June 26, 1962 B. F. DU WALDT 3,040,656

HAND OPERATED ARBOR PRESS

Filed June 24, 1960 2 Sheets-Sheet 1

Fig. 1

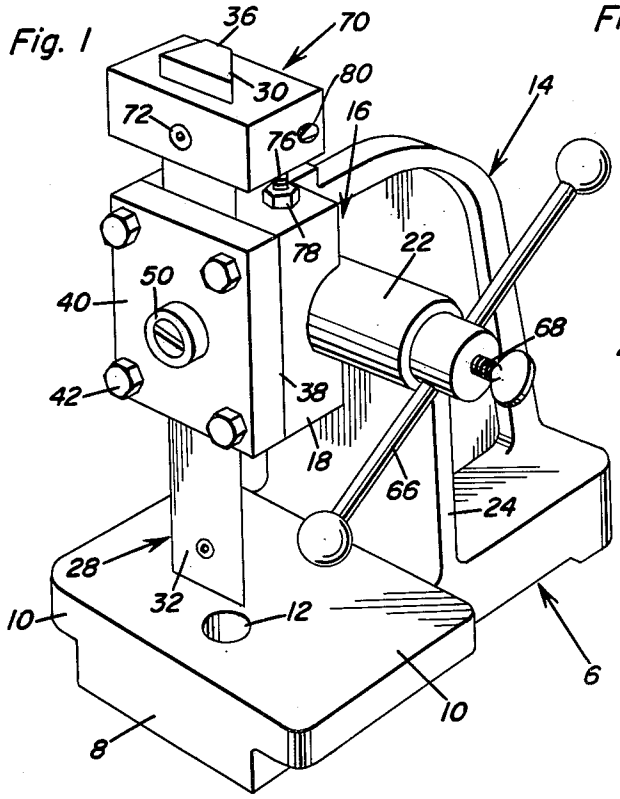


Fig. 2

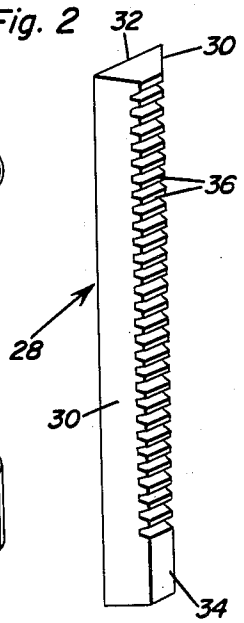
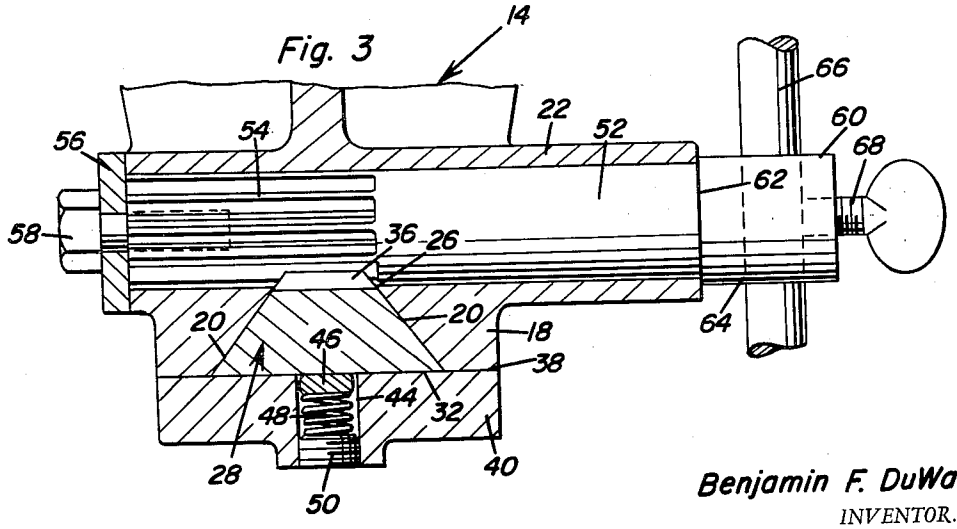


Fig. 3



Benjamin F. DuWaldt
INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson
Attorneys

June 26, 1962 B. F. DU WALDT 3,040,656

HAND OPERATED ARBOR PRESS

Filed June 24, 1960 2 Sheets-Sheet 2

Fig. 4

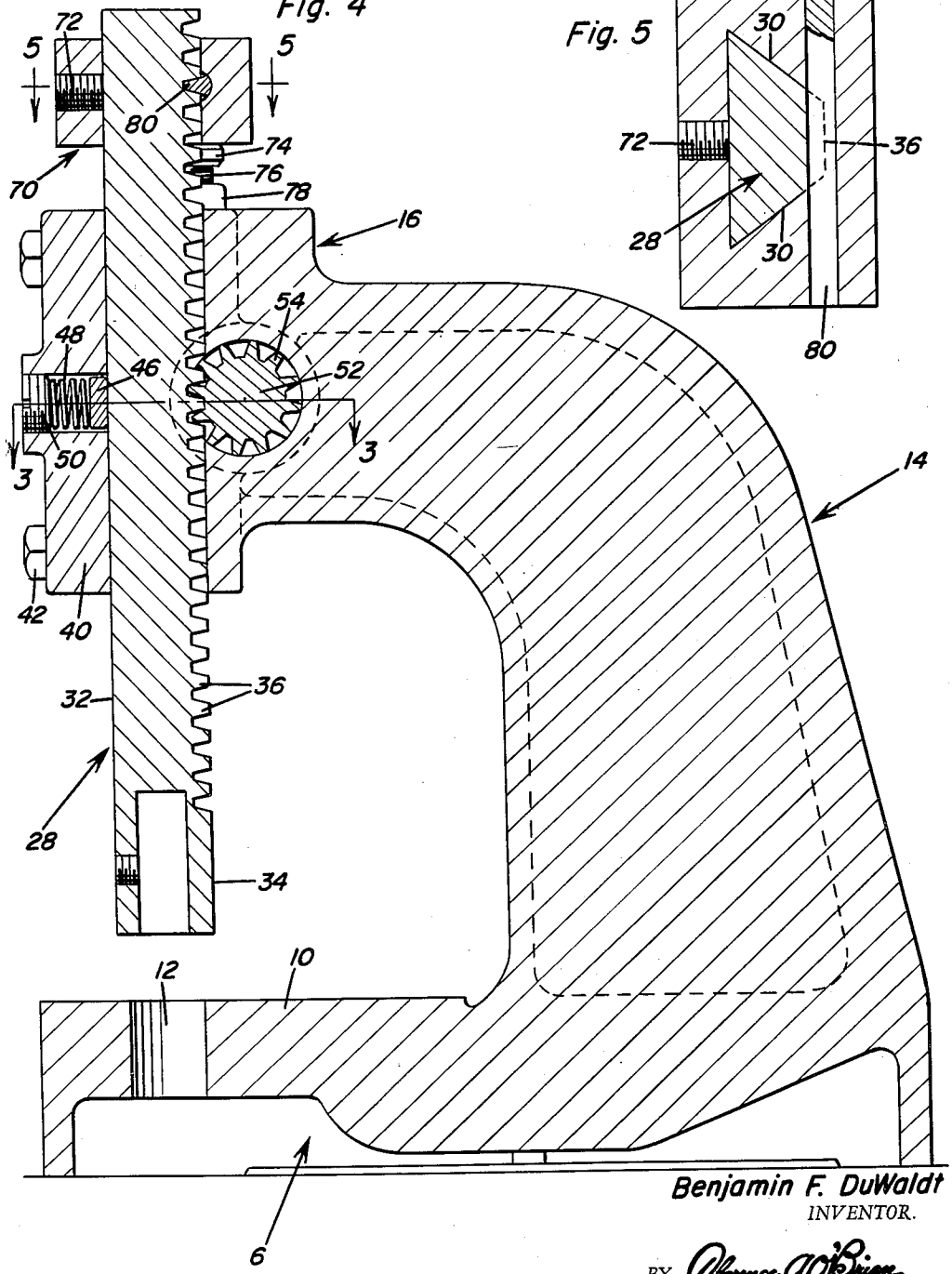


Fig. 5

Benjamin F. DuWaldt
INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson
Attorneys

United States Patent Office 3,040,656 Patented June 26, 1962

3,040,656

HAND OPERATED ARBOR PRESS

Benjamin F. Du Waldt, 3114 N. Monitor Ave., Chicago 34, Ill.

Filed June 24, 1960, Ser. No. 38,633
2 Claims. (Cl. 100—288)

The present invention relates to certain new and useful improvements in a rack and pinion type arbor press wherein the pinion, which is geared to the teeth of the rack, is hand operated by way of a readily accessible and freely turnable handle.

Persons conversant with the state of the art to which the persent invention relates are aware that arbor presses are of many and varied styles, forms and types. While other prior patents might well be used here to facilitate making certain observations and expressing points of view, reference will be made to the Krasberg Patent 2,336,262 which is characterized by a base having a standard attached to and rising therefrom with the standard provided with head means on the upper part thereof, the head means being equipped with a plunger rod having a rack, the rack being operated by a crank-turned gear pinion.

It often happens in a press having the above general construction that repeated use of relatively movable parts results in wear and ultimate lost motion. In addition, the directly coacting surfaces of the plunger or ram soon become defective with the result that undesirable friction binding between component parts has to be coped with. In fact, to overcome this the patentee Krasberg has found it necessary to resort to the use of special bars to maintain alignment of coacting parts. Then too, and as might well be the case in Krasberg and similar adaptations the pinion and rack gear thrust is in a direction away from the compensating aligning bars that it becomes conceivable that undesirable binding could become so troublesome that binding parts might easily prevent satisfactory operation of the reciprocable rack rod or plunger. Compared to generally analogous prior art adaptations the instant invention utilizes a reciprocable ram or rack bar which is such in shape that it reliably insures a user higher accuracy (parallel, horizontal and in between planes) than any arbor type press known to this applicant. In fact, the ram is so designed as to be independent of any interference from pinion gear and rack binding.

As will be appreciated, the ram herein revealed is self-contained, is independent of any bars or bushings to cramp its free and smooth accurate movement and, as a matter of fact, is one of the only two moving parts of the over-all press. The upper end of the ram for practical efficiency is provided with a novel stop located in the direct line of downward thrust of the ram. The invention is also advantageous in that it includes other featured parts.

For example, the main casting of this press has two of the three bearing surfaces in contact with the ram, and the two surfaces (an integral part of the casing) align the ram in all possible directions of vertical, horizontal and in between a cap is fitted to the press which is the third side of the guide means for the ram. This cap may be adapted to any working tolerance of fit desired and may be refitted to accommodate all wear due to use of the press.

Further, novelty is predicated on the cap fitted to the ram having a centrally located spring pressure pad of soft metal with sufficient thrust to remove all working tolerance or any opening due to temperature change from the ram, thereby permitting extremely close alignment to be maintained. The main casting of the press is designed to have a table overhang on both sides to fasten fixtures and remove fixtures with press in bolted down

position. When press is made with deep throat casting, a slot is cut in table overhang to permit use of measuring device with direct scale reading.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIG. 1 is a view in perspective of an arbor type mechanical manually operated and controlled press constructed in accordance with a preferred adaptation of the instant invention.

FIG. 2 is a view in perspective of the rack-type ram.

FIG. 3 is an exaggerated horizontal sectional view on the plane of the line 3—3 of FIG. 4, looking in the direction of the arrows.

FIG. 4 is an enlarged view in section showing all of the primary component parts.

FIG. 5 is a horizontal section on the plane of the line 5—5 of FIG. 4.

As is evident, the aforementioned base, which is generally rectangular in plan, is denoted by the numeral **6** and has a forward end portion **8** with overhanging end extensions **10** defining a work table at the approximate center of which is a vertical socket **12**. The standard which is attached to the right hand end portion of the base is denoted by the numeral **14** and rises vertically and terminates in an offset head here designated generally by the numeral **16**. This head embodies a generally rectangular block-like plate or body **18**, the median portion of which has a vertical slot or channel centrally positioned as shown in FIGURE 3 and which has vertical parallel diverging side walls **20**. This slot or channel opens through the upper and lower ends and also the flat front vertical side of the head. Integrated with the rear side of the median portion of the head is a horizontal cylindrical open-ended bearing **22** perched on and braced by a reinforcing and stabilizing web **24** as shown in FIG. 1. The rear median portion of the channel opens, as at **26**, into an aligned median portion of the bore of the cylindrical bearing **22**. This groove or channel provides a guideway for the novel vertically reciprocable rack bar or ram **28**. This ram is solid and has the polygonal cross-section shown which actually may be referred to as trapezoidal and perhaps even truncated triangular (the word polygonal, often referred to in reference to four or more sides, may be used here, it is believed in a generally applied sense). It follows that the polygonal ram has sloping sides **30** (FIG. 2) and a plane back **32** and a truncated front **34** provided with teeth **36** defining an operating rack. The guide for the ram is of corresponding cross-section so that the divergent surfaces cooperate with requisite nicety as brought out in FIG. 3. As is also brought out in FIG. 3, the aforementioned back surface **32** is flush with the corresponding surface **38** of the head. On the other hand, the teeth **36** of the rack project through the opening **26** into the bore of the sleeve or bearing **22**. In order to maintain the rack in its slideway or groove a cap plate **40** is provided and this is fitted firmly against the surface **38** and is secured by headed screws or equivalent fasteners **42**. At the approximate center of the cap plate a horizontal hole **44** is provided and this construction provides a socket for a so-called soft brass button **46** positioned and held by a biasing spring **48** with the spring assembled and held by a screw plug **50** threaded into the outer end of the socket.

The numeral **52** in FIG. 3 in particular designates a shaft having a smooth portion at the right and a ribbed portion **54** at the left with the ribs cooperating and defining a pinion gear. The pinion teeth obviously mesh cooperatively with the teeth **36** of the rack. The shaft

is held in place on the left by a washer **56** and cap screw **58**. At the opposite end of the shaft is slightly enlarged as at **60** to provide a stop shoulder **62**. This enlarged portion **60** constitutes a head and is provided with a bore **64** to accommodate a slidingly mounted handle **66** held in whatever position may be desired by the setscrew **68**.

In addition to the above features the invention embodies a limiting stop comprising a block or an equivalent flat-bottom member **70**. This block has an opening at the center slidingly mounted on the upper protruding end of the ram and held in place by a setscrew **72**. The block is adapted to contact a manually regulatable stop screw **74** (FIG. 4) carried by the top of the head and having a screw-threaded shank **76** carrying a lock nut **78**. This limit stop **70** is also provided with a rigid wedge-shaped key **80** which is engageable with the teeth of the rack thus offering the user this novel construction and arrangement.

It will be plain to the reader that the press herein disclosed will serve the needs of a user in that it provides straight line thrust with precise alignment for general shop use such as punching holes, forming material, pressing broaches and all pressing requiring a straight thrust line without spring. Not only this, it will be evident that because of the precise alignment and exact operation of the ram, tools may be interchangeable without removing adapters. A battery of low cost presses, such as herein revealed, can be set up in production work to do work now requiring far more expensive machines. In fact, with this press small shops will be able to perform accurate work. Then too, the construction is such that the rack and pinion means could be powered with the use of an air cylinder or some equivalent practical source of power.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. An arbor press comprising a base having upright means embodying a head, said head having a body portion which is provided with a vertical channel defining a ram guide, the walls of said channel diverging toward the outer side thereof and rendering said channel substantially dovetail-shape in cross-section, said outer vertical side of said channel being open from top to bottom, a vertically slidable ram removably and slidably mounted in said channel, said ram corresponding in cross-section to the cross-section of said channel, a cap plate removably mounted on the head and having a portion bridging and covering the open vertical side of said channel, a centralized portion of said plate having a constantly accessible socket provided with a spring-loaded soft metal wear compensating button, said button engaging a cooperating vertical surface of said ram, an opposite vertical side of said ram having a rack projecting through said channel, said head having a bearing, a rotatable pinion gear operatively mounted in said bearing and having teeth cooperating with the teeth of the rack, said bearing being of open-ended cylindrical sleeve form carried by and being a part of said head, and said pinion gear constituting a portion of a shaft which is removably and rotatably mounted in the bore of said bearing, limit stop means for determining and checking the downward movement of said ram relative to the head and base, said means comprising a flat-bottom block movable toward and from the upper surface of said head and said upper surface being flat and parallel and provided with an upstanding manually regulatable stop screw occupying a position between the head and block surfaces, said block having a passage therethrough corresponding in shape to the cross-section of that portion of the ram on which it is accessibly mounted, said block having a setscrew engageable with a cooperating surface of the ram, said block being further provided with a wedge-shaped key, a portion of said key constituting a horizontal rib and said rib being of a cross-section and size to be releasably engaged with adjacent cooperating teeth provided on the aforementioned rack.

2. An arbor press comprising, in combination, a base having a work table, a standard fixed to and rising perpendicularly from a top surface of said base, said standard having a laterally directed upper end terminating in a head, said head having an integral sleeve providing a bearing, said head having a body portion provided with a vertical channel defining a ram guide, the walls of said channel diverging toward the outer side thereof and rendering said channel substantially dovetail-shaped in cross section, a ram removably and slidably mounted in said channel, said ram corresponding in cross-section to the cross section of said channel, a cap plate removably mounted on said head and having a portion bridging and covering a cooperating outward side of said channel, said plate having a constantly accessible socket, a spring-loaded wear resisting member in said socket having a surface engaging a cooperating surface of said ram and tending to properly seat and maintain the ram in its sliding position in said channel, that portion of the head at the juncture of the head and said bearing having an opening affording communication between the bore of said bearing and channel, a shaft mounted for rotation in said bearing and provided at one end with an operating handle, a portion of said shaft being further provided with cooperating ribs defining a pinion gear, the inner side of said ram having a rack projecting through the inner side of said channel, certain of the teeth of said rack projecting through said opening into the bore of said bearing, the ribs of the pinion being operatively engageable with said teeth, a limit stop block for determining and checking the downward movement of said ram relative to the head and base and movable toward and from an upper surface of said head, an adjustable manually regulatable readily accessible stop screw operatively mounted in a position between cooperating surfaces of said head and block, said block being accessibly, adjustably and removably mounted on a projecting upper end portion of said ram, a horizontal lengthwise portion of said block adjacent to the teeth of said rack having an open-ended bore, and a readily insertable and removable retaining key fitted in said bore, said key being of a cross-section that a keying edge thereof corresponds in shape to intended spaces between the teeth of said rack and being releasably engageable with the teeth of the rack, said key being renewable.

References Cited in the file of this patent

UNITED STATES PATENTS

522,208	Hiser	July 3, 1894
825,273	Henry	July 3, 1906
987,370	Jenness	Mar. 21, 1911
1,038,543	Eames	Sept. 17, 1912
1,103,179	Elliott	July 14, 1914
1,106,500	Eames	Aug. 11, 1914
1,522,124	Hoisington	Jan. 6, 1925
2,177,939	Johnson	Oct. 31, 1939
2,525,805	Kirkpatrick	Oct. 17, 1950
2,574,653	Miller	Nov. 13, 1951