March 10, 1931. F. L. ALLRED ET AL 1,795,818

MECHANISM FOR HYDRAULIC BRAKES

Filed March 28, 1930 3 Sheets-Sheet 1

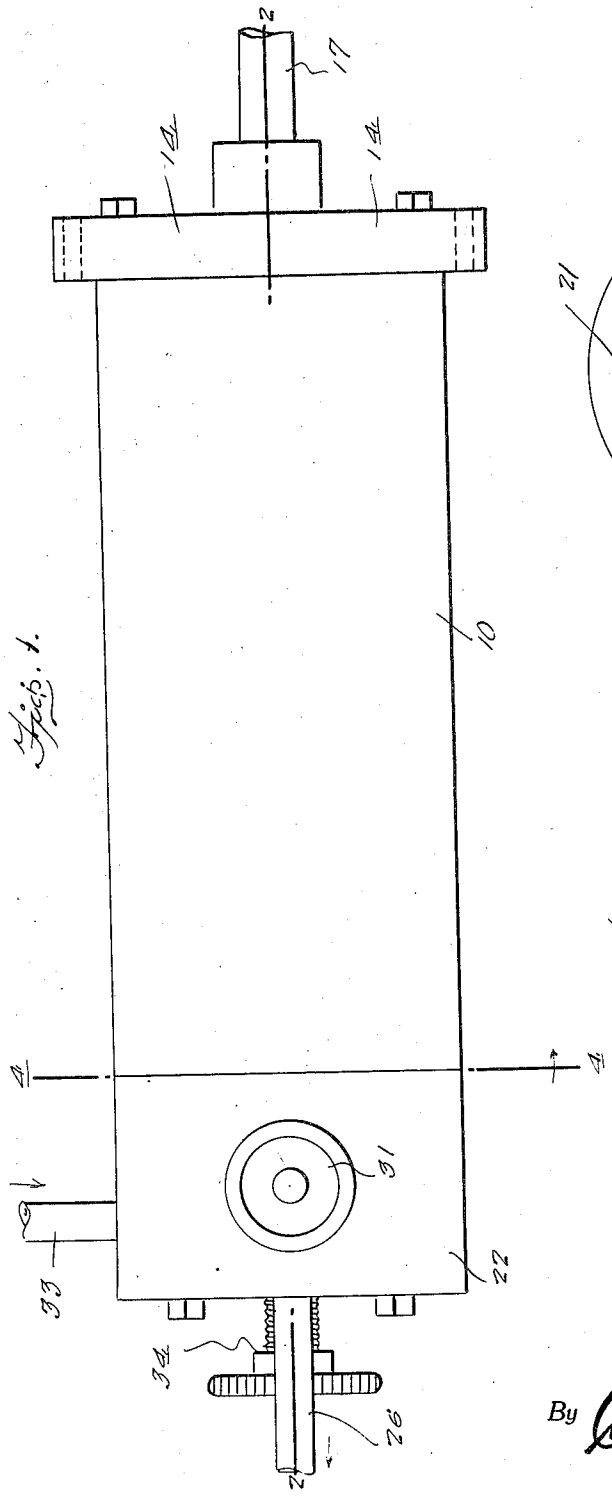


Fig. 1.

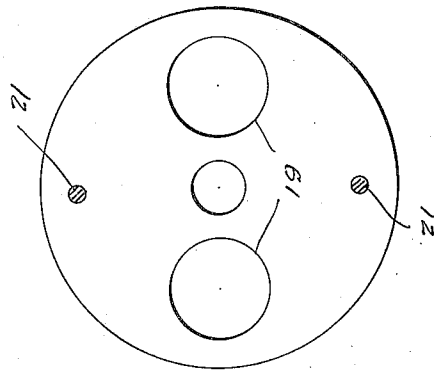


Fig. 4.

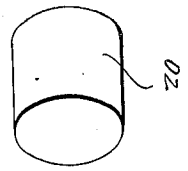


Fig. 9.

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MECHANISM FOR HYDRAULIC BRAKES

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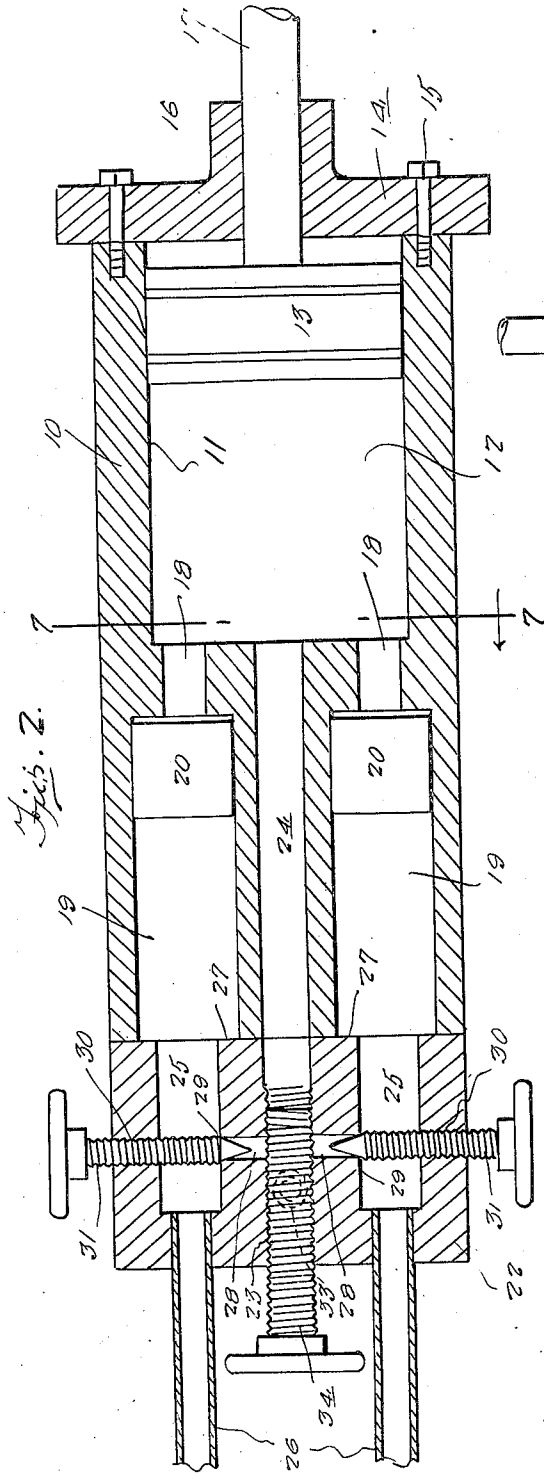


Fig. 2.

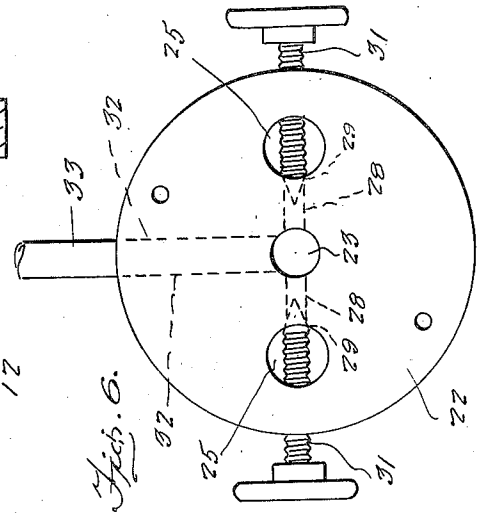


Fig. 6.

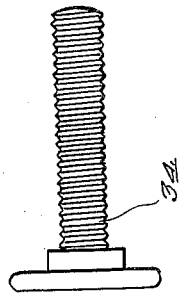


Fig. 8.

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MECHANISM FOR HYDRAULIC BRAKES

Filed March 28, 1930 3 Sheets-Sheet 3

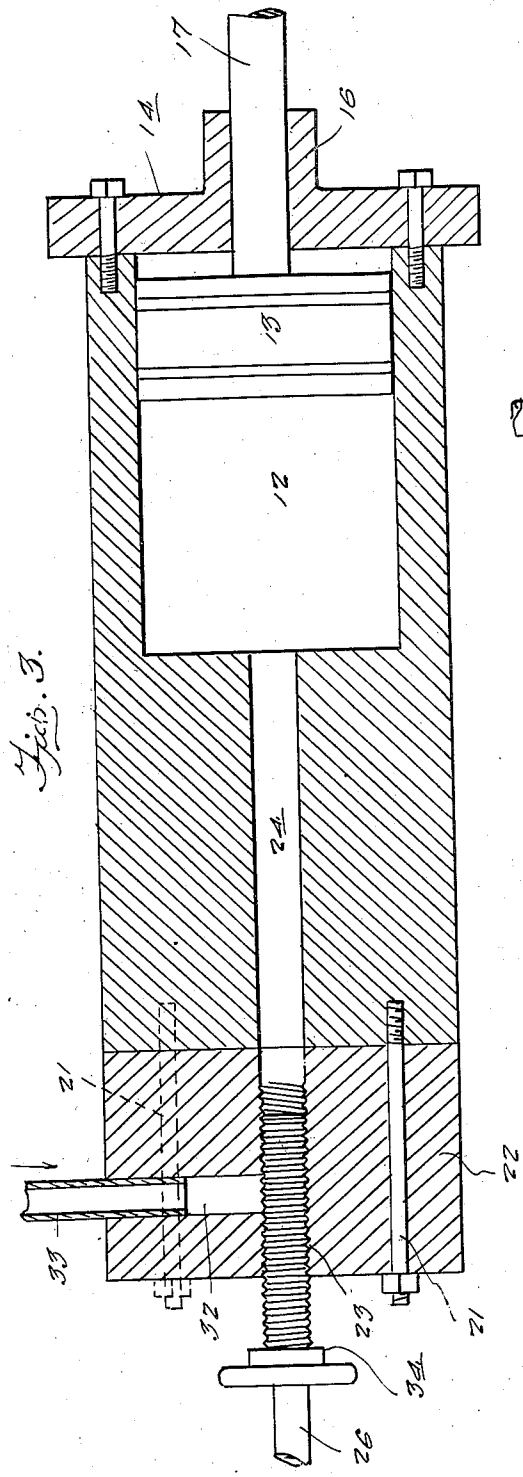


Fig. 3.

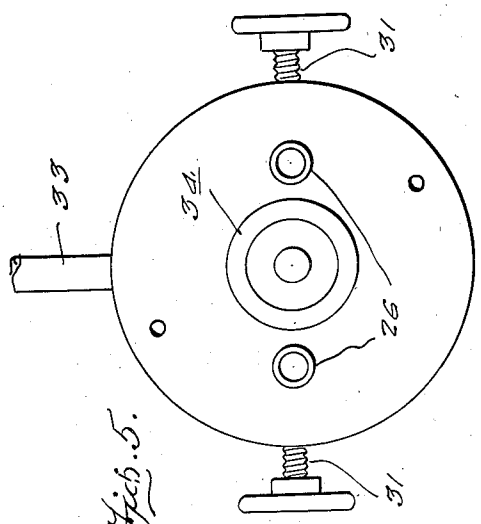


Fig. 5.

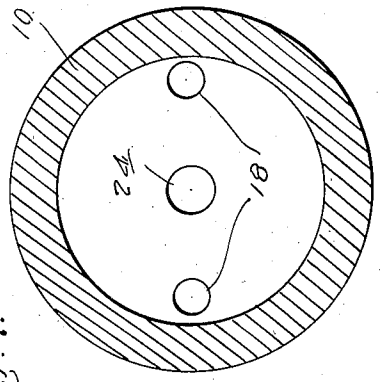


Fig. 7.

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UNITED STATES PATENT OFFICE

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MECHANISM FOR HYDRAULIC BRAKES

Application filed March 28, 1930. Serial No. 439,676.

This invention relates to fluid control mechanisms for hydraulic brakes on vehicles, and is particularly adapted to automobiles.

An object of the invention is to provide a control mechanism that will automatically cut out of the system, an individual brake that happens to be leaking without affecting the efficiency of the other brakes of the system.

Further objects of the invention are to provide in a manner as hereinafter set forth, a control mechanism of the character referred to that is strong, compact and durable, thoroughly reliable for its intended purpose, adaptable for installation on standard types of automobiles, that is very simple in its method of assembly, is comparatively inexpensive to manufacture and operate.

With the foregoing and other objects in view, the invention consists of a novel construction, combination and arrangement of parts, as will be hereinafter more specifically described and illustrated in the accompanying drawings, wherein is disclosed an embodiment of the invention, but it is to be understood that changes, variations and modifictations, may be resorted to without departing from the spirit of the claims hereto appended.

In the drawings wherein like reference characters denote corresponding parts throughout the several views:—

Figure 1 is a side elevation of the device in accordance with the present invention,

Fig. 2 is a longitudinal, vertical section in detail thereof,

Fig. 3 is a view similar to Fig. 2, taken at right angles to the view shown in Fig. 2,

Fig. 4 is one end view of the block taken substantially on the line 4—4 of Fig. 1 and looking in the direction of the arrow,

Fig. 5 is an end view of one end of the device,

Fig. 6 is an inner face view of one of the cylinder heads,

Fig. 7 is a diametric section taken substantially on the line 7—7 of Fig. 2,

Fig. 8 is the valve for controlling the central passage of the device, and

Fig. 9 is a perspective view of one of the piston valves.

As described and illustrated, the invention is shown for controlling the flow of brake liquids, to two liquid conducting lines, one of which is to lead to branches that control the pair of front wheel brakes of an automobile, and the other to lead to branches that control the pair of rear wheel brakes.

This construction is very economical and requires only pairs of cartridges, small cylinders, needle valves, and conductor lines, but in event it is desired to have individual conductor lines to the four wheel brakes, the modification is to be considered within the scope of the present invention.

Referring to the drawings in detail, 10 indicates an elongated block of any desired configuration, and in the form shown is cylindrical. About one-half of the block at one end is formed with an axial bore 11, to provide the main cylinder 12 in which is slidable piston 13. Over the open outer end of the bore 11 is a cylinder head 14 anchored to the block by stud screws 15. This cylinder head is provided with an opening 16 that forms a bearing for the piston rod 17 and this piston rod is associated at its outer end with a foot lever operated by the driver of the automobile, not shown in the drawings.

The inner end of the piston rod is joined to the piston 13. From the margins of the inner wall of the main cylinder 12 there extends passages 18 spaced radially from each other. These passages communicate with the inner end walls of the small cylinders 19 which as shown are two in number, that are parallel with, but spaced laterally of the axis of the main cylinder 12.

These small cylinders 19, extend the balance of the length of the block 10 and are open on the outer end of this block. Solid, cylindrical piston valves 20 slides freely in the small cylinders 19 and close the passages 18 from the main cylinder 12 to one end of the small cylinders 19.

The other end of the block 10 has anchored thereto, bindings of stud screws 21, a solid cylindrical head 22 that has an axial threaded bore 23, and this bore 23, communicates at

its inner end with axial passage 24 in the block 10. The passage 24 extends from the center of the inner wall of the main cylinder 12, between the small cylinders 19 to the end of the block, where it communicates with the threaded bore 23.

In the cylinder head 22 are also formed passages 25 which at their ends communicate with the outer ends of the small cylinders 19, and to the outer ends of the passages 25 are joined the conductors 26, one of which by suitable branches, not shown, leads to the pair of front wheel hydraulic brakes, while the other conductor leads, by suitable branches, not shown, to the pair of rear wheel brakes.

The passages 25 are smaller than the cylinder 19 to provide annular shoulders 27 at their juncture with the said cylinder, these shoulders forming seats for the piston valves 20 to close the passages 25.

Radial bores 28, one for each passage 25, extends through the cylinder 22 and communicates with the threaded axial bore 23, at their inner ends. These bores 28 extend through passages 25 and form needle valves 29 where they merge with the inner peripheries of the passages 25.

The outer portions of the radial bores, 28 are threaded as at 30 to receive the needle valves 31, which control the flow of liquid from the axial bore 23 through radial bores 28 into the passages 25. Outwardly from the radial bores 28, the cylinder head, has a radial passage 32, the inner end of which communicates with the axial bore 23, and the outer end thereof is joined to a conductor pipe 33 that leads from the liquid supply reservoir, not shown, for replenishing the liquid in the system.

A threaded cylindrical valve 34 is movably supported in the threaded axial bore 23 for closing the outer end thereof. By screwing the valve 34 outwardly until its passage 32, the liquid supply for the system will be replenished, while the same valve 32 is used for selectively and simultaneously controlling the flow of liquid between the passages 25 and the axial passage 24, of the block 10. Needle valves 31 also control the flow of liquid between the latter passages.

Valves 34 must be free of passage 32 and at the same time, needle valves 31 must be opened, before any brake liquids can pass these valves into the brake lines 26, except by the action of the free floating pistons 20 which will close in case a leak or break in any of the lines occurs.

Also by full opening up of valve 34, and opening needle valves 31, fluid can be passed direct from the supply line 32, to lines 26 for feeding or draining, and by closing line 32 and opening valves 31, we still have equal brakes without the action of the pistons 20.

By closing all valves, pistons 20 become active and opening of one of the valves 31 will not by-pass any liquid, nor stop the action of the pistons 20. By opening valve 34 beyond passage 32, the main cylinder 12 will be filled with brake liquid.

In working order valves 31 and 34 are closed, but will not go out of commission if any valve should be left open, and moreover open valves will not affect the brakes, in any way.

As will be understood the pressure in the conduits 26 and the brake means is such as to hold the pistons 20 in the position they occupy in Figure 2 or substantially so. Thus when the piston 13 moves inwardly the pressure of the fluid in cylinder 12 will force the pistons 20 toward the shoulders 27 thus exerting pressure on the fluid and thus applying the brakes. Of course the pressure of fluid in the system beyond the pistons 20 is not sufficient to apply the brakes so that the brakes will not be applied until the piston 13 is moved forwardly.

It is thought the present embodiment of the invention has been disclosed in considerable detail merely for the purpose of exemplification since in actual practice it attains the features of advantage enumerated as desirable in the statement of the invention and the above description.

It is to be understood that by describing in detail herein any particular form, structure, or arrangement, it is not intended to limit the invention beyond the terms of the several claims, or the requirements of the prior art.

Having thus described our invention, what we claim as new is:—

1. A control mechanism for hydraulic brakes, a body having conductor pipes leading into one end adapted to be connected to the hydraulic brakes, a main cylinder and piston in one portion of the body, adapted for connection to the brake applying means, said body further formed with a passage communicating with the main cylinder, auxiliary cylinders formed in the body and having one end in communication with the main cylinder, said body further having selectively controlled by-passes connecting the other ends of said auxiliary cylinders with the first-mentioned passage, means in said auxiliary cylinders responsive to leakage in said conductor pipes for closing the by-passes, a fluid supply pipe connected with said first-mentioned passage, and a valve in said first-mentioned passage to close the fluid supply pipe and said selectively controlled by-pass.

2. A control mechanism for hydraulic brakes, a body having conductor pipes leading into one end adapted to be connected to the hydraulic brakes, a main cylinder and piston in one portion of the body adapted for connection to the brake applying means, said body further formed with a passage commu-

nicating with the main cylinder, auxiliary cylinders formed in the body and having one end in communication with the main cylinder, said body further having selectively controlled by-passes connecting the other ends of said auxiliary cylinders with the first-mentioned passage, means in said auxiliary cylinders responsive to leakage in said conductor pipes for closing the by-passes, said last-mentioned means consisting of a free floating piston, a fluid supply pipe connected with said first-mentioned passage, and a valve in said first-mentioned passage to close the fluid supply pipe and said selectively controlled by-pass.

In testimony whereof we affix our signatures.

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