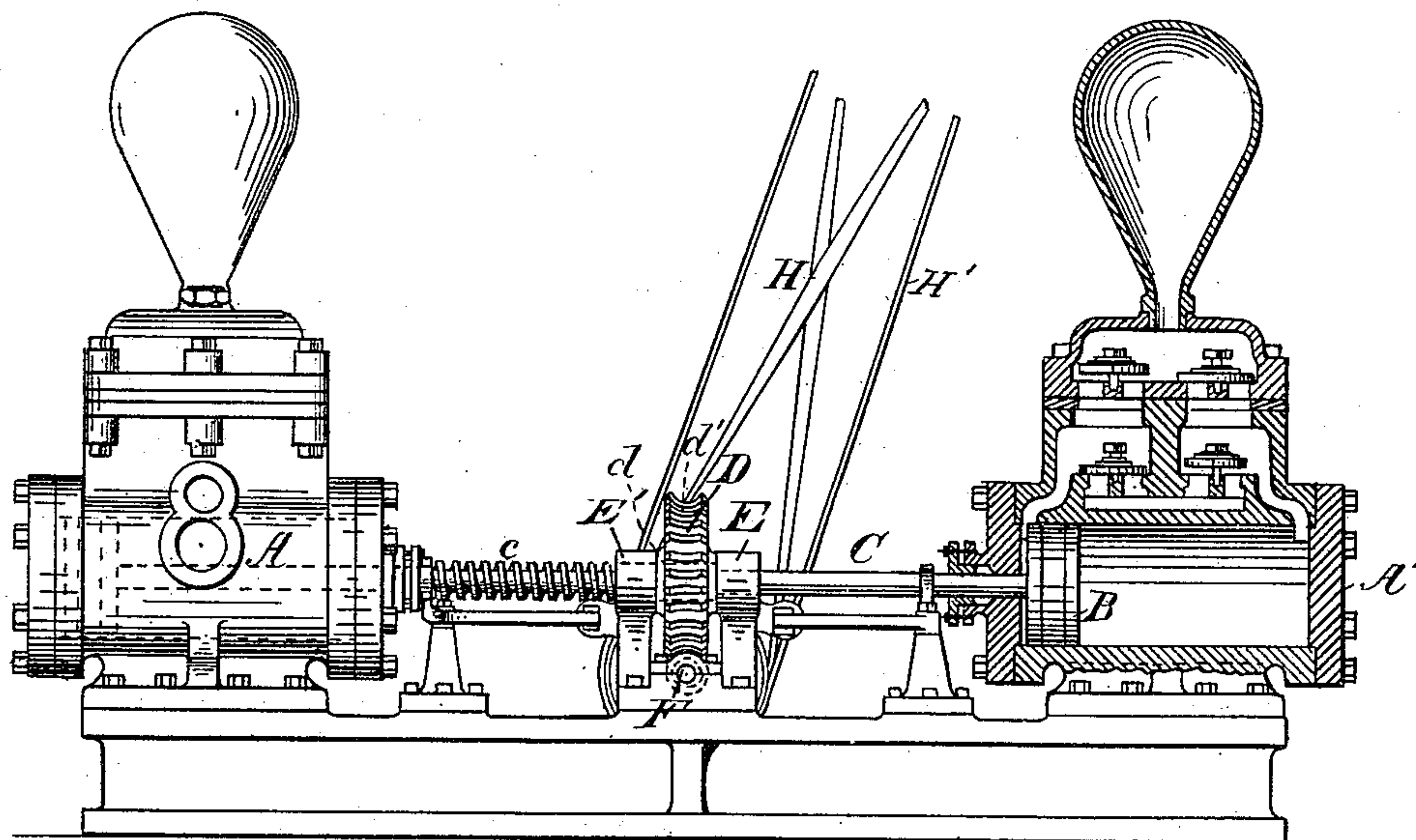


Fig. 1.

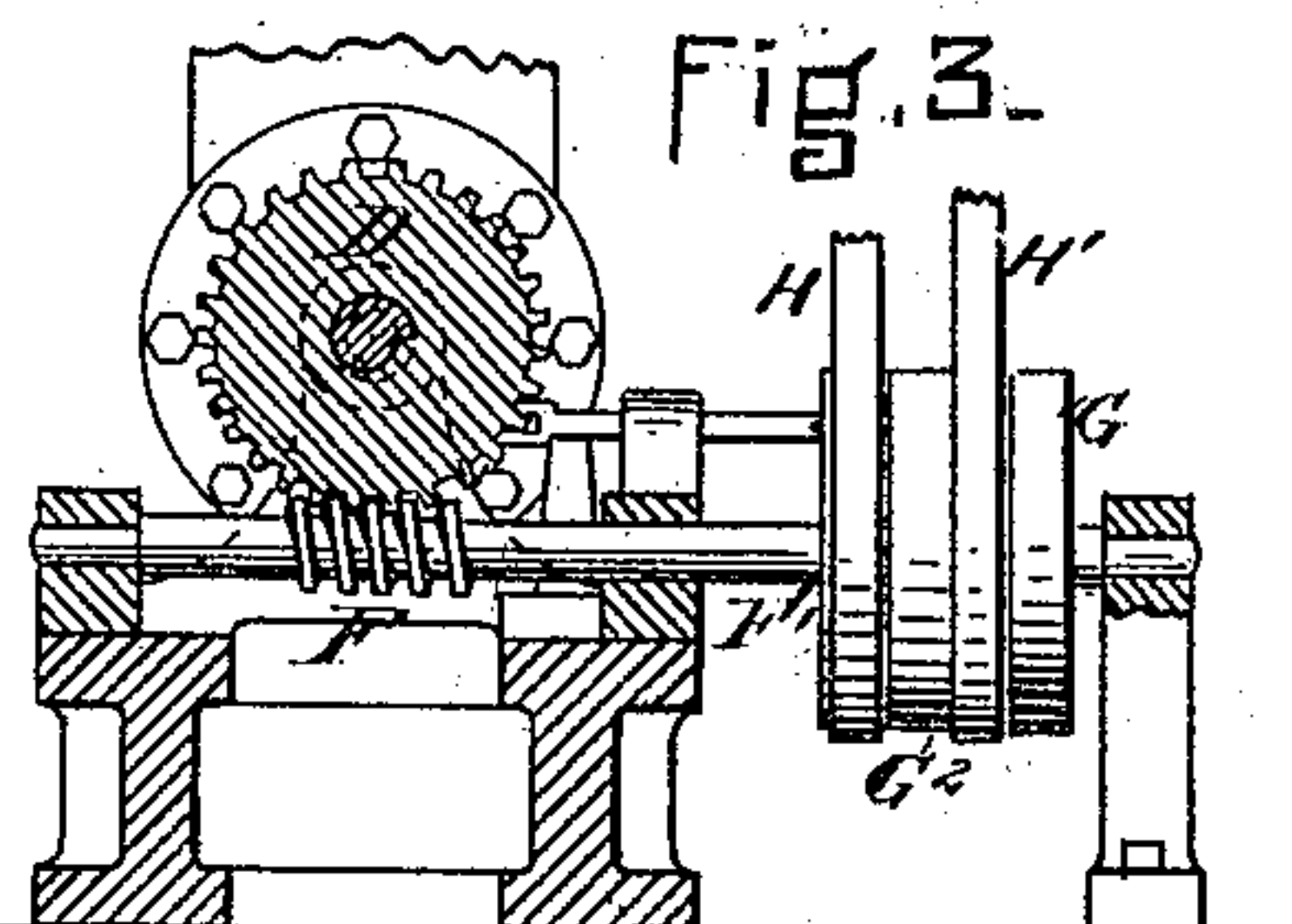


Fig. 3.

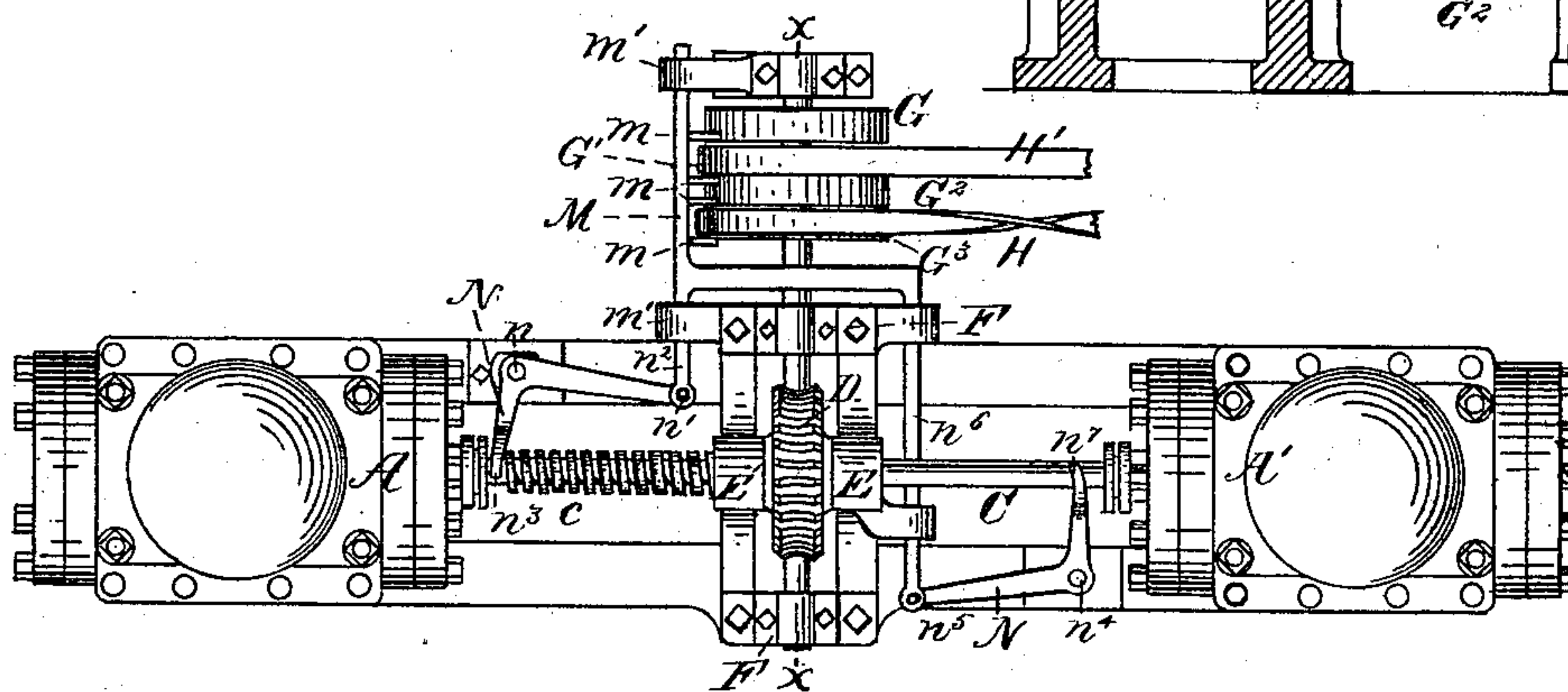


Fig. 2.

WITNESSES

Wm. B. Drake.  
E. A. Fisher.

INVENTOR

INVENTOR  
Mannus Russell  
by his atty  
Charles Raymond.



# UNITED STATES PATENT OFFICE.

MANUEL RUSSELL, OF BOSTON, ASSIGNOR OF ONE-HALF TO EDWARD H. PALMER, OF READING, FRANKLIN H. COLLINS, OF REVERE, AND CHARLES W. COLESWORTHY, OF BOSTON, MASSACHUSETTS.

## PUMP.

SPECIFICATION forming part of Letters Patent No. 336,263, dated February 16, 1886.

Application filed August 17, 1885. Serial No. 174,571. (No model.)

*To all whom it may concern:*

Be it known that I, MANUEL RUSSELL, of Boston, in the county of Suffolk and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Pumps, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The object of the invention is to provide a pump with very great power, and in the drawings I have illustrated the invention as applied to a double-acting pump; but I would here state that I do not confine myself to such use, as it may be used equally well on a pump with a single cylinder and piston.

Referring to the drawings, Figure 1 represents, part in front elevation and part in vertical section, a pump provided with my invention. Fig. 2 is a plan view thereof. Fig. 3 is a vertical section on the line  $xx$  of Fig. 2.

Referring to the drawings, A is one cylinder of the pump, and A' the other. Each cylinder has a piston,  $b$ , of ordinary construction, one only of which is shown. These pistons are connected by the piston-rod C, supported in suitable bearings. The reciprocating movement of the piston is obtained by means of a worm or screw,  $c$ , formed on the piston-rod C, and the worm gear-wheel D, which is mounted upon the piston-rod, and has the interior worm-thread,  $d$ , to engage with the worm  $c$ . This worm-wheel D is held in place between the two bearings E E', through which the piston-rod passes; and the worm-gear also has the exterior worm-teeth,  $d'$ , adapted to engage with the worm F, upon the shaft F'. This shaft has bearings at  $f f'$ .

I would state that in lieu of the worm-wheel D an ordinary spur-gear or bevel-gear may be employed, provided that it has the interior worm-teeth to engage with the worm  $c$  on the piston-rod.

It will be seen that upon the revolution of the worm-wheel D the pistons are moved in one direction or the other, according as the wheel is revolved; and it will further be seen that it is necessary at the end of the movement of the pistons in one direction that the revolution of

the worm-wheel D be reversed; and in order to accomplish this I have represented the shaft F as having the pulleys G G' G<sup>2</sup> G<sup>3</sup>, upon which are mounted the belts H H', and which move in opposite directions. Two of these pulleys—namely, the pulleys G G<sup>3</sup>—are loose, and two—namely, G' G<sup>2</sup>—are fixed to the shaft, and the pulleys are so arranged that they are alternately moved by the belt-shifter from a fixed to a loose pulley, or the reverse; and this movement of the belts is provided by the belt-shifter M, having the belt-engaging arms  $m$  mounted in the supports  $m'$ , and moved in one direction at the end of the movement of the piston in one direction by the lever N, pivoted at  $n$ , and secured at  $n'$  to the arm  $n^2$  of the belt-shifter, and having its end  $n^3$  arranged to straddle the piston-rod, so that upon contact of a projection thereon with it the belt-shifter is moved. The device for moving the belt-shifter in the opposite direction upon the end of the reverse movement of the piston-rod is of a similar character and comprises the lever N', pivoted at  $n^4$  and connected at  $n^5$  with the arm  $n^6$  of the belt-shifter, its end  $n^7$  being arranged in proximity to the piston-rod, and moved by any projection thereon that may be brought in contact with it.

In operation, at the end of the movement in one direction the revolution of the shaft F', and consequently of the gear-wheel D, is reversed by shifting the belt, and upon the end of the movement of the piston in the other direction the revolution of the shaft F is again reversed, and the piston-rod and piston caused to travel back.

It will be seen that by this construction very great power is developed upon the pistons, and by the exercise of comparatively little power upon the shaft F'.

Of course I do not confine myself to the especial form of reversing-gear herein described, but may use any of the well-known reversing-gears of the market as an equivalent; neither do I confine myself to the use of the invention in connection with two pistons and cylinders, as it may be used with one as well.

I would state that the device may be used with the cylinders of any of the ordinary pumps of the market, and as this is the case I have not

described the interior construction of the pump or of the valve mechanism.

Having thus fully described my invention, I claim and desire to secure by Letters Patent 5 of the United States—

1. The combination, in a pump, of the cylinders A A', a piston, *b*, in each cylinder, connected with each other by the piston-rod C, the said piston-rod having a worm, *c*, formed 10 thereon, a worm-wheel having an interior thread adapted to engage the worm or screw of the piston-rod, the bearings E E', for revolving the worm-wheel, and a reversing device for automatically reversing the movement 15 of the mechanism operating the worm-wheel at the end of each movement of the piston-rod, all substantially as described.

2. The combination, in a pump, of a cylinder and piston-rod having the worm or screw thread *c* formed thereon, the worm-wheel D, 20 having an interior screw-thread adapted to engage the thread upon the piston-shaft, the bearings E E', the shaft F', connected with the wheel D and carrying the pulleys G G<sup>2</sup> G<sup>3</sup>, the belts H H', and the belt-shifter operated at the 25 end of the movement in each direction of the piston, all substantially as described.

MANUEL RUSSELL.

In presence of—

F. F. RAYMOND, 2d,  
FRED. B. DOLAN.