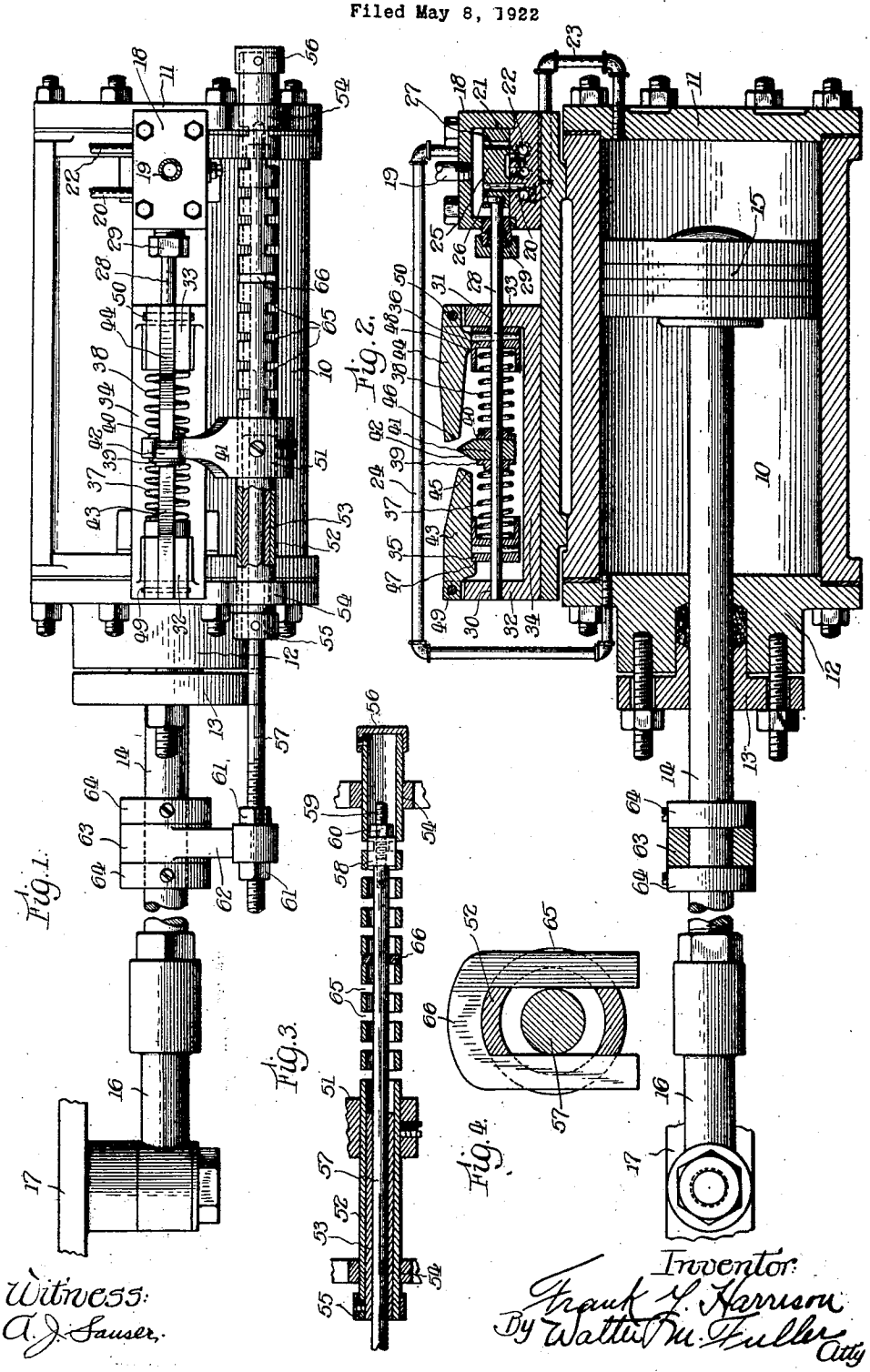
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F. Y. HARRISON

ADJUSTABLE VALVE OPERATING MECHANISM

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ADJUSTABLE VALVE-OPERATING MECHANISM.

Application filed May 8, 1922. Serial No. 559,168.

To all whom it may concern:

Be it known that I, FRANK Y. HARRISON, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Adjustable Valve-Operating Mechanisms, of which the following is a specification.

In fluid operated motors, especially those employed for actuating the movable parts of furnace stokers, usually operated at relatively slow speed, it is desirable to provide a mechanism with simple means for varying the length of the stroke of the reciprocatory piston, and the prime purpose of the present invention is the provision of effective means for accomplishing this result.

In other words, the present invention supplies a simple device for so controlling the operation of the valves governing the flow of fluid under pressure to the two ends of the cylinder housing the power piston that the stroke or length of path of travel of the piston may be easily and readily varied in accordance with the requirements of the stoker.

To enable those skilled in this art to have a full and complete understanding of the invention and its several structural and functional advantages, I have illustrated a desirable and preferred embodiment of the invention in the accompanying drawing forming a part of this specification and throughout the several views of which like reference characters refer to the same parts.

In this drawing:

Figure 1 is a plan view of the motor with a portion of the parts broken away to more clearly illustrate the construction;

Figure 2 is a central longitudinal vertical section through the mechanism;

Figure 3 is a horizontal section through the adjustable valve controlling mechanism and

Figure 4 is a cross-section through the same on an enlarged scale showing one of the adjustable clips in position for controlling the stroke of the piston.

The motor includes a suitable cylinder 10 fitted with heads 11 and 12, the latter equipped, as is usual, with a stuffing-box pressure-tight sliding connection 13 with a piston rod 14 connected to a piston 15 adapted to reciprocate in the cylinder.

The valve mechanism controlling the flow of fluid under pressure to the opposite ends of the cylinder is of simple and usual construction comprising a chambered member 18 equipped with an inlet pipe 19 through its top wall and supplied in its lower part with three ports 20, 21 and 22, the port or passage 20 being connected through a pipe 23 with the right-hand end of the cylinder, whereas the companion port 22 is in communication with the other end of the cylinder through a pipe 24, the port 21 being connected to any suitable exhaust as is customary.

Within this valve chamber 18 there is a flat sliding valve 25 having two ports or passages 26 and 27 therethrough adapted by the reciprocation of the valve to be brought into register with the ports 20 and 22 whereby to vary or control the flow of liquid or fluid to the two ends of the cylinder.

The under face of this valve is centrally recessed as shown so that either port 20 or 22 may be brought into communication or connection with the central exhaust port 21 as occasion requires.

This valve 25 is reciprocated by means of a valve rod 28 extended through a stuffing box 29 and slidingly mounted in a pair of bearings 30 and 31 in the upstanding walls 32, 33 of a yoke 34 mounted on the top of the cylinder in any appropriate manner.

Two chambered oppositely-facing collars 35 and 36 are pinned to the valve rod or shaft as is clearly illustrated in Figure 2 and their recesses receive the end portions of a pair of coil springs 37 and 38 surrounding the valve rod and bearing at their adjacent ends against two collars 39 and 40 slidable on the valve rod and pressing against the opposite flat or plane faces of an arm 41 bevelled in opposite directions at 42 on its top surface.

Two locks or latches 43 and 44 having respectively bevelled or inclined ends 45 and 46 and also equipped with locking shoulders

47 and 48 are hinged on the two standards 32 and 33 at the points 49 and 50, the shoulders of such latches or locks being adapted to co-operate with the collars or members 35 and 36 as hereinafter set forth.

The arm 41 forms a part of a collar 51 fastened by a set screw or otherwise on a sleeve or hollow shaft 52 slidingly accommodated in a pair of appropriate bearings 54, 54, the extent of reciprocation of the hollow shaft or sleeve being limited or restricted by a collar 55 fastened to one end thereof and by a cap 56 closing its other end.

Internally the sleeve or hollow shaft 52 is fitted with an internal sleeve 53 considerably shorter than the outer sleeve surrounding it.

Inside of the internal sleeve and slidable therethrough I employ a rod or shaft 57 equipped at one end with an enlargement or head 58 and an adjustable screw-threaded stud 59 supplied with a lock nut 60 to hold the threaded member in adjusted position, the other end of the rod 57 being threaded and provided with a pair of confining nuts 61 between which is an arm 62 having hub 63 rockingly mounted on the piston rod 14 between confining collars 64, 64 to permit compensation for irregularities in the alignment of the parts.

That portion of the element 62 which is apertured to receive the rod 57 is not threaded so that it may rock thereon if necessary.

As is clearly depicted, the outer sleeve 52 along its portion not housing the inner or internal sleeve 53 is equipped with a series of spaced notches on its opposite sides adapted to receive a U-shaped clip 66 straddling the rod 57 as shown in Figure 4.

One or more of these clips may be used and they may be inserted in any of the pairs of registering slots or grooves 65, all as will be readily understood.

The operation of this appliance occurs practically as follows:

Assuming that there are no clips 66 in any of the slots or grooves 65, when the valve is in the position shown in Figure 2, the fluid or liquid under pressure which enters the chambered member 18 through the admission pipe 19 flows through the ports 26 and 20 and through pipe 23 into the cylinder forcing the piston to the left, as will be readily understood.

Such movement of the piston rod carries the rod or shaft 57 in the same direction by reason of the connection 62 and any irregularities in the alignment of the parts is compensated for by the capacity of the member 62 to rock on either of the elements 14 and 57.

When the piston approaches the end of its stroke in this direction, the arm 41 is caused to travel to the left by reason of the head or enlargement 58 of the rod 57 striking the end of the inner sleeve 53 and carrying it and the outer sleeve as well as the arm 51 with it.

Such travel of the part 41 causes the compression of spring 37 because the collar 35 is prevented from moving to the left by the lock 47 on the latch 43.

After the spring has been adequately compressed and the piston is substantially at the end of its stroke, the inclined face 42 of the arm 41 by coaction with the surface 45 lifts the latch 43 releasing the collar 35 and the later in response to the expansion of the spring 37 moves to the left carrying the valve rod and valve with it thus bringing the port 27 into register with the port 22 and connecting the port 20 with the exhaust pasage 22.

This movement of the valve rod also shifts the collar 36 sufficiently to the left to permit the shoulder 48 to drop back of it under the natural descent of latch 44 due to its own weight.

The piston now travels to the right, but when it approaches the end of its stroke, the spring 38 is compressed and at the proper moment the collar 36 is released by the action of the bevelled face of the arm 41 on the inclined surface 46, which lifts the latch 44, whereupon the valve rod and valve are shifted to the right again reversing the connections for the two ends of the cylinder.

This movement of the arm 41 to the right is occasioned or brought about by the striking of the end of the threaded stud 59 on the cap 56 and as soon as this occurs continued travel of the rod 57 carries the outer sleeve with it in a manner which will be well understood.

In case it is desired to have a shorter stroke of the piston and therefore a shorter movement of the part 17 actuated by the motor, one of the clips 66 is inserted in the appropriate pair of slots 65 and then the head 58 can co-operate with this clip to bring about the valve reversing movement.

If the enlargement 58 is to the right of the clip, then the part 58 will co-operate with such clip and the stud 59 will coact with the cap 56 in the usual way.

On the other hand, if the enlargement 58 is to the left of the clip, then the enlargement will coact not only with the clip but also with the end of the inner sleeve 53 as will be readily comprehended.

Or, if preferred, two clips may be inserted in appropriate slots and the enlargement on the rod coact with both of them.

The adjustable feature for controlling the length of stroke of the piston is extremely simple in construction and readily operated,

the members 66 being easily inserted and withdrawn from the slots or grooves provided for their reception.

Those skilled in this art will readily comprehend that the invention is not limited and restricted to the precise details of structure illustrated and described because these may be changed in a more or less radical degree without departure from the substance of the invention and without sacrificing any of its substantial benefits.

I claim—

1. In an appliance of the character described, the combination of a cylinder, a reciprocatory piston therein, a valve mechanism controlling the admission of fluid to and its discharge from the ends of the cylinder, and adjustable means to operate said valve-mechanism permitting variation of the length of stroke of the piston, including a slidable slotted sleeve, a rod slidable in said sleeve by said piston and having an enlargement in the sleeve, and a clip, adapted to be inserted in any one of the plurality of the slots of said sleeve in the path of travel of such enlargement.

2. In an appliance of the character described, the combination of a cylinder, a reciprocatory piston therein, a valve mechanism controlling the admission of fluid to and its discharge from the ends of the cylinder, and adjustable means to operate said valve-mechanism permitting variation of the length of stroke of said piston, including a reciprocatory sleeve having a plurality of spaced slots, a rod slidable in said sleeve by said piston and having an enlargement in the sleeve, a clip adapted to fit in any of said sleeve slots in the path of travel of said enlargement, other means carried by said sleeve in the path of travel of said enlargement, and means mounted on said sleeve designed to actuate said valve-mechanism.

3. In an appliance of the character described, the combination of a cylinder, a reciprocatory piston therein, a valve-mechanism controlling the admission of fluid to and its discharge from the ends of the cylinder, and adjustable means to operate said valve-mechanism permitting variation of the length of stroke of said piston, including a slidably-mounted sleeve having a plurality of spaced pairs of transverse aligned slots therethrough, a rod slidable in said sleeve by said piston and having an enlargement in the sleeve, a U-shaped clip adapted to fit in any pair of said sleeve slots straddling said rod and in the path of travel of its enlargement, other means carried by said sleeve in the path of travel of said rod enlargement, and means mounted on said sleeve designed to actuate said valve-mechanism.

4. In an appliance of the character described, the combination of a cylinder, a reciprocatory piston therein, a valve-mechanism controlling the admission of fluid to and its discharge from the ends of the cylinder, and adjustable means to operate said valve-mechanism permitting variation of the length of stroke of said piston, including a slidingly-mounted external sleeve having a plurality of spaced pairs of transverse aligned slots therethrough, a shorter internal sleeve inside of and fastened to said external sleeve, a rod slidable in said inner sleeve by said piston and having an enlargement, a stud adjustably screwed longitudinally into the end of said rod in said external sleeve, a cap secured over the corresponding end of said outer sleeve, and a U-shaped clip adapted to demountably fit in any pair of said sleeve slots in the path of travel of said enlargement, and means carried by said outer sleeve designed to actuate said valve-mechanism.

In witness whereof I have hereunto set my hand and seal.

FRANK Y. HARRISON. [L. S.]