

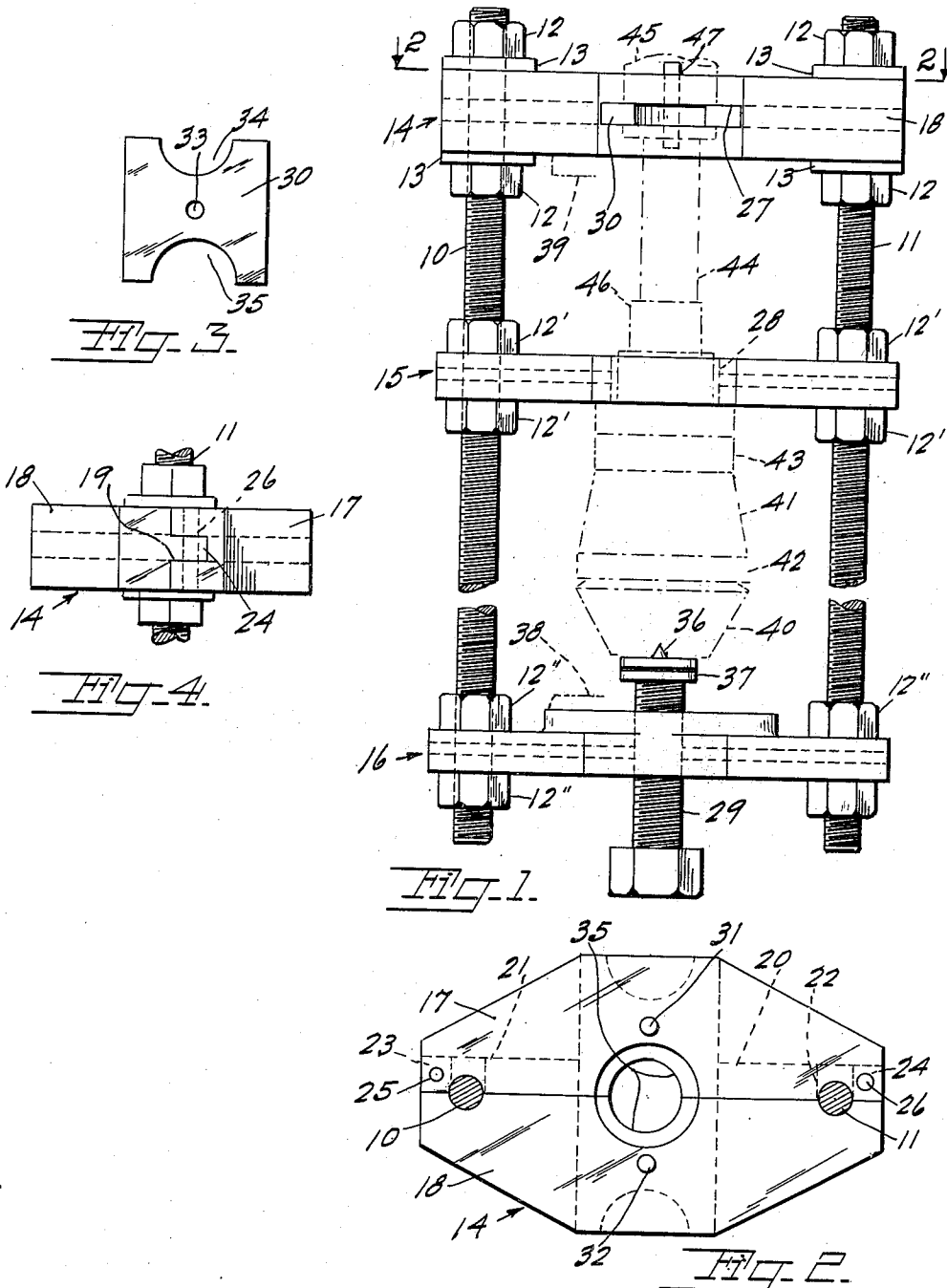
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CROSS-HEAD FOR PRESSES

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CROSSHEAD FOR PRESSES

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This invention relates to improvements in arbor presses and particularly to compact, light-weight, high-power manually operatable arbor presses, of a type which can be used in any position and easily and conveniently manually carried to any location, one which can be carried to the work instead of having the work moved to the press.

Arbor presses are generally very heavily built and cannot be moved about and can only be used in one position. This means that many very heavy objects must be transported to the arbor press and set in the press in a particular position, and in connection with automotive work particularly, because of non-portability, unnecessary work is involved because of the necessity of disassembly of many parts or of relatively light-weight parts from heavy structures, which disassembly would be unnecessary if the arbor press could be used in any position and at the job.

My invention provides an arbor press which is ideally adapted to general machine shop and automotive work, being sufficiently light so that it can easily be carried to the job by one man and yet having sufficient power for handling the majority of all jobs for which a tool of this type is required.

It is ideally adapted for removing and replacing drive pinions, can be used to pull a drive pinion and drive shaft assembly from a rear axle housing, pull the pinion off the shaft, and drive the pinion back on the shaft. It is useful for removing and replacing bearings, cams and other elements.

The objects and advantages of the invention are as follows:

First, to provide an easily portable arbor press.

Second, to provide an arbor press which while being easily carried to a job, can be used in any desired position and has sufficient power to handle the majority of pressing and pulling jobs about a machine shop or garage.

Third, to provide an arbor press of the manually-operable type which can be used in conjunction with a hydraulic jack where hydraulic operation is desirable.

Fourth, to provide an arbor press which is equally useful for pressing and pulling jobs.

Fifth, to provide an arbor press which is simple in construction and arrangement, easily as-

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sembled and disassembled, and adaptable to most types of pressing and pulling operations.

In describing the invention reference will be made to the accompanying drawings, in which:

Fig. 1 is a front elevation of the invention, illustrating the pressing of a drive pinion onto a drive shaft.

Fig. 2 is a section taken on line 2—2 of Fig. 1.

Fig. 3 is a plan view of one of a pair of thrust plates or dies for use in connection with the forcing of an automotive drive pinion on a drive shaft, for engagement in an annular groove in the drive assembly.

Fig. 4 is a side elevation of one of the arbor press heads.

The invention includes a pair of jack screws 10 and 11 both of which are threaded throughout their lengths, and each of which is provided with six nuts 12, 12' and 12'' together with thrust washers 13 which may, if desired, consist of thrust ball bearings for ease of adjustment of the nuts under load.

The invention also includes three cross members, 14, 15 and 16 either of which can be used as base, head, or stabilizing center plate or thrust plate, all three being easily removable and replaceable at will without removal of any of the nuts or washers from the screws and without disturbing the other heads.

Cross-member 14 is used as the base for pressing drive pinions on drive shafts of automotive vehicles, while cross-member 15 functions as the base for pressing drive shafts out of drive pinions, and cross-member 16 functions as the base in some cases such as for removal of certain types of bearings and bushings, so that the three cross-members are selectively usable for base or head.

Each of the cross-members is removable and replaceable on the jack screws at will without disturbing the others, and each consists of a jack-knife combination of two elements hinged together at one end and secured at the other by a locking device such as a pin.

The cross-member 14 therefore consists of the two members 17 and 18. Member 17 has a groove 19 formed in the inside face, while member 18 has a tongue 20 which closely fits in the groove 19; the tongue having slots 21 and 22 to clear the jackscrews, leaving ears at 23 and 24 respectively for the hinge pin 25 and lock pin 26. The members 17 and 18 are each built up of three plates

with the center plates protruding to form the tongue on one member, and being retracted on the other member to form the groove, and the center plates being separated to form a transverse passage 27.

Cross-members 15 and 16 are constructed identical with cross-member 14 with the exception that there is only a single center plate extending throughout the width and there is no transverse slot, merely a hole 28 of a suitable size for the work on which the operation is to be performed, in the cross-member 15; and a threaded passage for the thrust screw 29 in the cross-member 16.

A pair of dies 30 slidably fits in the transverse slot 27, and are respectively inserted from opposite sides and pinned through aligned passages 31, 32 and 33, the cross-member 14 having a central hole larger in diameter than either of the recesses 34 or 35 in the dies.

The thrust screw 29 is provided with a receding center 36 for aligning the shaft, and has a removable ball-thrust bearing 37 for cooperation with the hub portion of the pinion. A conventional hydraulic jack can be mounted on either of the heads 14 or 16 as indicated at 38 and 39.

For pressing a drive pinion on a drive shaft, all three heads should be used. The assembly includes the drive pinion 40, spacer 41, anti-friction bearings 42 and 43, the shaft proper 44 and torque member 45. The member 45 has an annular groove into which the dies 30 fit and thereby take the entire thrust, and the recesses 34 and 35 are made to different diameters to seat at the bottoms of the grooves of different shaft assemblies, so that for drive assemblies from different automotive vehicles it is merely necessary to change the die sections end for end.

For pressing a drive pinion on the drive shaft, the screw 29 is retracted, the nuts 12 and 12' are freed, the pins 26 are removed and both cross-members 14 and 15 are laid open. The drive shaft assembly is then laid in position, or the press is brought up to the work, the cross members 14 and 15 are then closed and the pins 26 re-inserted, and the nuts 12 and 12' are then adjusted to secure the two members in the most advantageous positions with member 15 clamping about the backing nut 46 and the slot 27 approximately in registry with the annular groove. The pair of dies is then inserted in the slot 27, and made to enter the annular groove and the pins 26 inserted in the holes 31, 32, 33. This secures the assembly in position to take any desired thrust.

Next the pinion 40 is placed in position on the end of the shaft, the screw 29 then being advanced to contact the hub face, and is then screwed in by using a suitable wrench or the like, forcing the pinion on the shaft. The assembly is removed by freeing the nuts 12 and 12', removing the pins 26, and opening the two cross-members.

A hydraulic jack can be substituted for the screw 29 if desired, the cross-members being suitably separated to accommodate the jack.

For removing the pinion from a drive shaft, the member 14 is not needed. In that case the cross-member 15 functions as the base. One of the bearings 43 thrusts against the inside face of the member 15. The thrust bearing 37 is removed from the thrust screw 29 so that the end of the screw will work on the end of the shaft. Thus by adjusting the screw 29, the shaft is forced out of the pinion.

Other operations are carried out similarly,

some requiring only the two end cross-members, while in other cases all three, or, the center member with either of the two end members, depending on the specific operation to be performed and the character and form of the structure.

I claim:

1. A cross-head for an arbor press comprising; two elongated members hinged together at one end and having locking means at the other end and keying means cooperating between the two members when locked together to align and reinforce the members; a jack-screw passage formed adjacent each end and a shaft passage formed centrally of the members, a die passage formed transversely and extending through the two members centrally thereof, and a pair of half dies slidably in said die passage and having semi-circular recesses formed inwardly from the sides and combining when inserted in different positions to form thrust collars of different diameters to engage in annular recesses formed in shafts of different diameters.

2. A cross-head for an arbor press comprising; a jack-knife combination of two elongated members hinged together at one end and having locking means for locking the two members together at the other end and having a jack-screw passage formed adjacent each end and having a shaft passage formed centrally with the axes of the passages coincident with the parting line between the two members, and a transverse passage formed centrally of the height and of the length of the two members to slidably receive shaft passage size reducing collar members to engage in annular recesses formed in shafts and the like.

3. A structure as defined in claim 2; said members being each formed of three plates secured together with the central one of the plates projecting inwardly from one member toward the other member to form a tongue, and with the central one of the plates of the other member being retracted to form a groove for the reception of said tongue to form said jack-knife combination, said central ones of said plates terminating in spaced relation on opposite sides of the axis of the shaft passage to form said transverse passage therebetween.

4. A structure as defined in claim 2; the members comprising each a plate to slidably fit in said transverse passage and each having semi-circular recesses of different radii formed inwardly from the respective sides with the axes coincident with the edges of the die members to form, in combination, collars to fit in annular recesses formed in shafts and the like, and means for locking said die members in cooperative position in said transverse recess.

5. A structure as defined in claim 2; said members being each formed of three plates secured together in laminated arrangement with the central one of the plates of one member projecting toward the other member to form a tongue, and with the central one of the plates of the other member being retracted to form a groove for reception of said tongue to form the jack-knife combination, said central ones of said plates both terminating in spaced relation on opposite sides of the longitudinal center of the members to form said transverse passage therebetween, and the members comprising each a plate to slidably fit in said transverse passage and each having semi-circular recesses formed inwardly from the respective side edges with the axes coincident with

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said side edges with the semi-circular recesses in each die member being of different radii to form in combination circular openings of different diameters to fit in annular recesses of different root diameters on shafts and the like, and means for locking said die members in cooperative position in said transverse passage.

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