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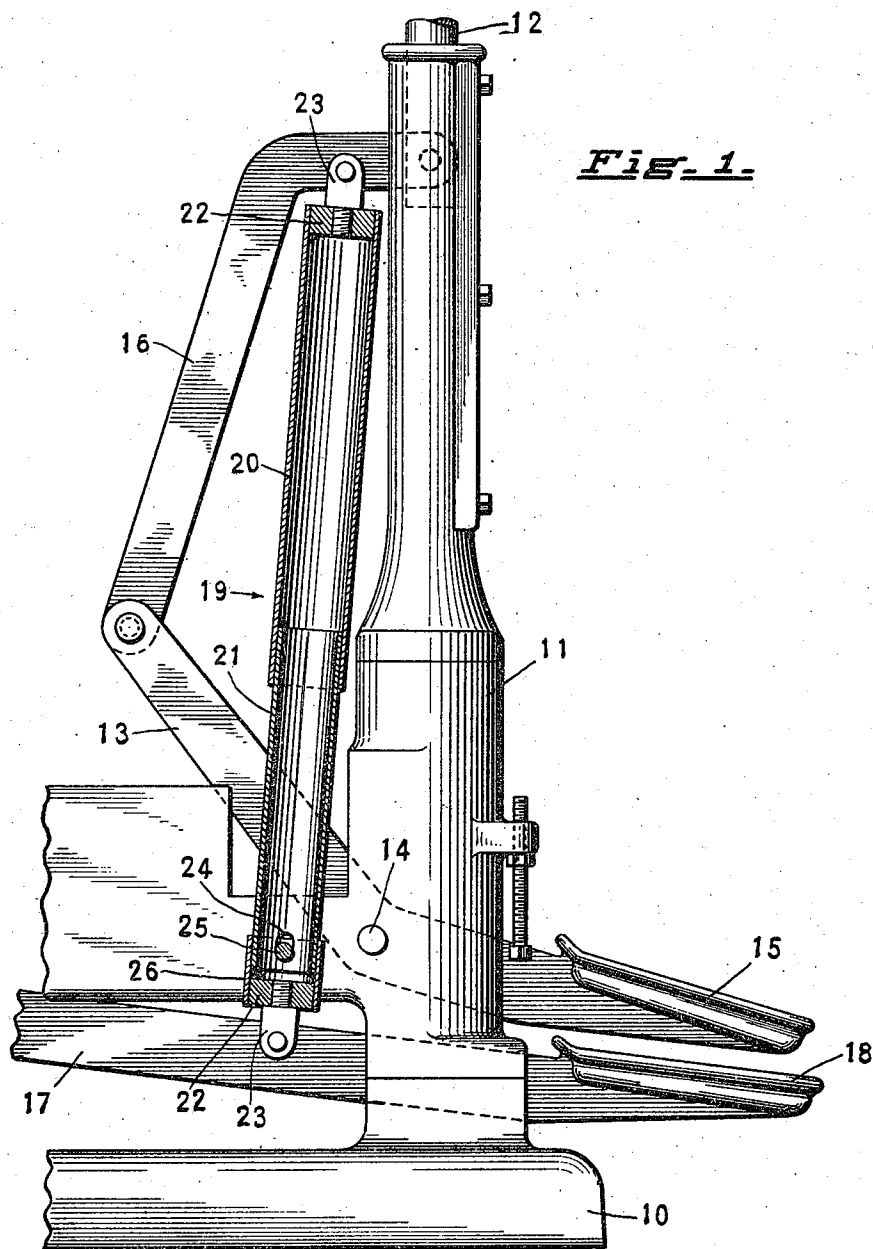
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E. B. STIMPSON

SHOCK ABSORBING AND NOISE ELIMINATING DEVICE

Filed March 7, 1925

2 Sheets-Sheet 1



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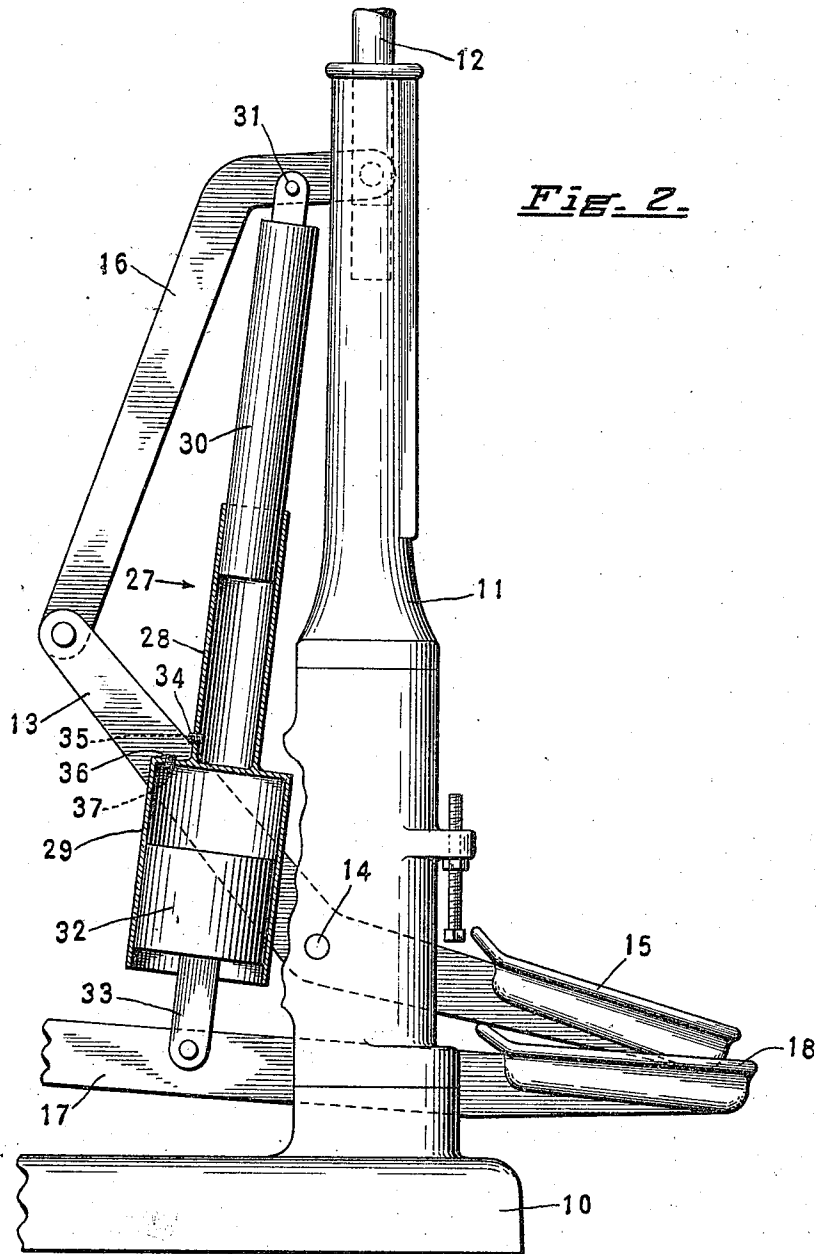
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UNITED STATES PATENT OFFICE.

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SHOCK-ABSORBING AND NOISE-ELIMINATING DEVICE.

Application filed March 7, 1925. Serial No. 13,758.

This invention relates to shock-absorbing devices for treadle-operated machines.

In the operation of machines of the foot treadle type, the reciprocation of movable parts connected to the treadle mechanism tends to produce an objectionable degree of noise, particularly at the conclusion of the idle or return stroke of the operating parts. A general object of the present invention is to provide means for cushioning or absorbing the shock of the moving parts as they strike the stop members which limit their motion in one or both directions.

The invention herein described and claimed is more particularly applicable to machines in which two treadle members are made use of and a feature of the invention resides in the connecting of a shock-absorbing device of a pneumatic type to parts connected to the respective treadle members.

In one embodiment of the invention the shock-absorbing device takes the form of a pair of telescoping cylinders movable toward each other in one direction of movement of the connected treadle members to thereby provide a cushioning or shock-absorbing effect. In another modification of the invention the shock-absorbing device takes the form of two sets of cylinder and piston members formed in a common structure and having the diameter and stroke of the pistons arranged to fit the requirements of the stroke of the respective treadle members. In this form of the invention the cushioning or shock-absorbing effect is utilized in both directions of movement of the treadles.

Other features of the invention will be hereinafter referred to.

In the drawings,

Figure 1 is a view in side elevation and vertical section of a portion of a treadle-operated machine equipped with a shock-absorbing device embodying the invention.

Figure 2 is a view similar to Figure 1 showing a modified form of the invention.

Referring to the drawings for a more detailed description of the invention, a base member 10 of the framework of any treadle-operated machine such as a rivet setting machine is provided with a post or standard 11 in which a reciprocating part 12 is guided for vertical movement. A treadle lever 13 is pivoted at 14 on the post 11 so that depression of the treadle member 15 by the foot of the operator will elevate the other

end of the lever 13 and through a link connection 16 raise the member 12 along the guideway provided by the post or standard 11.

A second treadle lever 17 may be provided to actuate any suitable mechanism in the machine that is provided with a treadle 18 to be operated in conjunction or separately from the treadle 15 already referred to.

In order to cushion the return stroke of the parts which in each case takes place upon the upward movement of the treadle members 15 and 18, the shock-absorbing device 19 embodying the invention herein described is connected at its opposite ends to the link 16 and the treadle member 17. The shock-absorbing device 19 consists of two hollow cylinders 20 and 21 having a telescopic relation to each other and having their inner ends open to each other and their outer ends closed by suitable closure members 22 ending in terminal members 23 formed for pivotal attachment to the link 16 and lever 17 already referred to.

The lower cylinder 21 is provided with an elongated slot 24 near the lower end thereof through which a pin or stud 25 carried by a sleeve 26 projects. With this construction the cylinder 21 may slide within the sleeve 26 to the extent permitted by the elongated slot 24. In the uppermost position of the cylinder 21, as is shown in Figure 1 of the drawing, the slot 24 is raised above the upper edge of the sleeve 26 to provide a port or opening for the admission of air into the bore of the cylinders in the outward movement of the cylinders with relation to each other which is produced by the depression of either treadle member 15 or 18. Upon the return stroke of either treadle member the corresponding cylinder moves inwardly into telescoping relation with the other cylinder and in so doing causes the lower cylinder 21 to move inwardly into the sleeve 26 to thereby move the port 24 into the sleeve 26 and thereby close the port to completely shut off the passage of air there-through or to cause the port to assume a partially closed position to correspondingly restrict the flow of air therethrough. It will be seen that the closing of the port 24 in the manner described will cause the further relative inward movement of the cylinders 20 and 21 to act against a confined volume of air which serves to provide the cushioned

effect sought for. The completion of the return movement of the parts is therefore cushioned so that there is no impact or jar at the termination of the stroke when the moving parts engage the limiting or stop members.

In the form of the invention shown in Figure 2 of the drawing the port or valve employed in the device shown in Figure 1 is not used, a slow-leak or bleeding type of air port being utilized instead to provide for a cushioning effect in both directions of movement of the connected parts.

In Figure 2 the shock-absorbing device 27 is made up of two cylinder members 28 and 29 mounted base to base and opening in opposite directions. The upper cylinder member 28 has a relatively narrow diameter and a relatively great length and cooperates with a piston member 30 attached at its upper end at 31 to the link member 16 of the machine.

The lower cylinder 29 is relatively shorter than the upper cylinder 28 and has a relatively larger diameter than that of the cylinder 28. The cylinder 29 is provided with a piston 32 which is connected through the terminal member 33 to the treadle lever 17.

The difference in length and diameter of the two sets of cylinders and pistons is designed to correspond to the relative differences in the length of stroke and the momentum of the respective connected parts. In other words, the length of the stroke of the movable part 12 which is actuated by the treadle 15 is substantially greater than the movement of the parts actuated by the treadle 18. In addition to this the weight and consequently the momentum of the parts actuated by the treadle 15 are less than the weight and momentum of the parts actuated by the treadle 18.

In order to cushion the stroke of the parts in both directions of movement the upper cylinder 28 is provided with a plug 34 having a slow-leak port 35 formed therein and a corresponding plug 36 with a port 37 is provided for the lower cylinder 29.

In operation depression of the treadle member 15 elevates the part 12 and lifts the plunger or piston 30 in the upper cylinder 28. The length of the cylinder 28 is relatively great to accommodate the correspondingly great travel of the movable part 12. Release of the treadle 15 permits the parts to descend to their normal position under the action of gravity and this stroke, as well as the stroke of the rising movement of the piston 30, is restricted or cushioned by the passage of air through the restricted port 35 in the plug 34.

On the other hand operation of the foot treadle 18 and its subsequent release produces first downward and then upward

movement of the piston 32 in the lower cylinder 29 which is restricted or cushioned by the slow passage of air through the leaking port 37 in the plug 36.

It will be seen that the shock-absorbing device in this embodiment of the invention, as well as in that shown in Figure 1 of the drawing, is connected at its opposite ends to the treadle lever 17 and to the link 16 operated by the treadle 15 so that both cylinders cooperate in the cushioning effect when either treadle member 15 or 18 is operated. In other words, the shock-absorbing device is common to both treadle members and participates in the control of each or both.

What I claim is:—

1. In a shock-absorbing device for reversible motion machine parts, two tubular members opening into each other and having a telescopic relation to each other, one of said tubular members being closed at its outer end, a cap closure member for the outer end of the other tubular member, means permitting a limited movement of the tubular member within the cap member, and one of said members being provided with a port arranged to be opened by relative movement of the parts in one direction and closed by movement of the parts in the other direction.

2. In a shock-absorbing device for two relatively movable machine parts, a tubular member closed at one end and attached at the closed end to one of the parts, another tubular member having telescopic relation with the first-named tubular member, a cap member slidably mounted on the outer end of the second-named tubular member and attached to the other of said parts, said cap member being provided with a pin and said tubular member being provided with an elongated slot into which said pin extends to limit movement of the tubular member in the cap member, said elongated slot providing a port for regulating the cushioning effect of said device.

3. A shock-absorbing device for two relatively movable machine parts, two piston members attached to the respective movable parts, a cylinder for each piston, and said cylinder members being formed in a unitary structure back to back, whereby a pneumatic cushioning device is provided common to the two movable parts.

4. In a shock-absorbing device for two relatively movable machine parts, two piston members each connected to one of said parts, a cylinder for each of said pistons, said cylinders being formed into a unitary structure back to back, the cylinder and piston for one of said parts having a relatively small diameter and having a substantial length to provide for a relatively considerable length of stroke, the other cylinder and piston having a relatively large diameter and providing

for a relatively short length of stroke, and said cylinders being provided with ports of restricted size to control the flow of air into and out of said cylinders in the operation thereof. 5

5. In a shock-absorbing device for a treadle-operated machine, a pair of treadles,

a shock-absorbing device of the pneumatic type connected in common to parts moved by said treadles whereby operation of either 10 treadle will be controlled by said shock-absorbing device.

In testimony whereof I affix my signature.
EDWIN B. STIMPSON.