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 FLUID OPERATED DEVICE FOR STARTING THE MOVEMENT
 OF SHAFTS FROM HUBS
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Fig 2

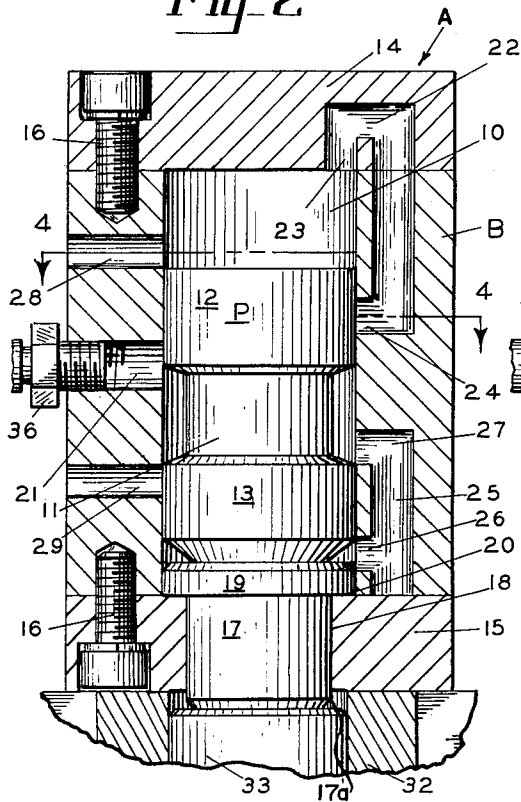


Fig 3

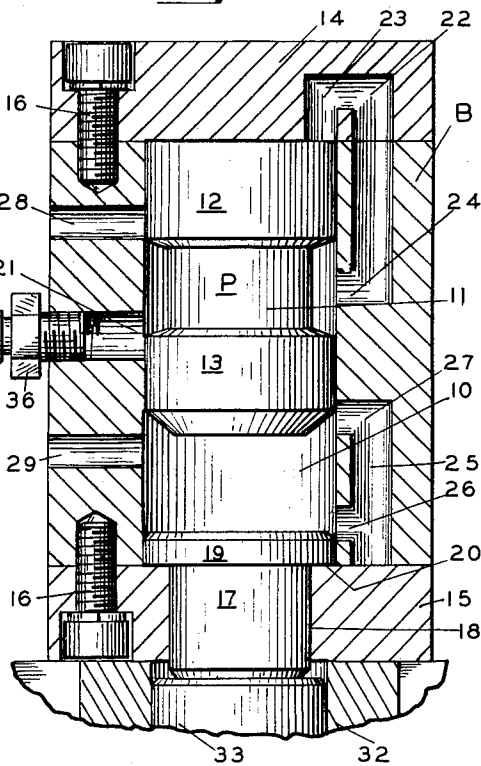


Fig 5

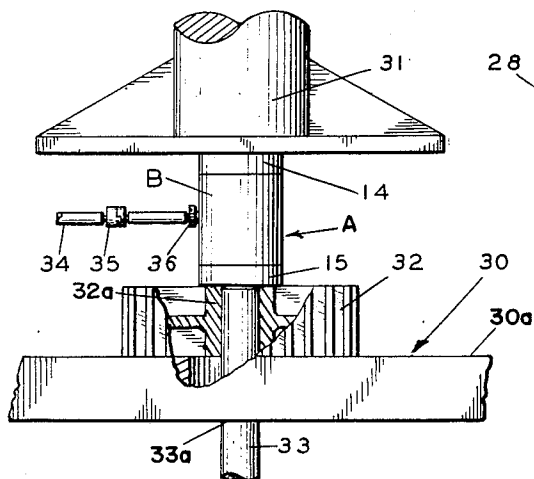
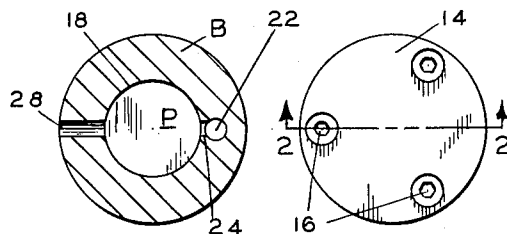


Fig 4

Fig 1



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FLUID OPERATED DEVICE FOR STARTING THE MOVEMENT OF SHAFTS FROM HUBS

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This invention relates to a device for starting the movement of shafts from hubs and relates more particularly to a device to be used in the removal of shafts from hubs of gears, wheels and the like under hydraulic presses.

The primary object of the instant invention is the provision of a device of the type described which will assist in freeing a shaft from a hub with much less pressure than ordinarily necessary from a hydraulic press.

Another object of this invention is the provision of a device wherein a hammering or impact force is applied to the end of a shaft as it is forced out of a hub by a conventional press.

A further object of this invention is to provide a device for starting the movement of shaft from a hub having means to automatically and continuously impart impact blows against the shaft while the shaft is under a constant pressure from a hydraulic press.

A still further object of the instant invention is the provision of such a device which is preferably operated by air.

Another object of this invention is the provision of a device which may be interposed between the press piston of a conventional hydraulic press and the bed of the press on which is supported a hub carrying a shaft, the device including a hammer which is raised and then quickly lowered to exert an impact blow upon the shaft thereby assisting in releasing the same from the hub.

Other and further objects reside in the combination of elements, arrangements of parts, and features of construction.

Still other objects will in part be obvious and in part be pointed out as the description of the invention proceeds and as shown in the accompanying drawing wherein there are disclosed preferred embodiments of this inventive concept.

In the drawing:

FIGURE 1 is a top plan view of the device of the instant invention;

FIGURE 2 is a longitudinal cross-sectional view, to an enlarged scale, taken on line 2-2 of FIGURE 1, showing the device in its impact-delivering position, with parts broken away for illustrative convenience;

FIGURE 3 is a longitudinal cross-sectional view similar to FIGURE 2 showing the device of the instant invention in its impact-potential position;

FIGURE 4 is a transverse cross-sectional view taken along line 4-4 of FIGURE 2; and

FIGURE 5 is a front elevational view of the device of the instant invention showing its relation to a conventional hydraulic press and its use in removing a shaft from a gear hub 32a, partly in cross-section and with parts broken away for illustrative convenience.

Referring now to the drawings, the device of the instant invention is comprised of a hammer device A including cylindrical body B having a hammer piston P operating within a longitudinal bore 10. The hammer piston P has a circumferential groove 11 defined between a pair of piston heads 12 and 13. The cylindrical body B has removable ends 14 and 15 secured thereto by way of bolts 16 or the like.

A plunger 17 having an end portion 17a operates within a bore 18 formed in the lower end 15 and has an enlarged head or anvil portion 19 to limit its downward movement against the shoulder 20 formed by the end 15.

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The enlarged head 19 also prevents the plunger 17 from dropping out of the device. The piston head 13 is adapted to strike the enlarged head 19 of the plunger 17 in a manner to be described further hereinafter to initiate an impact blow which would be transmitted through the lower end portion 17a of the plunger 17 to the shaft 33 to be removed from a hub.

An inlet port 21 is defined in the side of the cylindrical body B for admitting a fluid, such as air, and communicates with the circumferential groove 11 formed on the hammer piston P. A first bore 22 is formed in the cylindrical body B and the end 14 and communicates at 23 with the upper end of the longitudinal bore 10. The lower end of the bore 22 communicates with the cylindrical groove 11 at 24 when the hammer piston P is in the impact-potential position of FIGURE 3 and is sealed by the piston head 12 when the hammer piston P is in the impact-delivering position shown in FIGURE 2.

A second bore 25 is formed in the cylindrical body B and communicates with the longitudinal bore 10 adjacent its lower end at 26. The upper end of the second bore 25 communicates with the cylindrical groove 11 at 27 when the hammer piston P is in the impact-delivering position of FIGURE 2.

Exhaust ports 28 and 29 are also defined in the cylindrical body B and function in a manner to be further described hereinafter.

Referring now particularly to FIGURE 5, the bed of a conventional hydraulic press is indicated by the reference numeral 30a and the press piston thereof is shown at 31. In this illustration a relatively small gear 32 carries a shaft 33 which is to be removed therefrom. The bed 30a has a bore 33a therethrough for passage of the shaft 33. As seen in FIGURES 2, 3, and 5, the device of the instant invention has completed its operation and a separate plunger would be used for removing the remainder of the shaft 33 from the gear 32 after it has been loosened by this device. In certain instances, the device of the instant invention may itself be small enough to pass down through the hub of the gear or wheel completing the operation. However, the significant function of this device is to loosen the shaft from its hub and thereby initiate its removal.

A source of air pressure (not shown) communicates by means of a conduit 34 having a special hose connection 35 which may include a valve or a pressure gauge and which is in turn connected to the cylindrical body B by any suitable means indicated generally at 36.

The use and operation of the device of the instant invention will now be apparent. When the hammer piston P is in the impact-delivering position shown in FIGURE 2, it has just completed a blow against the plunger 17 which in turn was transmitted to the shaft 33 to be removed from the hub of the gear 32. In order to return the hammer piston P to the position shown in FIGURE 3 and designated as the impact-potential position, air is admitted through the inlet port 21 into the circumferential groove 11 around the hammer piston P and then passes through the second bore 25 and under the piston head 13 to raise the hammer piston P to the impact-potential position of FIGURE 3. When the piston reaches the top of its travel no more air will be admitted into the second bore 25 and the air used to raise the hammer piston P will be exhausted through the port 29.

Air from the inlet port 21 will continue to enter the circumferential grooves 11 and, in the position of FIGURE 3, will pass through the first bore 22 to be delivered to the top of the piston head 12 thereby driving the hammer piston P downwardly against the plunger 17. When the hammer piston P is moved to the position of FIGURE 2, the first bore 22 will be sealed by the piston head 12

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and the second bore 25 will again be placed in communication with the cylindrical groove 11. At the same time the air above the piston head 12 will escape through the exhaust port 28.

This action is automatic and continuous and the hammer piston P is raised and lowered many times in a single second, imparting a hammer or vibrating impact blow through the plunger 17 to the upper end of the shaft 33.

While the impact blows are continuously directed against the shaft 33, the pressure of the piston rod 31 of the hydraulic press will be constantly exerted against the device of the instant invention. Thus, the combination of the pressure of the hydraulic press and the impact blows from the device of the instant invention will loosen the shaft from its hub with a minimum amount of pressure exerted by the press itself.

It will now be seen that there is herein provided a device which satisfies all of the objects of the instant invention and others including many advantages of great practical utility and commercial importance.

Since many embodiments may be made of the device of the instant invention, and since many modifications may be made of the embodiments hereinbefore shown and described, it is to be understood that all matter herein is to be interpreted merely as illustrative, and not in a limiting sense.

I claim:

1. A device for starting the movement of shafts from hubs comprising a hydraulic press and a hammer device, said hydraulic press having a press piston and a bed adapted to support said hub, a bore through said bed for passage of said shaft and means for applying a pressure behind said press piston to maintain engagement of said hammer device with said shaft, said hammer device being interposed between said press piston and said shaft, and plunger means carried by said hammer device for imparting an impact blow against said shaft, said hammer device including a body member having means defining a longitudinal bore therethrough, said longitudinal bore having a closed top end and a bottom end including a bore for said plunger means, a hammer piston having

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two piston heads and being slidably supported within said longitudinal bore between an upper impact-potential position wherein one of said piston heads is adjacent said top end of said longitudinal bore and a lower impact-delivering position wherein the other of said piston heads is adjacent said bottom end of said longitudinal bore, said plunger means having an anvil portion within said longitudinal bore adjacent said bottom end thereof and an end portion adapted to seat against said shaft to transmit said impact blow to said shaft, and intermediate fluid supply motivating means including an intermediate arcuate recess in said hammer piston and upper and lower cylindrical grooves in said body member to alternately and continuously raise said hammer piston within said longitudinal bore and lower said hammer piston against said anvil portion of said plunger with sufficient speed and pressure to initiate said impact blow.

2. A device for starting the movement of shafts from hubs as in claim 1 wherein said intermediate arcuate recess in said hammer piston comprises a circumferential groove intermediate said piston heads.

3. A device for starting the movement of shafts from hubs as in claim 1 wherein said plunger means comprises an upper end terminating in an anvil shoulder portion, and seating means in said longitudinal bore of said body member to contact said anvil portion of said plunger means contiguous to the lower end of said body member to reciprocally secure said plunger means within said longitudinal bore in said body member.

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