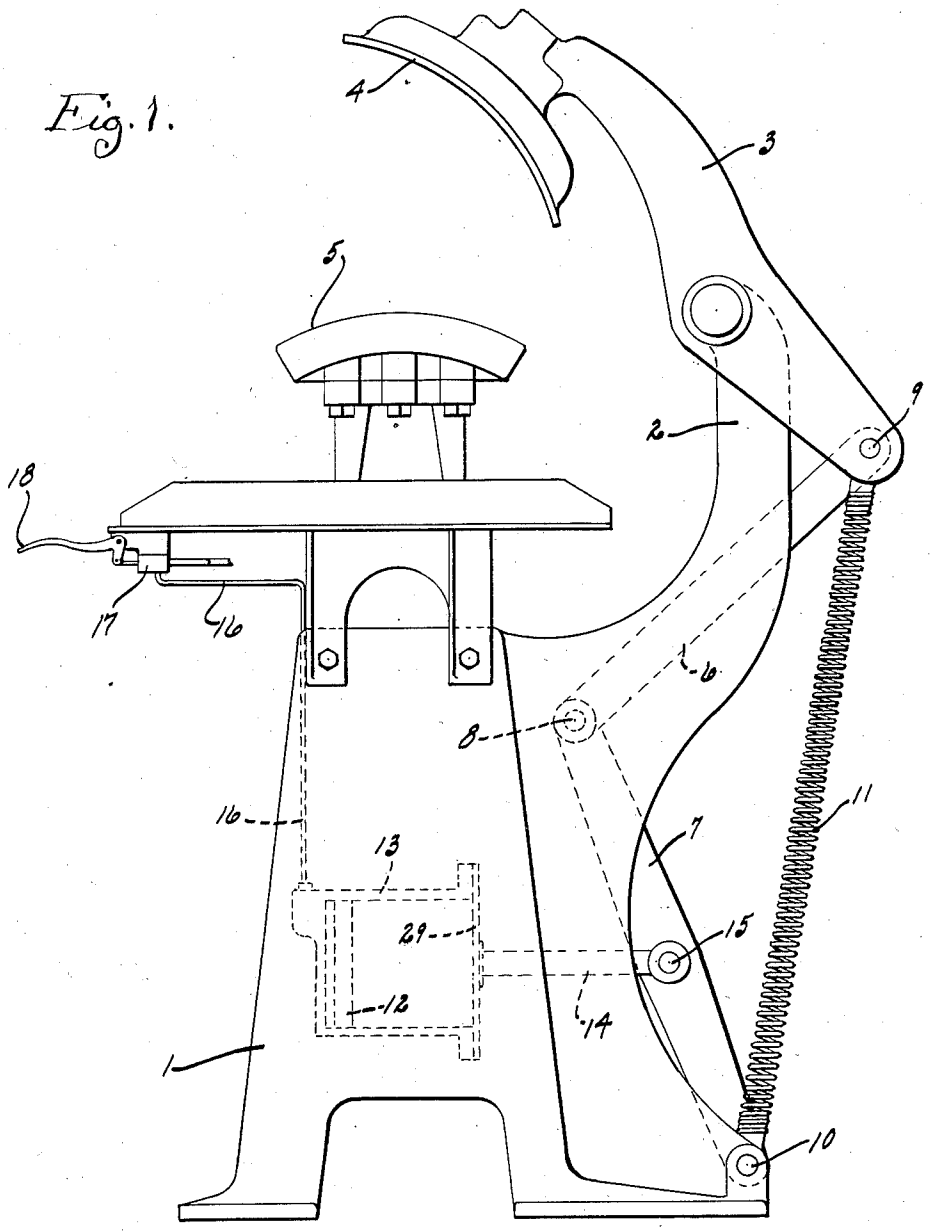
Dec. 31, 1935. O. W. JOHNSON 2,026,347

FLUID OPERATED MOTOR

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Fig. 1.



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Fig. 2.

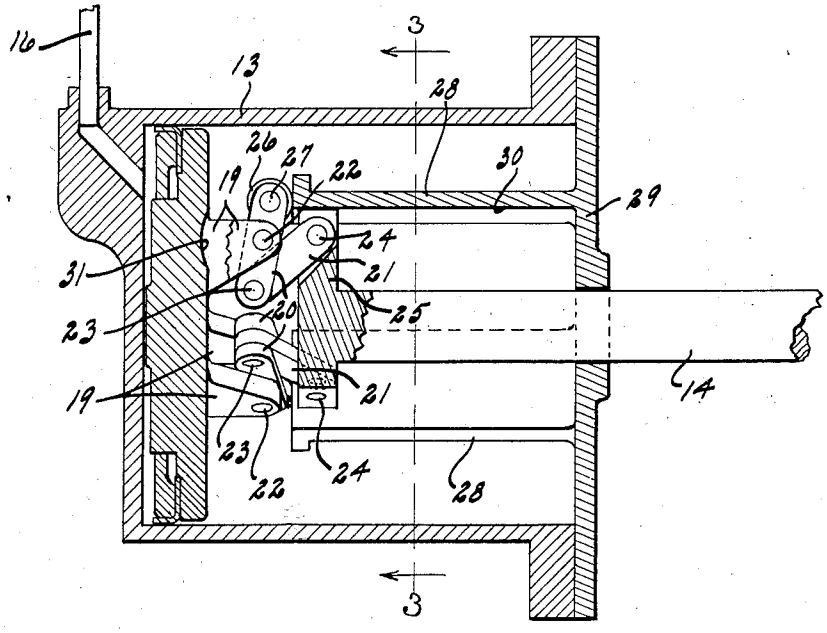


Fig. 3.

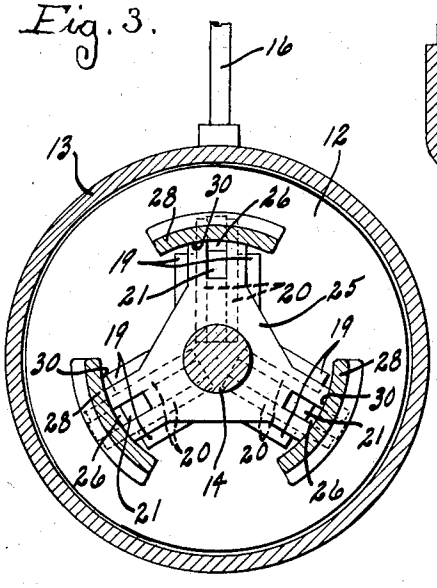
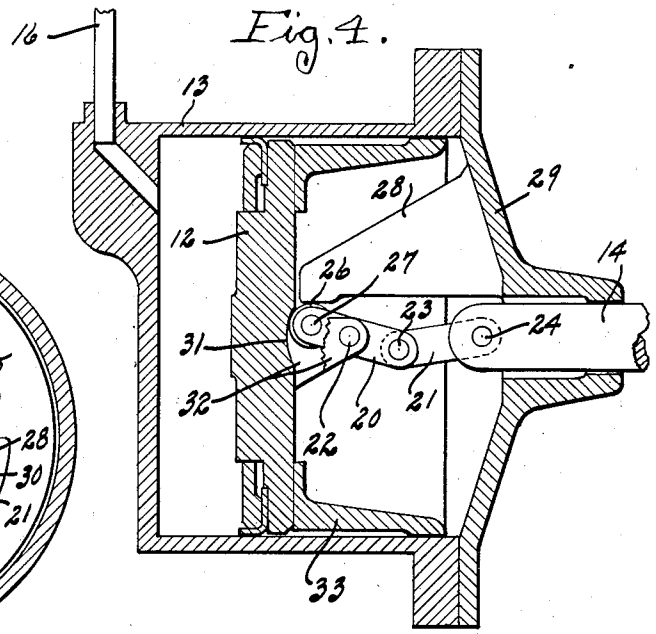


Fig. 4.



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2,026,347

FLUID OPERATED MOTOR

Oscar W. Johnson, Rochester, N. Y., assignor to The American Laundry Machinery Company, Cincinnati, Ohio, a corporation of Ohio

Application December 1, 1932, Serial No. 645,243

1 Claim. (Cl. 121—38)

My invention relates to a motor means of a piston and cylinder type, and will be hereinafter described as the motor means for a scissors type pressing machine including head and bed members movable into pressing engagement by such motor means.

It is one object of my invention to provide a piston and cylinder type motor means wherein the relative movement of the pressing members in closing and in exerting pressing pressure on work therebetween will be greatly multiplied relative to the movement of the piston of the motor means, to thereby permit of a piston and cylinder type motor means wherein the piston has a short throw and requires but a small volume of fluid pressure, in contradistinction to the hereinbefore prevalent type of piston and cylinder motor means wherein the piston had a long throw for causing initial engagement of the pressing members and thus necessitated a relatively large volume of fluid pressure.

Another object of my invention is to provide a motor means of the piston and cylinder type wherein quick closing of the pressing members is accomplished with a short throw of the piston; wherein the motor means includes a minimum number of parts; and wherein the motor means is a self-contained unit of a nature to be applicable to substitution for the piston and cylinder type motor means now in use without necessitating changes in the pressing machine construction.

Various other objects and advantageous features of my invention will be seen in the following description and one embodiment thereof may be seen in the accompanying drawings wherein similar characters of reference designate corresponding parts, and wherein:

Fig. 1 is a side elevation of a pressing machine having a motor means constructed in accordance with my invention forming a part thereof; Fig. 2 is a view longitudinally of the motor means, partly in section, showing the piston and cylinder type motor means constructed in accordance with my invention; Fig. 3 is a view taken on the line 3—3 of Fig. 2; and Fig. 4 is a view similar to Fig. 2 but showing a modified form of motor means.

In Fig. 1 of the drawings, I have shown a pressing machine of the scissors type which includes a base frame 1 provided with an upwardly extending arm 2 on the rearward side thereof, on which is pivotally mounted an arm 3 carrying a pressing head 4 on one end thereof. The pressing head 4 is arranged to be moved into pressing engagement with a pressing bed 5 carried by the frame 1 by means of straightening of a toggle mechanism made up of links 6 and 7 pivotally connected together as at 8, the link 6 having one of its ends pivotally connected to the arm 3 as at 9 and the link 7 having one end pivotally connected to the frame 1 as at 10, the toggle mechanism being actuated by a motor means hereinafter described. Reversely, the head 4 is moved out of engagement with the bed 5 and the toggle broken by means of a spring 11 having one of its ends connected to the frame 1 and its other end connected to the arm 3 on the opposite side of the pivot thereof from the head 4.

A motor means for straightening the toggle made up of the links 6 and 7 consists of a piston 12 in a cylinder 13, the piston 12 having its rod 14 connected to the toggle link 7 as at 15. Such connection between the piston rod 14 and the link 7 is well below the pivotal connection 8 between the links 6 and 7 to thereby reduce the distance necessary for the piston 12 to travel in straightening the toggle to move the pressing head 4 into engagement with the pressing bed 5 and cause pressing engagement therebetween. Fluid pressure is supplied to the cylinder 13 to move the piston 12 in one direction through a fluid line 16, the piston 12 being moved in the opposite direction by action of the spring 11 in breaking the toggle made up of the links 6 and 7.

Flow of fluid through this line is controlled by a valve 17 operable by a handle 18. Preferably, there are two of these valves connected either in series or in sequence in the fluid line, whereby to provide the well known two hand control.

In accordance with my invention, the piston rod 14 is not rigidly connected to the piston 12 but is connected thereto by an articulated connection. As shown in Figs. 2 and 3, the face of the piston 12 toward the piston rod 14 is provided with three outwardly extending bifurcated lugs or ears 19 and the connection between the piston 12 and the piston rod 14 is made by a plurality of toggles made up of links 20 and 21. The links 20 are pivotally connected intermediate their ends, and preferably at a point closer one end than the other of the links as at 22, to the ears 19, the lower ends of these links being connected to the links 21 as at 23. At their opposite ends the links 21 are pivotally connected as at 24 to a spider 25 which is integral with or rigidly connected to the innermost end of the piston rod 14. It will be noted in Fig. 3 that the ears or outwardly extending lugs 19 are circumferentially spaced on the surface of the piston 12. The free

ends of the links 20 are provided with rollers 26 mounted on shafts 27 that, when the piston and piston rod are in their rearwardmost position as shown in Fig. 2, bear against the innermost ends of circumferentially spaced inwardly projecting extensions 28 that are integral with or rigidly mounted on the inner surface of the closure 29 for one end of the cylinder, the segments of the spider 25 having bearing surfaces on the inner surfaces of these extensions as shown at 30 in Fig. 3 which serves to hold the piston rod in aligned position. The circumferentially spaced toggles serve to maintain the alignment of the piston 12.

In the operation of this motor means, when fluid pressure is allowed to flow through the line 16 and into the cylinder 11 by reason of operation of the valve or valves 17, the piston 12 is moved forwardly. The free ends of the links 20 which carry the rollers 26 are held against movement by reason of the rollers 26 contacting with the inner ends of the inwardly extending members 28. Thus, forward movement of the piston 12 will result in movement of the link 20 about its pivot with the lower end of the link moving outwardly to the right as viewed in Fig. 2 which will serve to project the piston rod 14 outwardly through the link connections 21. With this arrangement, it will be apparent that the piston rod 14 will move outwardly of the cylinder at a much faster rate than the rate at which the piston 12 is moving since the pivots 22 of the links 20 are closer the top than the bottom of the links. Continued outward movement of the piston 12 will continue to swing the links 20 about their pivots 22 and move the piston rod 14 outwardly through the toggle straightening effect until the toggle is substantially straightened and the rollers 26 pass beneath or inside of the inward extending members 28, the parts and connections being preferably so arranged that the pressing members reach initial engagement simultaneously with straightening which occurs before the piston 12 reaches the innermost ends of the inwardly extending members 28. Likewise, the pivotal connections 22 between the links 20 and the ears or outwardly extending lugs 19 is such that the rollers 26 will engage depressions 31 in the surface of the piston 12, which depressions are made on true circular arcs struck from the centers of the pivots 22. Thus, when the toggles made up of the links 20 and 21 are straightened, the moving effect of the piston 12 will be transmitted directly to the piston rod 14 through the links 20 and 21 and the movement of the piston rod 14 will be at the same rate as that of the piston 12. Thus, movement of the piston 12 under the effect of fluid pressure admitted to the cylinder will be first effective to move the piston rod 14 outwardly with considerable speed to cause a quick closing of the pressing members and then a final slower movement which produces the pressing pressure between the members.

Referring to Fig. 4 of the drawings, I have shown a modified form of motor unit wherein only a single inwardly extending lug or ear 32 is provided on the piston 12, this inwardly extending lug or ear being connected by a toggle mechanism identical with those hereinbefore described with the piston rod 14. In this construction, only a single inwardly extending member is provided on the closure 29 of the cylinder and the piston 12 differs from that hereinbefore described in that it includes an annular extension 33 which serves to maintain the piston 12 in an aligned position in the cylinder. Otherwise, the two constructions are identical.

Referring to the drawings and the preceding description, I have provided a motor means of a piston and cylinder type that is particularly adapted for use with pressing machines wherein a quick closing movement and a comparatively slow pressing pressure movement are desired. In addition to this, I have provided a motor means wherein both the closing movement and the pressing pressure movement of the pressing members are accomplished by a relatively short travel of the piston. The accomplishment of these movements by such short piston movement gives the advantage of permitting operation of the pressing machine with but a small volume of pressing pressure fluid.

What I claim is:

A motor means comprising a cylinder, a piston adapted to reciprocate therein, a piston rod guided for reciprocating movement axially of said cylinder, a plurality of cam members spaced circumferentially about said piston rod, said cam members having portions extending longitudinally of said cylinder toward said piston and other portions extending outwardly therefrom transversely of said cylinder at the ends of said cam members nearer the piston, said piston rod having at its inner end a portion rigid therewith and extending between the longitudinal portions of said cam members, and a plurality of pairs of toggle links, one for each cam member, each pair having the free end of one link pivotally supported on said inner end portion of the piston rod and having the central portion of the other link of the pair pivotally supported on the piston, the free end of each of the last-named links being adapted to contact the transverse portion of its associated cam member, whereby said toggles are straightened as said piston advances along said cylinder, and said toggles and piston rod portion guide said piston axially of said cylinder.

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