Dec. 19, 1939. S. MANDL 2,183,842

HINGE PIN PUSHER

Filed March 26, 1937

Fig. 1.

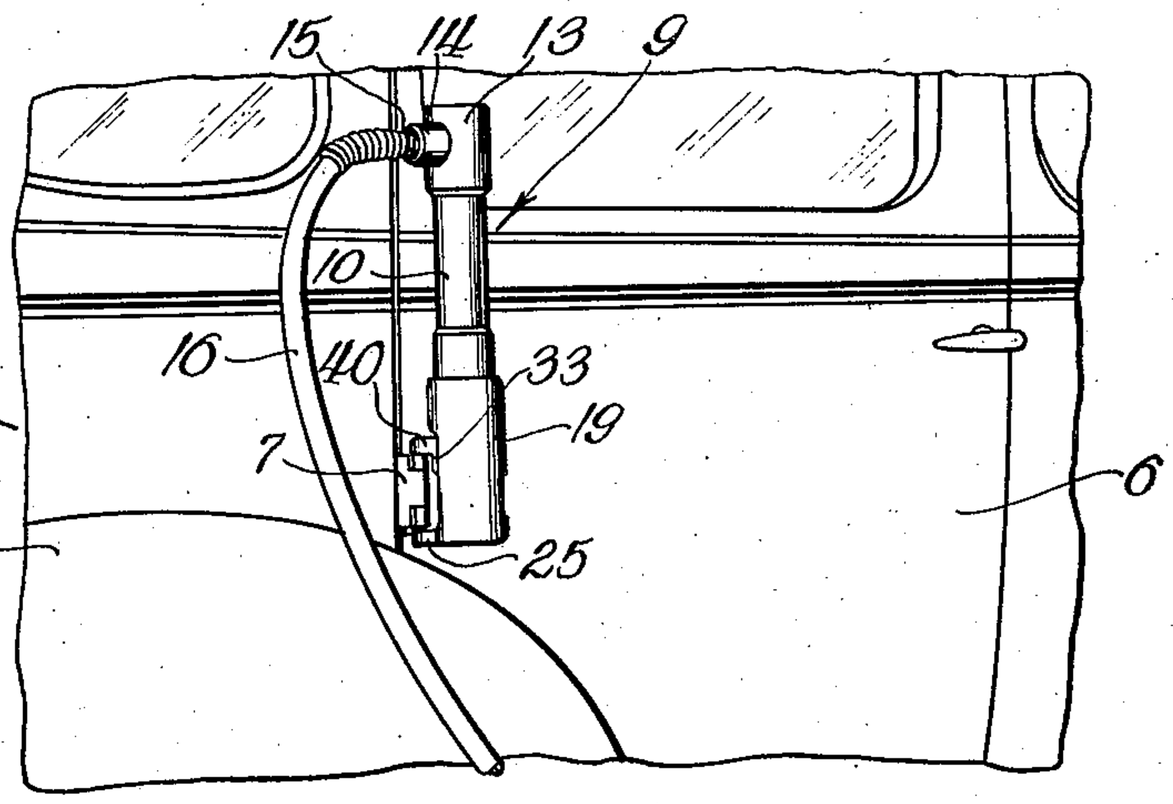



Fig. 2.

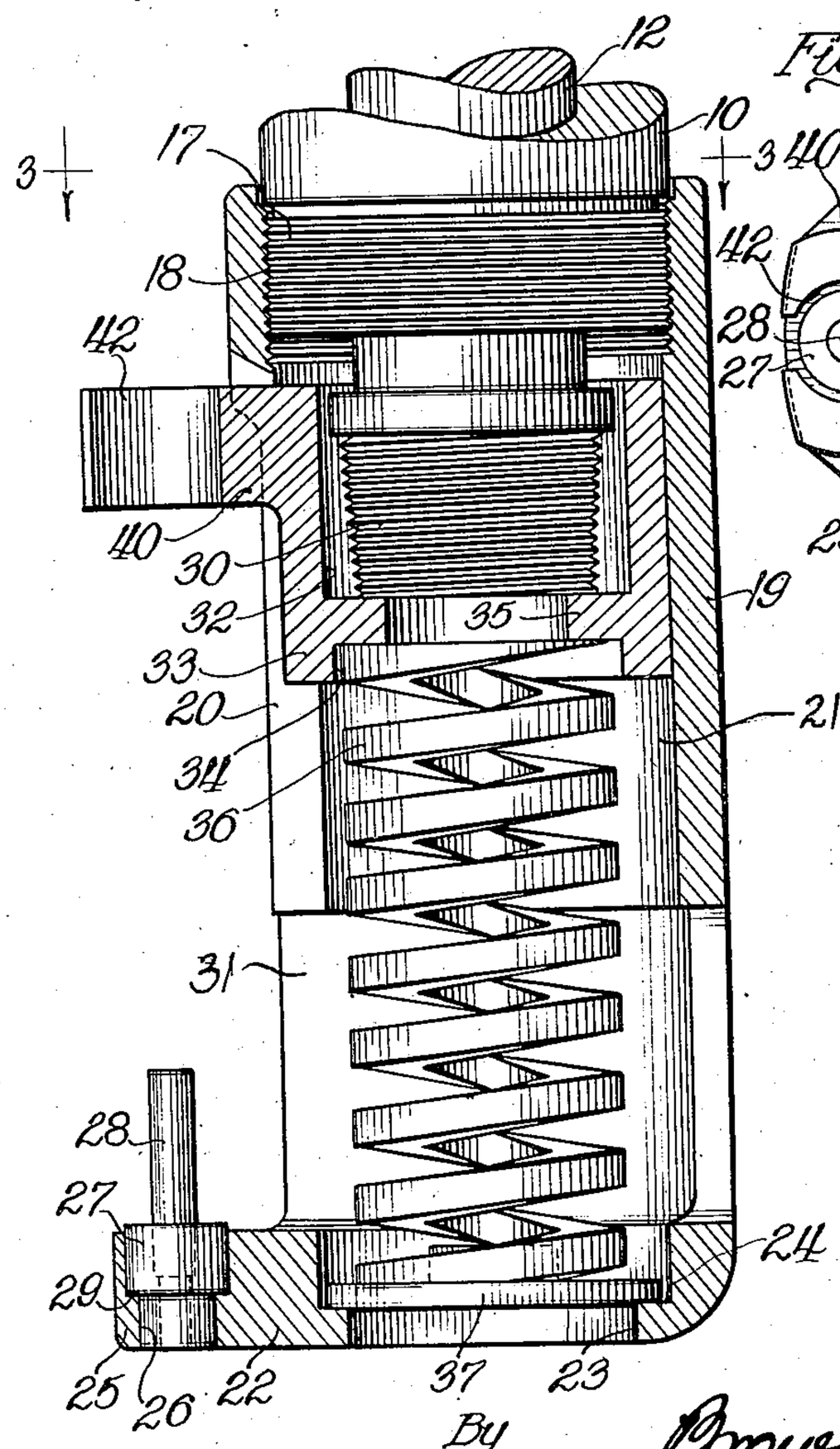



Fig. 3.

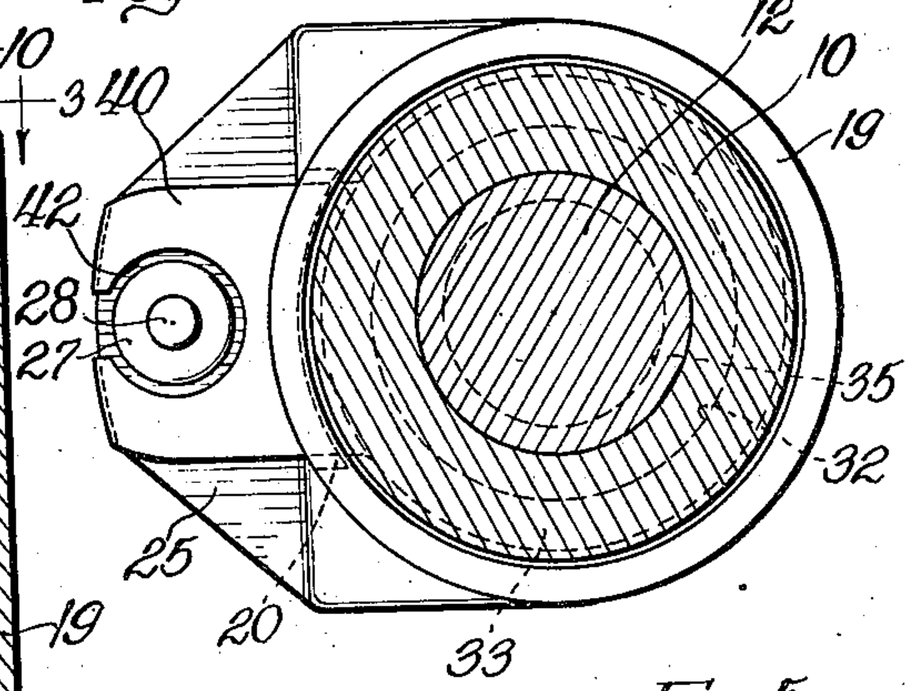
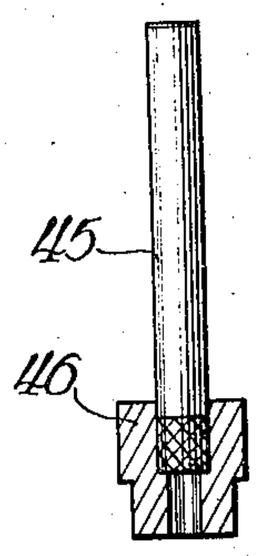
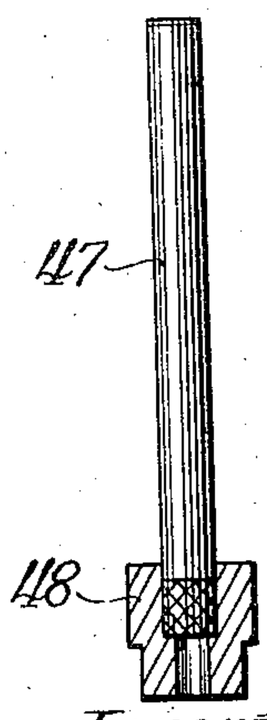



Fig. 5.

Fig. 4.

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# UNITED STATES PATENT OFFICE

2,183,842

## HINGE PIN PUSHER

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Application March 26, 1937, Serial No. 133,129

11 Claims. (Cl. 29—86.1)

This invention relates to hinge pin pushers, and more particularly is directed to a portable mechanism for removing pins from hinges such as employed on automobile doors and the like, it being understood, however, that the mechanism is not of course limited to this specific use, and may be employed in connection with the removal of any tightly engaged pins which are located in positions rendering the use of a drift pin inadvisable.

In automotive repair work and other similar types of body work, it is sometimes necessary to remove the door members. The hinge pins used on these door members are usually forced into position, and in certain instances, due to body and fender design, are practically inaccessible so far as removal by a drift or the like is concerned. Further, the use of such removal means is likely to result in damage to the parts or the finish of the vehicle.

The present invention contemplates the provision of portable hydraulic power means, constituting in the instant embodiment a hydraulic ram, operated manually from a remote source through flexible pressure transmitting means, preferably of a type shown in the Pfauser Patent No. 2,165,504, issued July 11, 1939, to which is attached a pusher unit. This pusher unit comprises a pair of telescoping members carried by the ram which are movable toward each other upon extension of the ram plunger. One of these members is adapted to carry pin means for forcing out the hinge pin upon transmission of pressure to and extension of the ram. Due to the fact that the ram is capable of operating in any angular position, it is apparent that the pusher unit can be employed in locations formerly considered relatively inaccessible, and because of the even positive pressure which can be exerted by the ram under the control of the operator, hinge pins which have been forced into position, or are frozen in place can be readily removed without damage to the surrounding portions of the structure and without any possibility of injury to the operator.

One object of the present invention is to provide a hinge pin pusher unit capable of use in any desired position and adapted to be operated from a remote point independently of manual support by the operator.

Another object of the present invention is to provide a unit of this type in which the relative telescoping movement between two members carried at one end of the ram unit results in the application of a uniform positive displacement of the hinge pin, the two members being automatically separated upon release of pressure to disengage the unit from the hinge.

A still further advantage of the present invention resides in the provision of a unit having interchangeable means accommodating it for use in connection with various lengths of pins, without requiring any disassembly of the unit itself with respect to the ram.

Another feature of the present invention resides in the use of simplified castings and machine parts for the unit, capable of economical manufacture and assembly.

Other objects and advantages of the present invention will appear more fully from the following detailed description which, taken in conjunction with the accompanying drawing, will disclose to those skilled in the art the particular construction and operation of a preferred form of the present invention.

In the drawing:

Figure 1 is a somewhat diagrammatic view illustrating the operation of the unit upon a door hinge;

Figure 2 is an enlarged sectional view through the pusher unit;

Figure 3 is a sectional view taken substantially on line 3—3 of Figure 2;

Figure 4 is an elevational view, partly in section, of one of the pin members employed with the unit; and

Figure 5 is a corresponding view of another pin member.

Referring now to the drawing in detail, I have illustrated, in Figure 1, an automotive vehicle generally indicated at 5, having a door member 6 provided with the hinge 7, the vehicle also having a laterally projecting fender portion 8. The hinge 7 as will be noted, is disposed immediately above the crown surface of the fender 8, and consequently is inaccessible as far as the use of a drift in removing the pin is concerned, since the drift pin cannot be inserted and driven from the space between the fender and the hinge.

I preferably provide a hydraulic ram unit 9, which may be of the form shown in the above mentioned Pfauser application, comprising a ram cylinder 10 and a ram plunger 12, as shown in detail in Figure 2, the cylinder 10 being provided at one end with a base portion 13 which has a laterally extending boss portion 14 forming an entrance port adapted to receive the coupling 15 at the end of a flexible pressure transmitting member 16, which may be of the form of a flexible reinforced hose member or the like.

The hose member 16 is preferably connected at its opposite end to the outlet of a manually operable pressure developing pump, such as disclosed in the copending application of Edward M. Pfauser, which pump is adapted to force oil or other similar liquid under pressure through the line 16 into the interior of the ram cylinder 10, thereby effecting displacement of the ram plunger 12 axially outwardly of the opposite end of the ram.

The cylinder 10 is provided at the end opposite the boss portion 14 with a threaded portion 17, which is adapted to receive the threaded end 18 of an extension member 19 as shown in Figure 2. The member 19 is provided with a cylindrical guide bore 21, which bore is provided with a longitudinal slot-like opening 20 therein, and which terminates at its lower end in a transversely extending flange portion 22 suitably apertured as indicated at 23 and counterbored to provide a radial seat 24. The flange portion 22 is extended laterally of the member 19 to form a foot portion 25, which is provided with a shouldered bore 26 adapted to receive the bushing member 27 carrying a pin member 28. The pin member 28 is forced into a counterbored opening in the bushing member 27, and the member 27 is adapted to seat in the bore 26 upon the shoulder 29 to extend parallelly to the axis of the member 19 and spaced outwardly of the periphery thereof.

The plunger member 12 of the ram is provided with the extending threaded end portion 30, which is adapted to be loosely received within the recess 32 of a telescoping member 33 carried within and longitudinally movable within the cylindrical guide bore 21 of the member 19. Between the lower end of said cylindrical guide bore 21 and the lower flange portion 22, the main body member 19 is provided with an assembly opening 31 formed with a relatively wide entrance at the inner side of said main body casting. In the assembly of the device, the guided member 33 is inserted laterally through this opening and is then moved upwardly into the cylindrical guide bore 21. The member 33 is provided with an upwardly extending recess 34 disposed opposite to the recess 32, the shoulder 35 therebetween forming an abutment against which the outer end face of the threaded end 30 of the plunger is adapted to engage.

The bore 34 forms one spring seat against which one end of the relatively heavy coiled spring member 36 is adapted to be engaged, the opposite end of the spring engaging a suitable washer 37 carried on the shoulder 24 of the flange 22 of the member 19, thereby biasing the spring between the flange 22 and the adjacent end of the member 33.

This spring member serves two definite purposes in the construction. It prevents the sliding member 33 from approaching the lower assembly opening 31 of member 19 through which it is assembled for sliding movement, and holds the member 33 from loose movement within the member 19. Secondly, it provides for positive movement of the ram plunger back into the ram when the pressure is released, being of such capacity as to return the oil in the ram to the reservoir by this displacement of the plunger.

The member 33 is provided with an outwardly extending shoulder portion 40, which projects laterally through the longitudinal slot 20 and which is adapted to establish reaction engagement with the opposite end of the hinge structure 7. This shoulder portion has an opening 42 formed therein for guiding the hinge pin as it is moved outwardly of the hinge.

In the operation of the structure as thus far described, the unit containing the members 19 and 33 is assembled over one end of the ram cylinder, as indicated in Figure 2, the end 30 of the ram plunger resting in the recess 32 of the member 33. The pin 28 and its associated bushing 27 are fitted into the extension 25 of the flange 22, and positioned immediately below the hinge with the pin 28 having abutting engagement at its upper end with the lower end of the hinge pin. Pressure is then applied to the ram cylinder 10, resulting in axial extension of the ram plunger 12. This extension tends to compress the spring 36, and to move the member 33 relative to the flange 22, but since the portion 40 of the member 33 engages over the upper surface of the hinge 7, the effective movement is an upward movement of the member 19 relative to the member 33, moving the pin 28 upwardly against the hinge pin, and consequently resulting in displacement of this pin upwardly through the opening 42 in the extension 40 of the member 33.

After the hinge pin has been moved a distance corresponding to the length of the pin member 28, the pusher unit is no longer capable of effecting movement of the hinge pin. The pressure is then released within the cylinder 10, and due to the effect of spring 36, the members 33 and 22 are moved away from each other to disengage the pin 28 from within the hinge pin opening. The hinge pin at this time is disposed slightly above the upper end of the hinge 7, and if sufficiently loose can be removed manually by grasping the same at this time. However, if the pin is tightly engaged within the hinge, it may be necessary to employ the pin pusher member 45 shown in Figure 4, which is carried in a bushing 46 similar to the bushing 27, and which can be inserted in the opening 26 of the flange extension 25 in place of the pin 28 and bushing 27. Inserting the pin 45 in this position, the unit is again engaged with the hinge, with the pin 45 extending upwardly into the hinge opening.

The pressure is again applied to the cylinder 10, and the relative movement between the flange 22 and the member 33 results in further dislodgment of the hinge pin from the hinge 7, this being accomplished due to the extended length of the pin 45. Upon reaching the limit of displacement possible with the pin 45, the pressure is again released and the member 33 is moved away from the flange 22 by means of the spring 36.

If a relatively long hinge pin is to be displaced, it may be necessary to employ the pin member 47, carried by a bushing 48 corresponding to the bushings 46 and 27, which can be inserted in the shouldered opening 26 in lieu of the assembly of members 28—27 or 45—46.

When using the longer push pin members 45 and 47, if the space at the lower end of the hinge structure 7 should be crowded, as by the presence of the fender 8 (Figure 1), such longer push pin member can first have its upper end inserted into the hinge eyes before the lower bushing end 46 or 48 is inserted into the shouldered bore 26 of the tool.

It is thus apparent that with the present construction the ram unit is supported in position on the hinge without any necessity for the operator holding it in position, and consequently

the operator may be freed of any possible danger due to slippage of the device or the like. Further, the operator may stand at the point at which pressure is developed, namely the pump, and watch the displacement effect upon the hinge pin from this vantage point. Due to the fact that hydraulic pressure is being employed, a uniform positive displacement of the hinge pin is effected without any of the hammering formerly necessary. Further, the assembly is useful for removal of such pins in locations which are inaccessible for use of a common drift or the like. By the provision of a number of pin lengths with the unit, it is possible to effect displacement of any desired length of hinge pin, and the relative proportions of the members 19 and 33 is such that space between the extensions 40 and 25 in normal position is such as to accommodate the unit to any desired length of hinge. This of course may be varied depending upon the type of work which is expected of the unit.

I am aware that various changes in details of construction and operation of the unit may be made without departing from the principles of the present invention, and I therefore do not intend to be limited except as defined by the scope and spirit of the appended claims.

I claim:

1. A hinge pin pusher assembly comprising a first member having a lateral extension at one end, a pin removably supported in said extension and extending normally thereto, a second member mounted for telescoping movement in said first member and having a lateral extension in alinement with said first extension and having a normally extending aperture, and means for producing relative movement between said members to move said pin toward said aperture.

2. In combination, a first member having a push pin mounted in fixed relation thereon and adapted to engage an end of a hinge pin, a second member mounted for relative telescoping movement within said first member and having an extension adapted to engage the opposite end of the hinge from the pin engagement, said extension being apertured to accommodate outward movement of the pin therethrough, a hydraulic ram unit comprising a cylinder detachably threaded to said first member and a piston detachably associated with said second member for producing relative movement between said members to move said hinge pin outwardly of said hinge through said aperture, and spring means reacting between said members for causing relative separating movement between said push pin and said apertured extension when the pressure in said ram unit is released.

3. A hinge pin pusher for forcing hinge pins out of hinge members comprising a pair of relatively movable members, each having a lateral extension, one of said extensions supporting a pusher pin extending toward the other extension and the other of said extensions having an aperture in alinement with said pusher pin, the extensions being disposed on opposite ends of the hinge members with said aperture in alinement with one end of the hinge pin and the pusher pin engaging the opposite end of the hinge pin, and a cooperating cylinder and piston detachably connected to said movable members in laterally offset relation to said pusher pin for moving said pusher pin toward said other extension to displace said hinge pin outwardly through said aperture, the detachable connection between said relatively movable members and said cooperating cylinder and piston enabling the latter to be detached for other uses.

4. The combination, with a hydraulic ram unit including a ram cylinder and a ram plunger extending coaxially thereof, of means secured to one end of said cylinder and constituting a tubular extension thereof, said means having a lateral extension at its free end, a pin supported in said extension and extending parallelly toward said cylinder, reciprocal means supported in said first named means and having a lateral extension spaced from said pin supporting extension and apertured in alinement with said pin, and means in said reciprocal means engaged by the ram plunger, said ram unit being adapted to be supplied with liquid under pressure from a remote source to produce relative movement of said cylinder and plunger for moving said pin relative to said aperture.

5. A hinge pin pusher comprising a tubular member having a longitudinal slot intermediate the ends thereof and having a closed end provided with a lateral extension, a pin supported in said projection and extending parallel to said slot, a member reciprocal in said first member and having a lateral extension projecting outwardly of said slot and provided with an aperture disposed in alinement with said pin, and means for moving one of said members relative to the other.

6. A hinge pin pusher comprising a first tubular member secured at one end to a ram cylinder and having a lateral projection at the opposite end, a pusher pin carried in said projection and extending parallel to said member, a second member slidable in said first member and having a lateral projection apertured in alinement with said pin, spring means between said opposite end of said first member and said second member, and means in said second member receiving the head of a ram plunger disposed for coaxial movement outwardly of said cylinder.

7. In combination, a portable hydraulic ram unit operable in any angular position and adapted to be connected to a remotely disposed pressure developing source through a flexible pressure transmitting conduit, a tubular pusher member secured to one end of said unit and having a laterally offset projection at one end thereof, a pin carried in said projection and extending parallel to said member, a second member having telescoping movement within said first member, a projection on said second member in alinement with said first projection, and plunger means in said unit engaging said second member and movable through said first member for producing relative movement between said projections.

8. A device for removing hinge pins from hinges comprising a first member having means engaging over one end of the hinge and apertured to permit outward movement of the hinge pin therethrough, a second member movable relatively to said first member, said second member having pin means engaging the opposite end of the hinge pin and adapted to move into the hinge pin opening to displace the hinge pin, and a ram unit comprising a ram cylinder and a coaxially extensible ram plunger, a screw thread on said ram cylinder engaging with a cooperating screw thread on said second member for detachably connecting said cylinder and member together, and means on said plunger engaging said first member for effecting relative movement of said members toward each other upon

transmission of fluid pressure to said unit, said screw threaded connection between said cylinder and said second member enabling said ram unit to be disconnected from said hinge pin removing device for other uses.

9. A hinge pin pusher comprising a first tubular member having a lateral extension, a second member slidable longitudinally therein and having a lateral extension apertured in alinement with a pin carried by said extension of said first member, a coiled spring member biased between one end of said first member and said second member normally tending to move said extensions apart, and pressure means secured to the opposite end of said first member for moving said members toward each other, said spring member restoring said members to normal spaced relationship upon release of pressure.

10. In a device for removing hinge pins and the like, the combination of a main body member having a lateral extension adjacent one end thereof, a push pin fixedly carried by said lateral extension and adapted to engage one end of a hinge pin, said body member being provided with guide means, a second member slidably engaging with said guide means for guided relative movement between said members, said second member having a lateral extension provided with an aperture through which the hinge pin is adapted to be forced, spring means confined between said members normally tending to cause relative movement between said members in one direction, and hydraulic means for causing relative movement between said members in the opposite direction.

11. In a device for removing hinge pins and the like, the combination of a main body member having a lateral extension adjacent one end thereof, a push pin carried by said lateral extension and adapted to engage one end of a hinge pin, said body member being provided with guide means, a second member slidably engaging with said guide means for guided relative movement between said members, said second member having a lateral extension provided with an aperture through which the hinge pin is adapted to be forced, spring means normally tending to cause relative movement between said members in one direction, and a hydraulic ram unit detachably connected with said hinge pin removing device for causing relative movement between said members in the opposite direction, said hydraulic ram unit being removable from said device without removing said spring means from its operative relation in said device.

SIGMUND MANDL.