

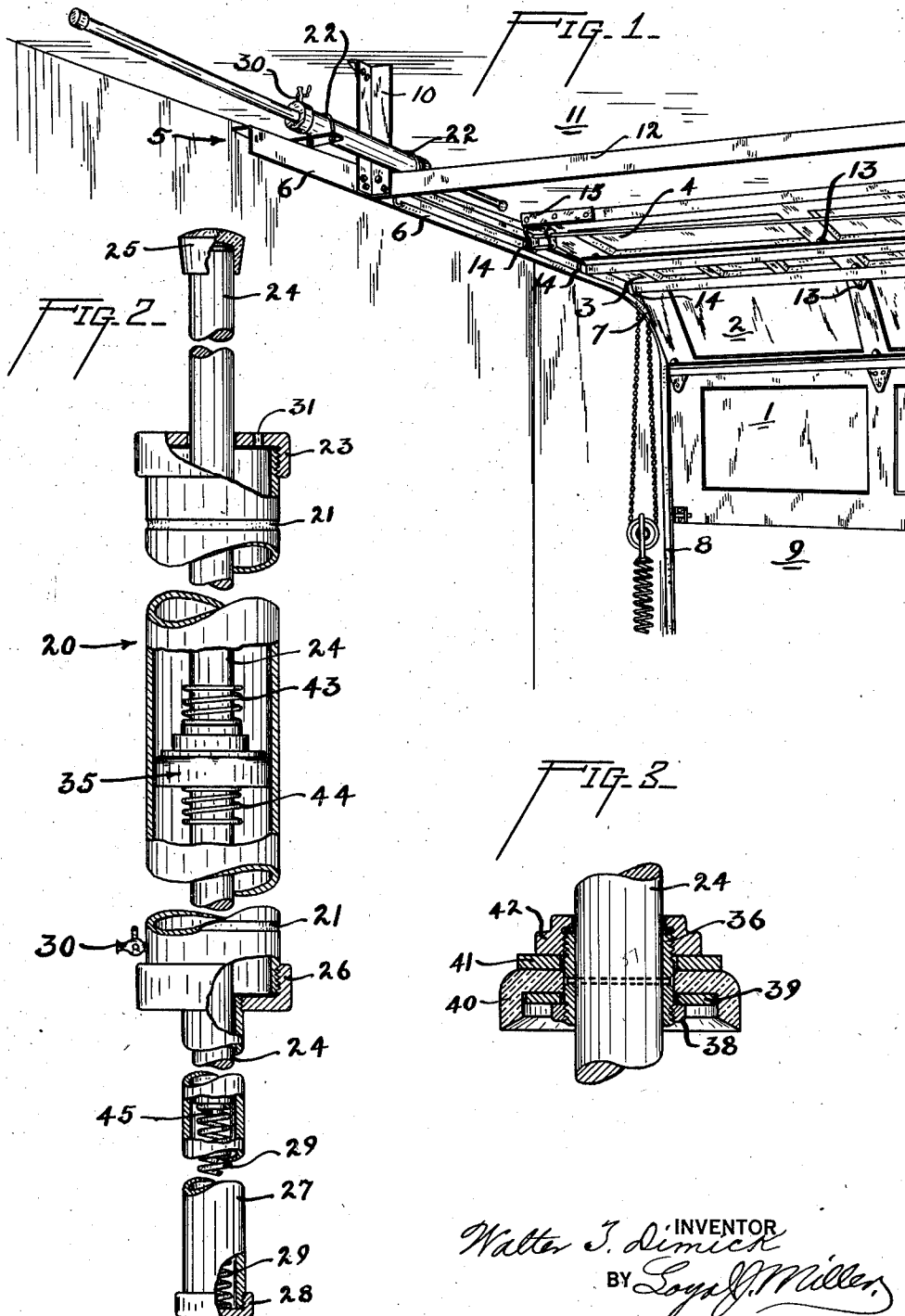
Sept. 7, 1937.

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2,092,531

SHOCK ABSORBER

Filed Dec. 2, 1935



UNITED STATES PATENT OFFICE

2,092,531

SHOCK ABSORBER

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Application December 2, 1935, Serial No. 52,587

1 Claim. (Cl. 16—84)

My invention relates to shock absorbers, and more particularly to shock absorbers requiring a long stroke.

The invention is particularly designed for use in receiving the shock occasioned by opening a heavy door of the "overhead type".

By an overhead door I refer to doors of the type comprising hinged horizontal sections operating upon tracks and being adapted to be raised upwardly from a closed vertical position and to extend overhead along tracks when in an open position. These doors are usually provided with a mechanical counterbalance so that they may easily be raised and when they are raised the upper end travels along a horizontal track overhead. The track must be provided with a stop of some type and if the stop is of a rigid nature the blow of the first or upper section striking the stop causes a jar which is not only detrimental to the building in which the doors are installed but also tends to shatter and wreck the numerous connections between the various door sections. The prime object of the present invention is the provision of a shock absorbing element for receiving this shock and easing the door to a stop.

In order to be used for this specific purpose the device must be so designed that the blow is received a considerable distance before the door is finally brought to a complete halt because of the fact that a more abrupt stop of the door would cause the following door sections to jamb one against the other which is detrimental to the sectional connections. Therefore the device must be so designed that it has a stroke of considerable length and so designed that as the complete halt is approached the resistance offered by the shock absorber is increased so that the door is finally halted without any considerable jar.

Other objects of the invention are to provide a device of this class which is new, novel, practical and of utility; which is adjustable in order to accommodate doors of various weights; which is durable; which is simple in construction; which is cheap to manufacture; which is simple to install; the parts of which may be easily and quickly removed for replacement; and, which will be efficient in accomplishing all the purposes for which it is intended.

With these and other objects in view as will more fully appear hereinbelow, my invention consists in the construction, novel features, and combination of parts hereinafter more fully described, pointed out in the claim hereto ap-

ended, and illustrated in the accompanying one sheet of drawings, of which,

Figure 1 is a fragmentary perspective view of an installed door of the overhead type showing the device operatively positioned;

Figure 2 is a fragmentary longitudinal sectional view of the device; and,

Figure 3 is a detail of the manner in which the cup-leather or piston is assembled upon the piston rod.

Like characters of reference designate like parts in all the figures.

It is understood that various changes in the form, proportion, size, shape, weight and other details of construction, within the scope of my invention may be resorted to without departing from the spirit or broad principle of my invention and without sacrificing any of the advantages thereof; and it is also understood that the drawing is to be interpreted as being illustrative and not restrictive.

The inventive idea involved is capable of receiving a variety of mechanical expressions one of which, for the purpose of illustrating the invention, is shown in the accompanying drawing wherein:—

The reference numerals 1, 2, 3 and 4 indicate the lower, second, third, and upper sections respectively of a conventional door or closure of the "overhead" type, shown in Fig. 1 in a partially opened and a partially closed position. The opposite ends of the sections are slidably mounted upon a pair of oppositely disposed similar tracks, one of which is indicated as a whole by the reference numeral 5. Each of the tracks is composed of an overhead horizontal portion 6, a curved portion 7, and a vertical portion 8 which extends along one side of an opening 9. The track may be positioned rigidly in any desired manner, for instance, a bracket 10 for connecting the horizontal portion 6 to a room ceiling 11, and by a spacer beam 12 extending between the two portions 6. As above stated herein, the door sections are hinged together, and any conventional hinge mechanisms 13 may be used for this purpose. The ends of the door sections are usually provided with rollers 14 which are adapted to run upon the tracks. A bumper plate 15 is ordinarily provided upon the upper edge of the upper door section for the purpose of striking either the beam 12 or bracket 10 and receiving the shock of halting movement of the entire door.

The above described mechanisms indicated by reference numerals 1 to 15 inclusive are con-

ventional and are not a part of the present invention.

The invention proper consists substantially of a barrel or piston housing 20 having exterior spaced superficial grooves 21 adapted to receive yokes 22 for holding the barrel rigidly in position upon the portion 6 of the track 5.

The forward end of the barrel 20 is closed by a cap 23 through which slidably extends a piston-rod 24 having a resilient cap 25 upon its free end. The rear end of the barrel receives a threaded closure 26 having a rearwardly extending tubular spring housing 27 secured thereto. The rear end of the spring housing is closed by a cap 28.

The piston rod 24 extends through the barrel 20, closure 26 and into the spring housing 27, and terminates in a reduced end portion 45 which receives one end of a compression spring 29, the other end of which bears against the inner surface of the cap 28.

Adjacent the closure 26 the barrel 20 is equipped with a pet-cock 30, and the cap 23 is provided with a breather-hole 31.

Intermediate its ends and within the barrel 20, the piston-rod 24 is provided with a rigidly mounted piston 35 which preferably consists of the following described structure:

An exteriorly threaded sleeve 36 is rigidly held upon the rod 24 by a pin or pins 37 which extend through the rod. A metal ring 38 is threaded upon the sleeve 36 and an annular spreader plate 39 is positioned against the ring 38. A rearwardly facing cup-leather 40 is held firmly against the plate 39 by an annular plate 41 and a jamb-nut 42.

Compression springs 43 and 44 are provided around the rod 24 upon each side of the piston for receiving any shock which might arise from the piston striking the inner surfaces of either the cap 23 or the closure 26.

In operation, the barrel 20 is positioned by the yokes 22 as illustrated in Fig. 1 with the forward end, or the end which carries the rubber cap 25, of the piston rod 24 in alinement with the horizontal path of travel of the upper edge of the upper section 4 of the door. By partially "cracking" or opening the valve 30 the speed with which air may escape from the housing 20 as the piston 35 is moved rearwardly may be adjusted. The adjustment of course will be different for doors of different weight and will be made so that the impact from the upwardly traveling door will be received by the rubber cap 25 and rod 24 and will gradually be brought to a complete halt when the door is approximately at its complete opened position. The flow-hole, not shown, in the valve 30 will be of such capacity that adjustment may be made to accommodate any encountered condition.

When the door is lowered, or in other words closed, the spring 29 acts to force the piston 35 to the forward end of its stroke in position to again receive another impact. This movement

is permitted by the breather-hole 31. The rate of return of the piston 35 to its normal position is dependent upon the adjustment of the valve 30 which controls the flow of air into the barrel 20 behind the piston. However, since the open end of the cup-leather 40 is then traveling away from the valve 30, the tendency is for it to permit a slight escape of air past the cup-leather and into the chamber behind the piston.

Overhead doors have, in the last few years, been used extensively in connection with garages, warehouses, and the like. Recently they are being used in connection with the doors of fire stations where it is required that the doors be opened with great speed. With the advent of their use in connection with fire stations it was at once discovered that the doors ordinarily would not stand up for any length of time because of the shock occasioned when they were quickly and forcibly opened. This is usually done by some mechanical means.

My device renders overhead doors of any type practical for use where the door is to be violently opened, and one of them be used for each side of the door.

Obviously, the invention is susceptible of embodiment in forms other than that which is illustrated in the accompanying drawing and described herein, and applicable for uses and purposes other than as detailed, and I therefore consider as my own all such modifications and adaptations and other uses of the form of the device herein described as fairly fall within the scope of my invention.

Having thus described my invention, what is claimed and desired to be secured by Letters Patent, is:

A shock absorber comprising a first cylindrical fluid chamber; a second cylindrical chamber of smaller diameter in axial alignment therewith, and having one of its ends connected to one end of and in communication with said first chamber; a piston within the first chamber for compressing a fluid in both chambers; a piston rod connected to the piston extending beyond both ends of said first chamber, one of its ends extending into said second chamber; a cylinder head for the open end of said first chamber having a central passage therein for the piston rod, and having a port therethrough communicating with the interior of the chamber and with the atmosphere; a closure for the open end of said second chamber; a coil spring within said second chamber, one of its ends bearing on said closure and the other end on the inner end of said piston rod, and adapted to normally maintain said piston at the opposite end of its chamber; a stop cock near the end of said first chamber opposite said cylinder head, adapted to regulate the passage of fluid into and out of both chambers; and a coil spring on each side of said piston, surrounding said rod, for cushioning its impact against either end of said first chamber.

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