June 12, 1962 E. GRIMM 3,038,646

SLIDE FEED

Filed March 21, 1961 4 Sheets-Sheet 1

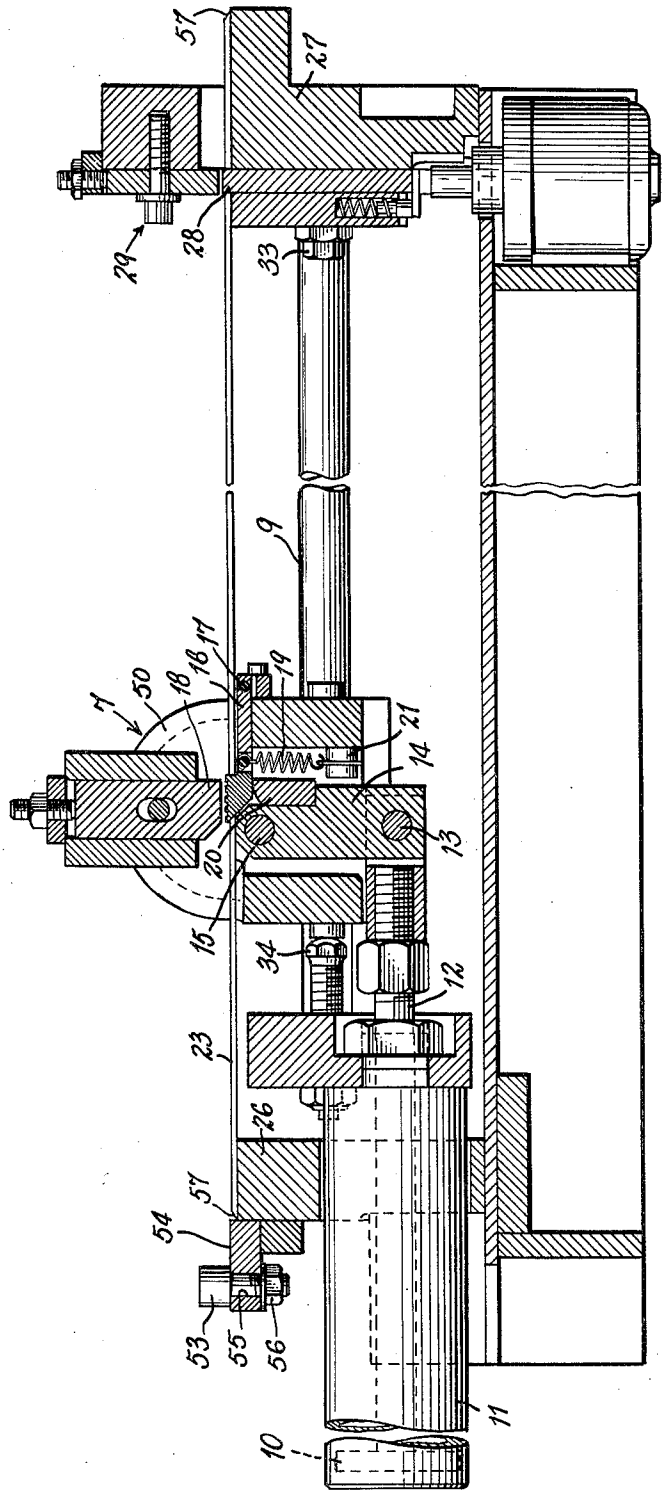


Fig. 1.

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SLIDE FEED

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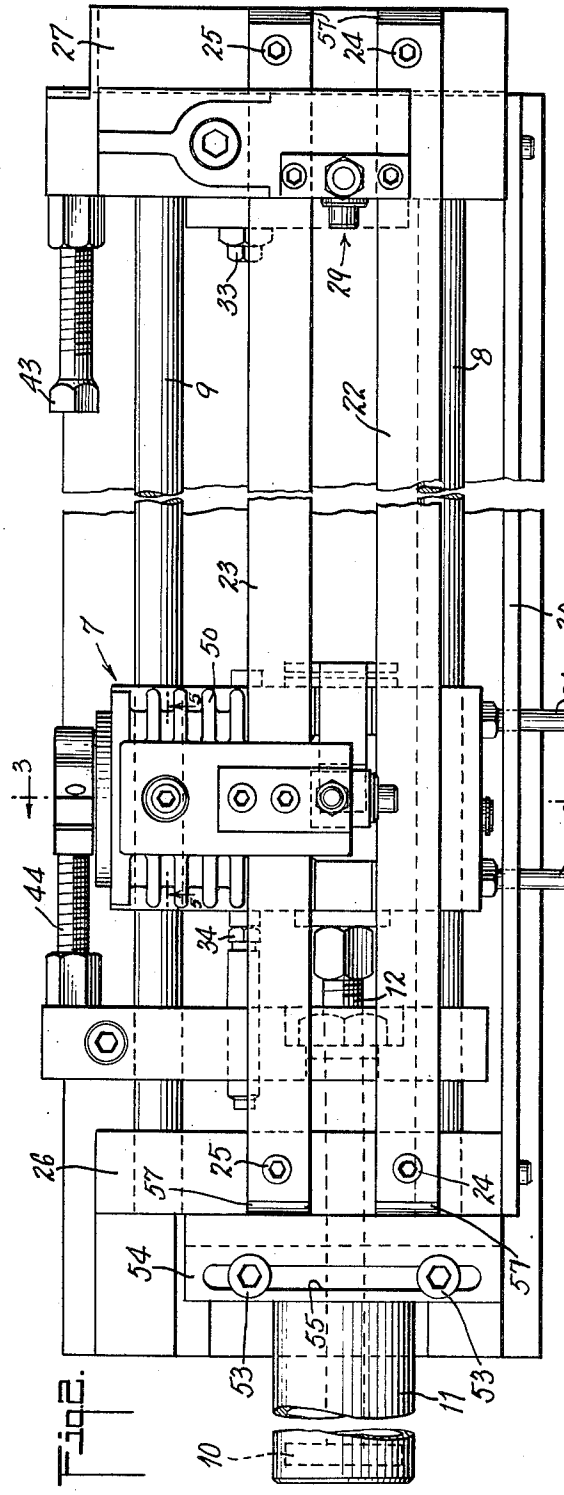


Fig. 2.

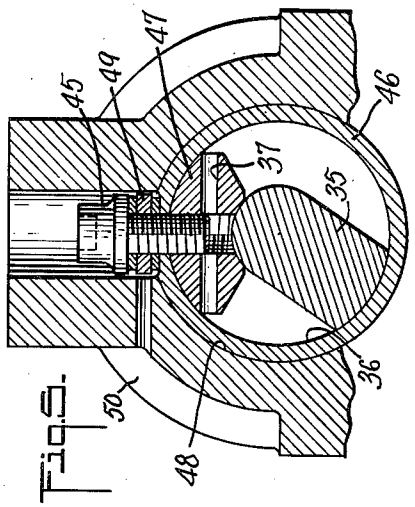


Fig. 3.

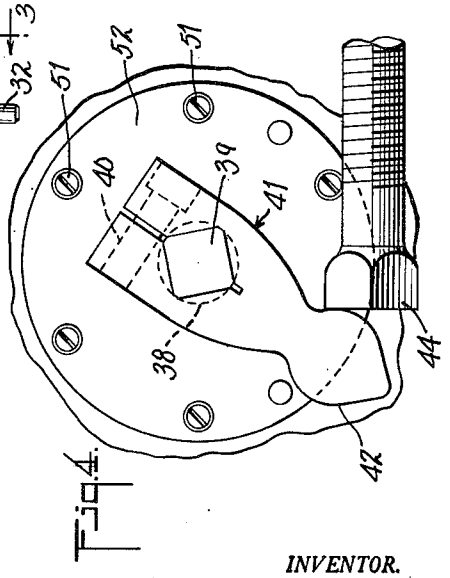


Fig. 4.

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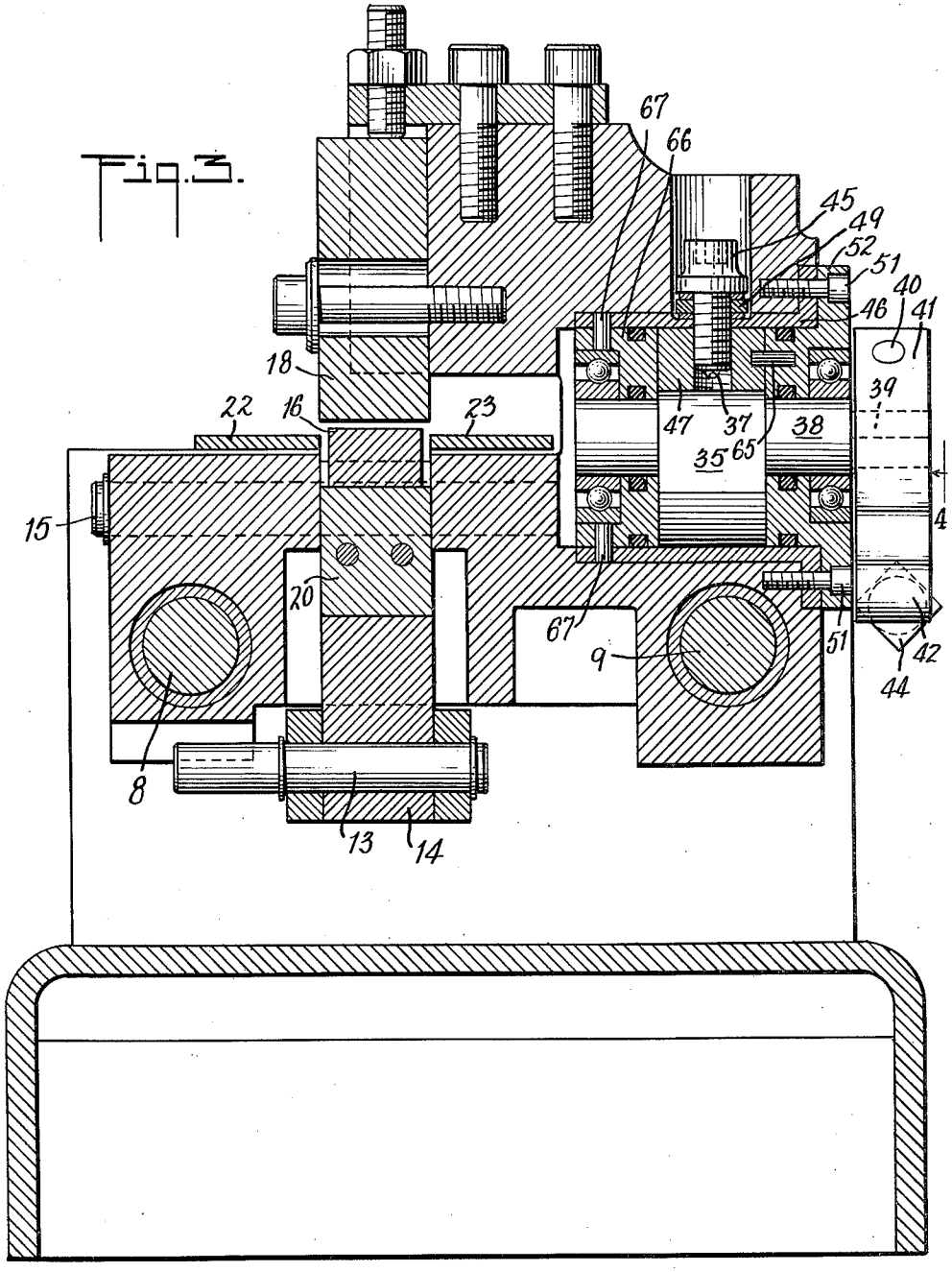
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Fig. 3.



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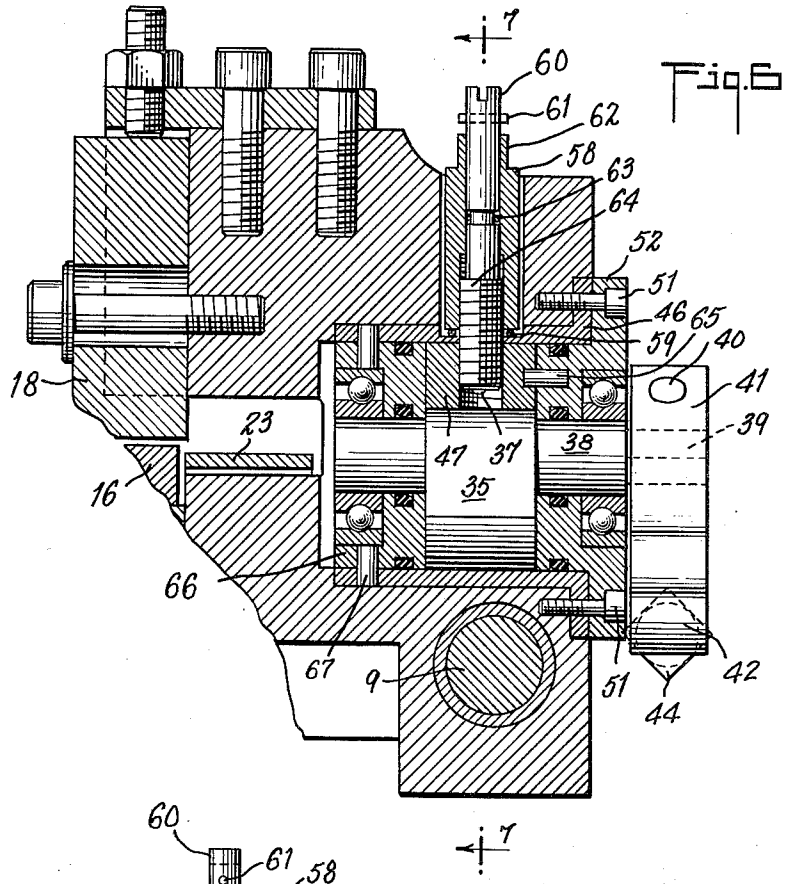


Fig. 6.

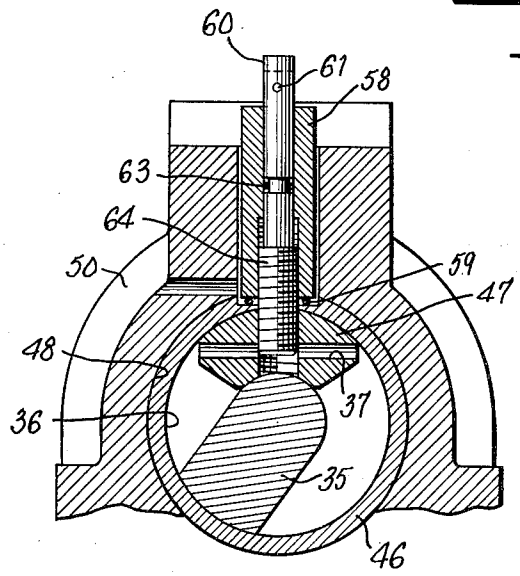


Fig. 7.

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3,038,646

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SLIDE FEED

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Filed Mar. 21, 1961, Ser. No. 97,220
5 Claims. (Cl. 226—158)

The invention here disclosed relates to slide feeds of the type claimed in copending patent application, Serial No. 837,870, filed September 3, 1959, embodying a feed block reciprocated by the piston of an air cylinder and carrying a stock gripper actuated from the same power source.

Objects of this invention are to effectively cushion the stopping of the feed block at the opposite ends of its travel, to provide a simple compact unit for this purpose which can be readily removed from or be replaced on the feed block and to improve the stock feeding action by lightening the reciprocating parts.

Other special objects of the invention are to accomplish these and other desirable results in a simple practical inexpensive form of structure.

These objects have been accomplished by certain novel features of construction, combinations and relations of parts as hereinafter set forth and as illustrated by way of example in the accompanying drawings which form part of this specification.

FIG. 1 in the drawings is a broken part sectional and part side elevation view of a slide feed embodying features of this invention.

FIG. 2 is a top plan view of the same.

FIG. 3 is a cross sectional view on substantially the plane of line 3—3 of FIG. 2.

FIG. 4 is a partial side elevation looking in the direction of arrow 4 in FIG. 3.

FIG. 5 is an enlarged cross sectional detail of the stop cushion on substantially the plane of line 5—5 of FIG. 2.

FIGS. 6 and 7 are fragmentary sectional views taken on planes at right angles to each other, illustrating a different form of pressure control.

In the general views, FIGS. 1 and 2, the feed block is indicated at 7 sliding on guide rods 8 and 9 impelled by piston 10 operating in air cylinder 11 and having a rod 12 with a yoke pivoted at 13 to the lower end of lever 14 pivoted at its upper end on the block at 15.

This lever in addition to forming part of the operating connections between the air cylinder and feed block serves by its rocking motion to operate the stock gripper.

The gripper consists, in the illustration, of a lever 16 pivoted at the forward end of the block at 17, this lever forming the lower jaw, cooperating with the upper fixed jaw 18.

The lower jaw forming lever 16 is held by spring 19 in engagement with a rounded lifter 20 on lever 14.

A fixed stop 21 limits the throw of lever 14 and the closing stroke of the lower jaw.

Smooth, flat strips 22, 23 secured by screws 24, 25 on top of the front and back brackets 26, 27 in spaced relation at opposite sides of the gripper serve to support and guide the stock, particularly such as thin strip material. The ends of these stock guiding and supporting strips are shown as beveled at 57 for clearance purposes.

The spacing of these strips also is such as to pass the lower movable jaw 28 of the stock check 29.

A bar 30 extending between the brackets 26, 27 at the front provides support for the air cylinder controlling switches which are actuated by the projecting pins 31, 32 on the front end of the feed block.

Front and back stops for the feed block are indicated at 33, 34.

To bring the block to rest without shock, hammer or rebound a hydraulic cushion is provided in the form of a vane or piston blade 35 mounted to oscillate in a cylindrical chamber 36 containing fluid which may pass through an orifice 37 from one side to the other side of the vane.

The shaft 38 carrying this vane has a squared outer end 39 over which there is clamped at 40 the radially projecting arm 41 having an oval shaped cam contour 42 engageable with adjustable front and back abutment screws 43, 44 on the front and back brackets.

The cam 42 on the end of the cushion lever may be shaped as shown to first apply a light pressure and gradually increase the pressure to bring the block firmly to a smooth stop.

The pressure developed by the hydraulic cushion is determined by a screw 45, FIG. 5, extending down through the cylinder 46 into the block 47 separating the two sides of the cylinder and intercepting the port 37 extending through this partition.

The screw 45 secures the cylinder 46 in place in its seat 48 in the block, secures the partition piece 47 in place in the cylinder and, by the extent of its projection across port 37 serves to fix the pressure and rate of deceleration effected by the hydraulic cushion.

To determine the cushioning effect a washer 49 is located beneath the head of the securing screw of a thickness limiting the projection of the screw and hence the degree of restriction of the cushioning orifice. Washers of different thickness may be selected for this purpose.

To enable fast, smooth acceleration and deceleration the feed block is preferably made of aluminum, magnesium or other such light material, suitably bushed to ride the guide rods and this block is shown as ridged or finned at 50 about the hydraulic cushion to further reduce the weight and help dissipate heat developed in the cushioning operations.

The hydraulic shock absorber is a simple cylindrical unit which can be mounted in a cylindrical socket in the side of the slide block and be secured in place by the orifice screw 45 and by screws 51 which secure the outer end or cover 52 of the cylinder and which screws are extended as shown in FIG. 3 into the body of the block.

This view also shows how the outer cover 52 is keyed to the partition block 47 by a pin 65 and the inner cover 66 is keyed to the cylinder by pins 67.

This unit is small so as not to add objectionable bulk or weight to the gripper carrying slide block and it can be sealed in place in its socket so as not to leak or require servicing. The swinging action of the vane provides smooth quiet operation and firm positive retarding and stopping of the feed block. The device consists of but few parts and can be produced at low cost. The orifice partition being shaped to fit the wall of the cylinder at the outside and the rounded back portion of the vane at the inside requires only the single bolt 45 and pin 65 to hold it so located. The vane and the shaft may be made in one piece or in separate pieces as found best suited to particular requirements.

Guides for directing the stock are indicated in the form of screws 53 mounted on a bracket 54 at the entry end of the slide feed, these screws having rounded heads to engage the edges of the stock and being adjustable to suit the width of strip stock by extending down through a slot 55 in the bracket and secured in adjusted relation by nuts 56. These guides are shown located close to the ends of the supporting strips 22, 23 so as to accurately hold the stock in line with these supports.

The limiting washer 49 for the orifice determining screw 45 provides a practical way for fixing the orifice size at the factory but in some cases it is desirable that the

operator have the option of adjusting the orifice size as considered necessary or desirable.

The construction illustrated in FIGS. 6 and 7 answers such purpose.

In these views the orifice screw here designated **64** is screwed into the partition block **47** as before and is locked in adjusted position by a screw sleeve **58** on the upper portion of it and bearing against the top of the cylinder **46**, with an O-ring or equivalent packing **59** between the end of the sleeve and the top of the cylinder.

The stem **60** of the screw is shown as slotted and as having a cross pin **61**, by either of which means it may be turned and held. The screw sleeve **58** has a flat **62** by which it can be turned and held.

The orifice screw is sealed within the screw sleeve **58** by an O-ring or equivalent packing **63**.

In both forms illustrated the cushioning unit may be filled with the necessary amount of liquid through the opening provided for the orifice screw.

The orifice through the partition forms a passage restricting flow between opposite sides of the oscillating piston blade. Equivalent effect may be obtained by providing limited clearance between the end or sides of the blade and the circumferential and end walls of the cylinder or by providing limited clearance between the back of the blade and the partition block **47** or between the partition block and the enclosing cylinder wall. In restricting the flow by any such limited clearances the opening for the screw **45** or **64** and the transverse passage **37** through the partition block would preferably be retained for filling purposes.

What is claimed is:

1. In a slide feed, the combination of a reciprocating gripper carrying block having a cylindrical cavity in one side of the same on an axis transverse to the line of reciprocating movement of the gripper block, a pressure cylinder seated in said cavity, said cylinder having a closed outer end, a shaft journaled in said cylinder on an axis transverse to the reciprocating movement of said block and projecting through the closed outer end of the cylinder, a piston vane carried by said shaft, in cooperative relation with the wall of said cylinder, a partition in said cylinder separating opposite sides of said vane and having an orifice providing restricted communication between the opposite sides of the vane, a radial arm on the outer projecting end of the shaft, front and back abutments positioned to be engaged by and to rock said arm in opposite directions in the reciprocation of the gripper block in opposite directions and cam faces on the opposite edges of the arm which engage said abutments, shaped to retard movement of the arm approaching stopped position.

2. In a slide feed, the combination of a reciprocating gripper carrying block having a cylindrical cavity in one side of the same on an axis transverse to the line of reciprocating movement of the gripper block, a pressure cylinder seated in said cavity, said cylinder having a closed outer end, a shaft journaled in said cylinder on an axis transverse to the reciprocating movement of said block and projecting through the closed outer end of the cylinder, a piston vane carried by said shaft, in cooperative relation with the wall of said cylinder, a partition in said cylinder separating opposite sides of said vane and having an orifice providing restricted communication between the opposite sides of the vane, a radial arm on the outer projecting end of the shaft, front and back abutments positioned to be engaged by and to rock said arm in opposite directions in the reciprocation of the gripper block in opposite directions and a screw extending down through the block and through the cylinder into said partition and intercepting the orifice therethrough for adjusting the orifice size and for securing the partition in position in the cylinder.

3. The invention according to claim 2 in which said orifice adjusting screw has a head and a spacing washer of predetermined thickness is located beneath said head to positively fix the size of the orifice.

4. The invention according to claim 2 in which the gripper block is of a light metal on the order of aluminum and the orifice is restricted to bring said light metal block to a gradual stop.

5. The invention according to claim 2 with a screw threaded locking sleeve engaged on the screw and having a bearing against the cylinder to secure the screw in adjusted relation.

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