

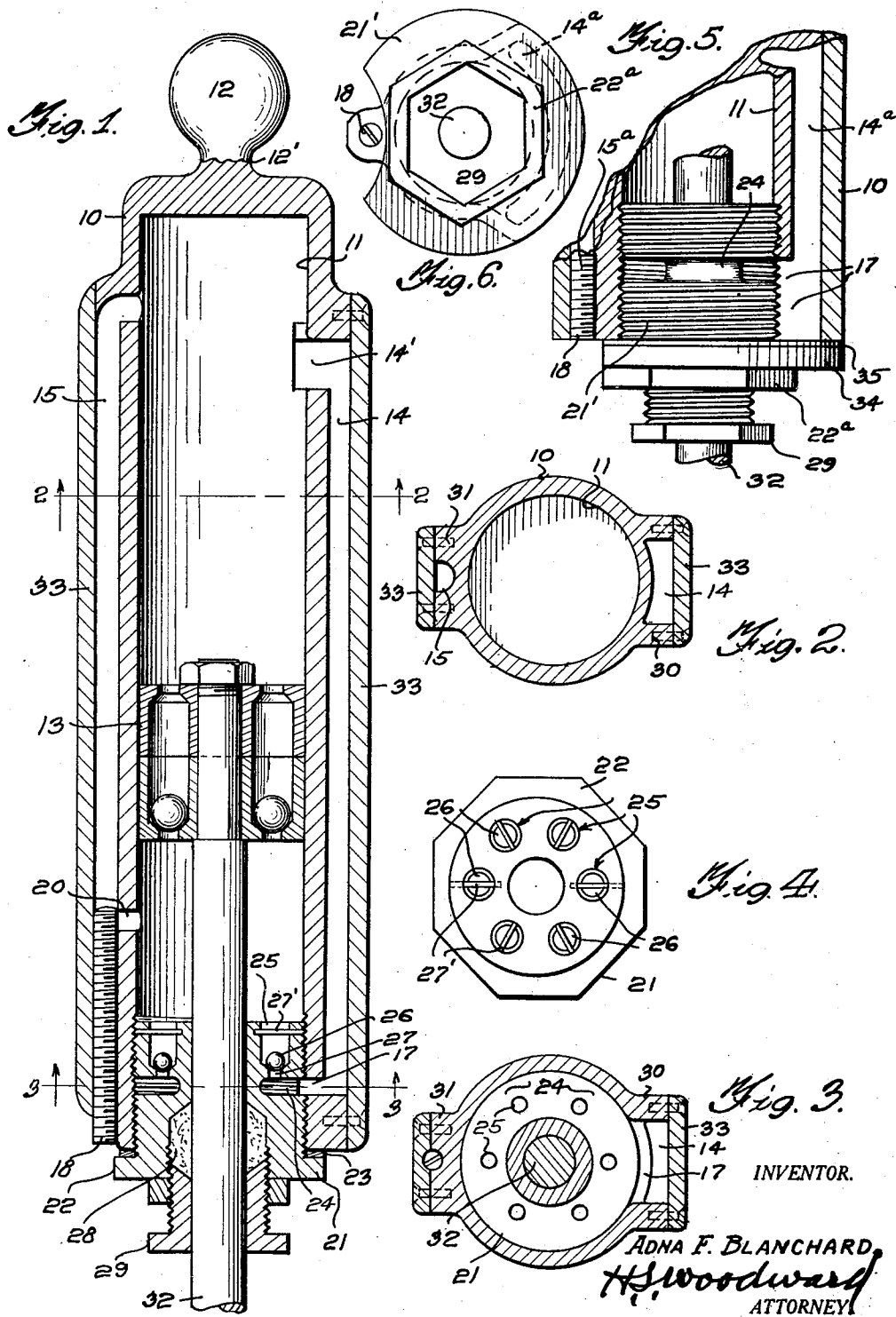
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SHOCK ABSORBER

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UNITED STATES PATENT OFFICE

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SHOCK ABSORBER

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This invention has for an object to effect improvements in the construction of shock absorbers of the kind illustrated in my application similarly entitled, filed Oct. 18, 1926, Serial No. 142,288. It is an important aim to improve the functioning of the device of my prior application, and also to provide a novel form of construction enabling its production with few parts and shop operations, as well as simplifying the assembly operations, and minimizing the need for special tools.

It is an important object to utilize the open end of the cylinder casting to mount a combined closure head, stuffing box and check valve mounting, enabling this assembly to be put into the cylinder as a unit, and obviating the need for mounting the check valve or valves in the cylinder casting directly, where awkward positioning of parts would be involved. It is also a purpose to so form the parts that in putting the head in place there will be no uncertainty or need for special care in securing registry between the ports of the by passage in the casting, and ducts in the removable head carrying the check valves. A further important object is to enable at the same time the closure of the piston bore, and also the outer end of the large by-passage in the cylinder casting, while permitting closure of the small by-pass on the same end of the casting by an adjustable screw by which the rebound check is regulated.

Additional objects, advantages and features of invention reside in the construction, arrangement and combination of parts involved in the embodiment of the invention, as may be understood from the following description, and accompanying drawings, wherein—

Fig. 1 is a longitudinal sectional view of one form of the new construction.

Fig. 2 is a cross section thereof, on the line 2—2 of Fig. 1.

Fig. 3 is a similar view on the line 3—3 of Fig. 1.

Fig. 4 is an end view of the lower head.

Fig. 5 is a fragmentary view similar to Fig. 1, showing the lower end of a modification.

Fig. 6 is an end view of the last mentioned modification.

There is illustrated a cylinder casting or casing 10, having a cylindrical bore 11 opening from the lower end, the other end being integrally closed and provided exteriorly with a coaxial ball 12 connected with the casting body by a reduced neck 12'. Reciprocable in the bore 11 there is a piston 13 constructed as disclosed in my aforesaid application. A main by-pass passage 14 is formed in the wall of the cylinder at one side, while a two-way and smaller by-pass passage 15 is formed in the wall at the opposite side, as shown. These passages open into the bore 11 at the upper end in the same positions and relation as described in my prior application, and the by-pass 15 opens into the lower part of the bore 11 as did the similar by-pass in the said prior application. The by-passes both function in conjunction with the piston and check valves as described in the said prior application on which will also be otherwise obvious to those versed in the art. The by-pass is in the present instance arranged to discharge into the extreme lower end of the bore, instead of directly opposite the lower end of the by-pass 15. This distinction is immaterial broadly as to the function, but enables the provision of larger port areas and freer action of the device under spring compression.

The passage 14 opens into the bore 11 near the extremity of the casting, through a port 17, while the passage 15 opens into the bore a distance thereabove through the port 20. This passage 15 is continued rectilinearly in the wall of the casting, downwardly past the port 20 and through the end of the casting, being interiorly threaded from the port to its outer end, and receiving a screw 18, by which the passage beyond the port is closed, and adjustable restriction of the port 20 effected. The passage 14 is broadened, as well as the port 17 to provide for movement of a substantial body of fluid therethrough under movement of the piston in one direction, while the passage 15 may be of much smaller capacity.

The lower part of the bore 11 from a distance above the port 17 to the lower end is

interiorly threaded, and screwed thereinto so as to cover the port 17, there is a head 21 having a circumscribing hexagonal flange 22 abutting snugly the end of the casting, except that a gasket 23 is interposed. On a level with the port 17, a deep groove or channel 24 is formed in the head, circumscribing the head, while opening upwardly through the inner or top face of the head from the groove there is a multiplicity of ports 25, each accommodating loosely a ball 26, and being restricted slightly at the lower part to form a seat 27' for the ball. The balls are retained by radial pins 27' in the head. An interiorly threaded stuffing box recess 28 is formed in the outer side of the head, a gland 29 being engaged therein, while the head is centrally bored to receive the piston rod 32 slidably. The wall of the casting may be formed integrally with the by pass passages therein after any approved practice. For convenience I have shown the casting as consisting of a body cylinder with a longitudinal medially recessed boss 33 at one side, and a corresponding boss 31 at the opposite side. The recesses in the bosses are closed by plates 33 held by screws. The recess in the boss 30 is wider than the recess in the boss 31 and forms the passage 14, while the recess in the boss 31 may be much narrower, and forms the passage 15. The portion of the passage 15 receiving the screw may at its lower part pass through the end of the boss spaced slightly from the plane of the closure plate 33.

In Figures 5 and 6 I have shown a method of forming the by-passages adapted to die casting. In this instance both of the passages 14^a and 15^a, corresponding to the passages 14 and 15 have outer walls integral with the wall of the cylinder casting and they both extend rectilinearly past the ports 20^a and 17' through the end of the casting, which is finished with a planiform face. The head 21' is formed with a larger flange than in the first instance herein as at 34, while a hexagon 22^a is formed outwardly thereof. This large flange is utilized to close the outer end of the passage 14^a, a gasket 35 being interposed. After screwing of the head into place to safely seal the outer end of the passage 14^a, the opposite edge portion of the flange 34 opposite the passage 14^a is cut away to expose the end of the passage 15 and permit insertion and adjustment of the screw 18, as before described. By the use of a proper tool this cutting away may be done without removing the head again. The hexagon 22^a is made of a size to avoid interference with the operation of the screw 18, and does not require to be cut away at all.

In the operation of this device, the bore 11 and all passages being filled with a proper liquid, the member 10 being connected to the frame of a motor vehicle centrally over the axle, and the rod 32 to the axle thereunder,

upon compression of the spring by which the frame is customarily supported on the axle, the piston 13 will move upwardly. This will cause the liquid to be moved rapidly downward through the passage 14, and slowly downward through the passage 15. From the passage 14 the liquid passes into the groove 24 of the head 21 and thence upwardly past the valves 26 into the bore 11 behind the piston. From the passage 15 the liquid escapes slowly and directly into the bore 11 behind the piston. On recoil of the vehicle spring the piston will move downwardly, but the valves 26 being seated there will be no rapid movement of liquid into the passage 14 and upwardly and only a slow escape of liquid from the lower part of the bore 11 past the screw 18 through the passage 15 to the upper part of the bore 11. Certain valves in the piston function with novel effect at the beginning of movement of the piston in either direction, as explained in my said prior application.

I claim:

1. In a device of the character described, a casing having a longitudinal piston passage opening on one end of the casing and interiorly threaded at the outer part, said casing having a by-passage in the wall thereof opening on respective end portions of the piston passage, a head piece screwed into the open end of said casing beyond the adjacent end of said passage having a circumscribing groove communicating with the passage, a multiplicity of ports opening from the groove through the inner face of the head, and check valves mounted respectively in said ports to oppose movement of fluid in one direction through the said by-passage.

2. The structure of claim 1 in which the by-passage is of considerable width, opening also on the end of the casing adjacent said head, said head having a flange, and a closure plate for the open end of the by-passage confined against the end of the casing by said head.

In testimony whereof I affix my signature.
ADNA F. BLANCHARD.