

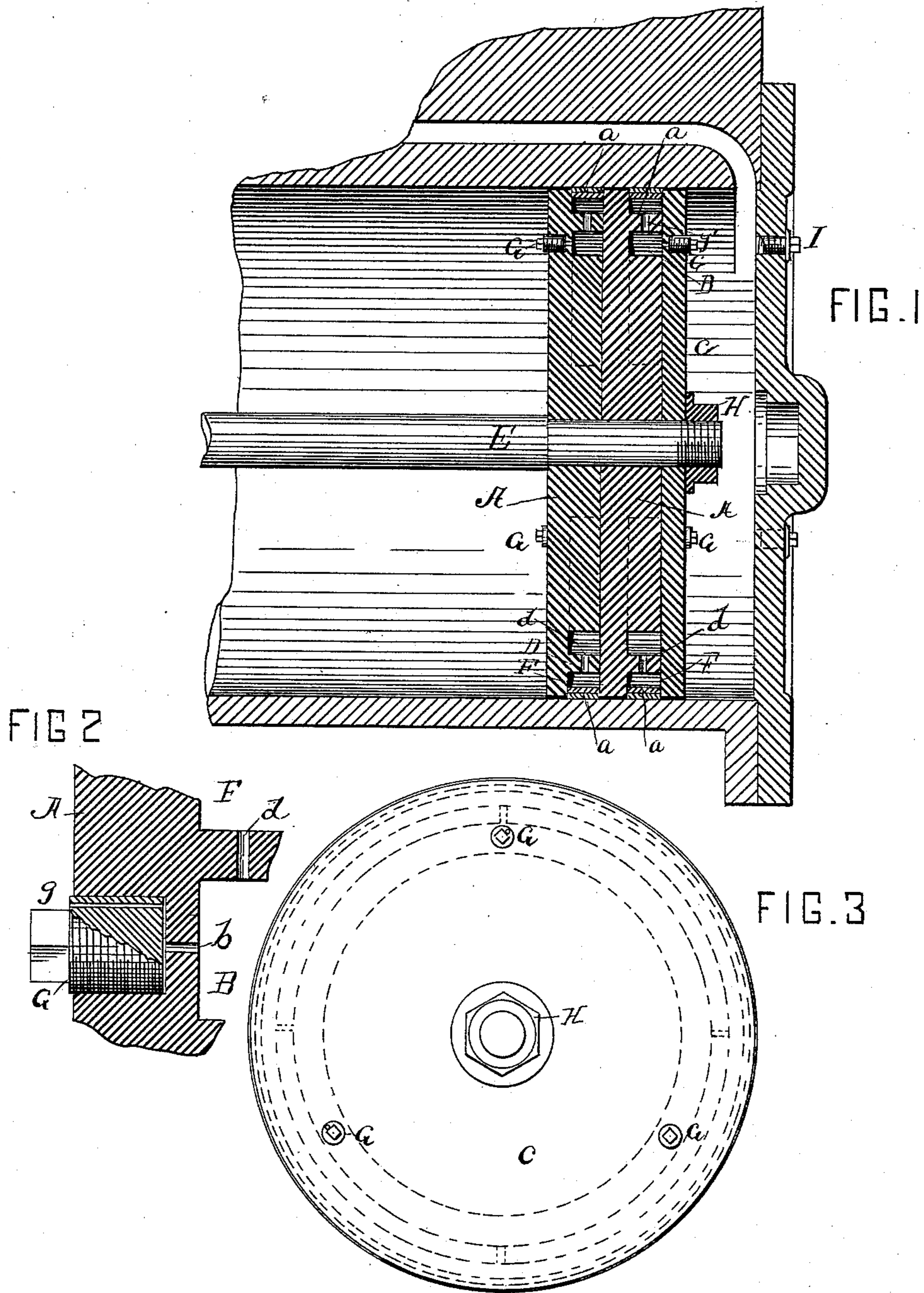
(No Model.)

C. H. STEEN & M. McDONALD.

PISTON FOR ENGINES.

No. 392,078.

Patented Oct. 30, 1888.



WITNESSES,

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# UNITED STATES PATENT OFFICE.

C. H. STEEN AND MILTON McDONALD, OF STREATOR, ILLINOIS.

## PISTON FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 392,078, dated October 30, 1888.

Application filed April 2, 1888. Serial No. 269,370. (No model.)

*To all whom it may concern:*

Be it known that we, C. H. STEEN and MILTON McDONALD, of Streator, in the county of La Salle and State of Illinois, have invented certain new and useful Improvements in Pistons for Engines and Pumps; and we do hereby declare that the following is a full, clear, and exact description of the invention, which 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 of reference marked thereon, which form part of this specification.

This invention has relation to pistons for steam and other engines, and is generally applicable to pistons which are provided with packing-rings, which rings have to be set out occasionally to keep them tight.

Heretofore the piston-packing has been set out with springs, and attempts have also been made to set the rings out by steam from the cylinder, which have been more or less successful, but have not attained satisfactory results, for the reason that the parts were liable to become loose and rattle, not only being very annoying, but dangerous. Therefore, to overcome these objections and to produce a piston that will automatically control the pressure of its packing against the walls of a cylinder by the steam, fluids, or air in the cylinder are the objects of our invention.

To these ends our invention consists in forming the piston-head in sections and providing each section with an annular recess beneath the bearings of the rings, said recesses communicating with the steam in the cylinder and with annular recesses in the periphery of the bearings for the piston-rings, said steam or fluid having access to said chambered recesses through the front head and follower, respectively, by means of an adjustable plug provided with an inlet and exit port, said plug being tightly screwed into its seat, so that it will not turn only when desired by means of a socket-wrench or suitable instruments, all of which will be more fully hereinafter described.

In the drawings hereto annexed, Figure 1 is a section through the piston and part of the cylinder and head. Fig. 2 is an enlarged sectional view of the regulating plug or valve; and Fig. 3 is an end view of the piston, showing the position of the plugs.

A further object of our invention is to construct a piston that will be light in weight and simple in construction, the principal object being to set out the packing-rings by steam or fluids and to control the said steam or fluids, so that the pressure will not be as high in the recesses in the piston as it is in the cylinder.

The piston is composed of the two disks A, which are similar in construction, so the description of one will describe the other. The disk A is provided on one side with an annular recess, B, that extends from near its periphery toward the piston-rod E. This recess may extend nearly to the rod, as shown in dotted lines, which will make the piston lighter in weight. Between the periphery of and forming one side of the recess B is an annular flange, D, having two or more ports, *d*, that lead from the recess into the groove F, formed by placing one disk upon the other and a follower, C, upon the outer disk. The groove F contains the packing-rings *a a*, that may be of any suitable material. When these disks and followers are secured upon the piston-rod—in this instance by a nut, H, screwed on the end of the rod—they form two recesses or chambers and two grooves for the packing-rings. Leading from the cylinder through the disk on one side and the follower on the other of the piston is a port, *b*, which is enlarged to receive a plug or valve, G, which is provided with a port, *g*, drilled through it or cut in its periphery, as shown in Fig. 1 at *g'*. This port *g* or *g'* does not register with the port B, so that when the plug is down upon its seat the steam cannot pass through to the packing. We have shown three plugs or valves; but it is evident that one upon each side of the piston could be used and have the same effect. Opposite the plugs G, and in each head of the cylinder, are screw-plugs I, upon the removal of which a wrench may be inserted to adjust the plug-valves G.

The adjustment of the plug and the operation of the device are as follows: The plugs are screwed down to their seats and then screwed very slightly in the opposite direction, thus leaving a very small opening for the steam to pass. The amount of opening will be governed by the pressure of steam that the engine is operated with—the higher the steam-pressure the smaller the opening. Steam being admitted

to the cylinder will pass through the ports *g* and *b* into the recess B and through the port *d* into the groove F, and gradually increasing in pressure and setting out the packing on that  
5 end of the piston; but before the pressure acting on the packing-rings can reach that in the cylinder the piston has reached the end of the stroke and the steam from that side of the piston is exhausted, which permits the steam, or  
10 a greater part of it, to be exhausted from the recess and lower the pressure upon the packing-rings until the next stroke of the engine. This operation occurs alternately on each side of the piston as it receives and exhausts the  
15 steam at each stroke. It follows that by thus controlling the steam acting upon the packing-rings the objection to using steam to keep the rings in contact with the cylinder is overcome, for in using steam for this purpose, especially at a high pressure, the rings would  
20 be set out so hard that a great part of the en-

ergy of the engine was lost on overcoming the friction thus produced.

Having thus fully described our invention, what we claim, and desire to secure by Letters Patent of the United States, is—

In a piston-head, the combination of a recessed disk and a follower with packing-rings, a seat having a port leading from the cylinder into the recess, and a tight-screw plug or valve  
30 for controlling said port, the plug having a port outside of its axial line, substantially as shown and described.

In testimony that we claim the foregoing as our own we affix our signatures in presence of  
35 two witnesses.

C. H. STEEN.  
MILTON McDONALD.

Witnesses:

E. F. CONKLIN,  
JOHN E. PHILLIPS.