June 16, 1959 F. MARTINDELL 2,890,648

ASSEMBLED HEAD FOR METAL-WORKING PRESS

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FIG. 1.

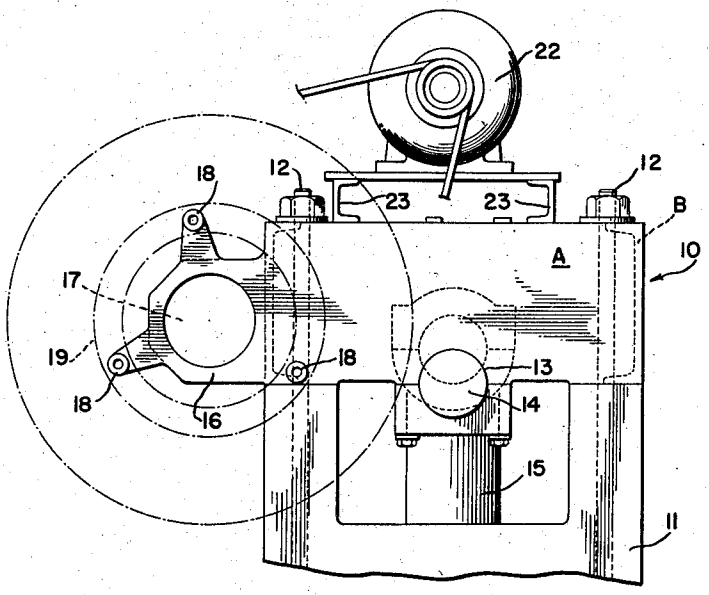
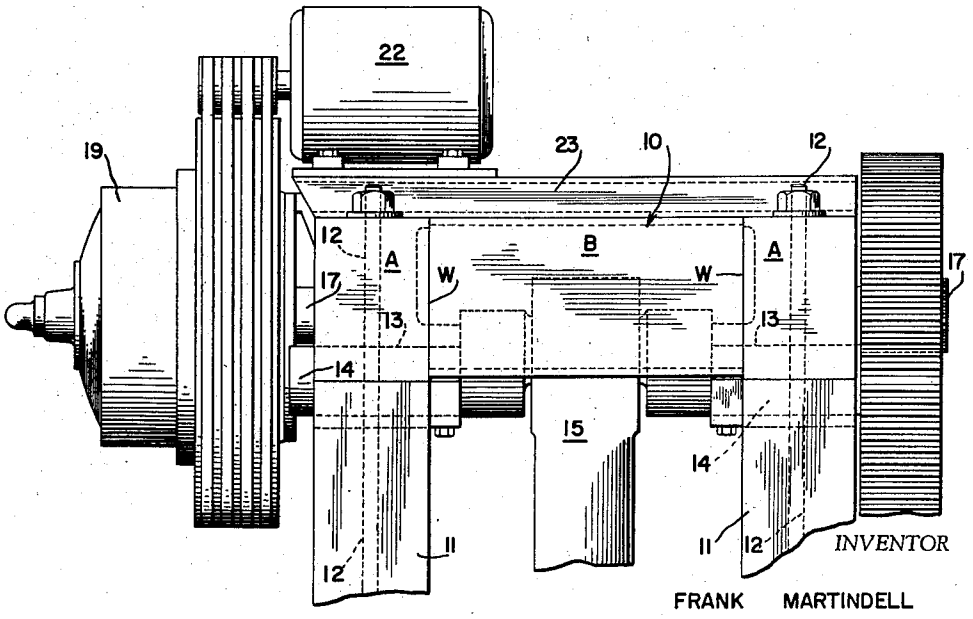


FIG. 2.



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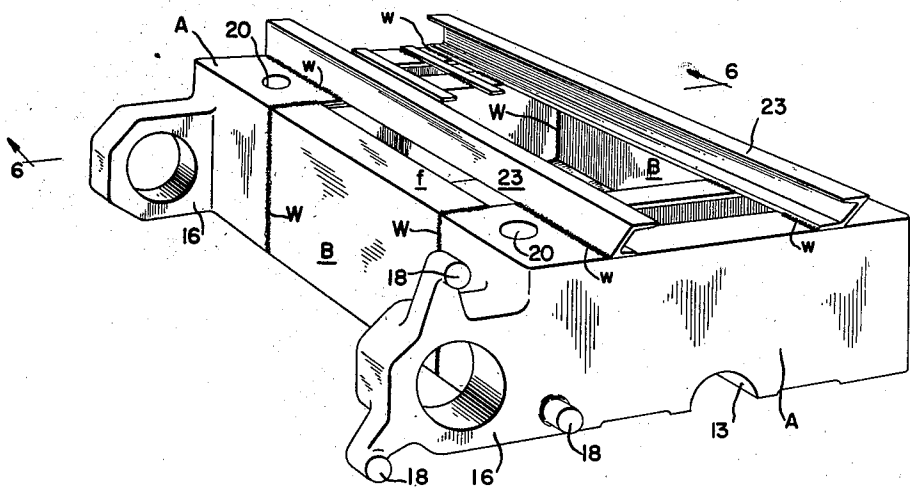
ATTORNEY

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FIG. 3.



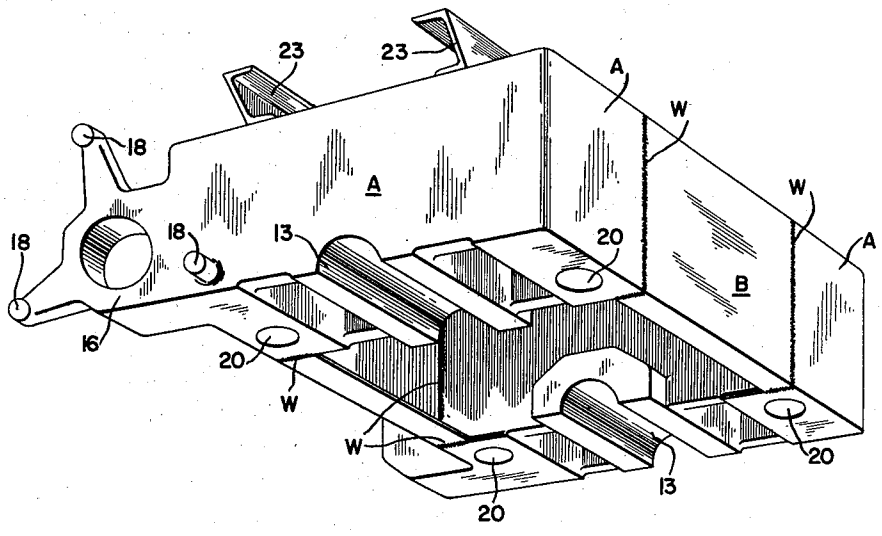


FIG. 4.

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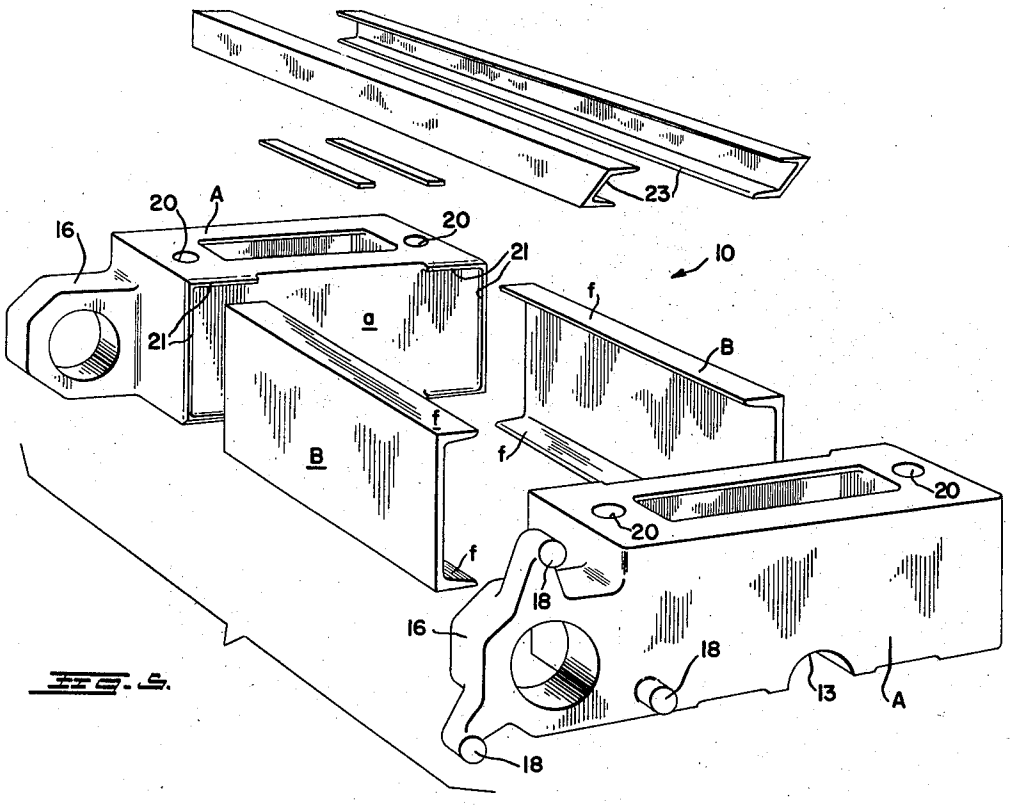
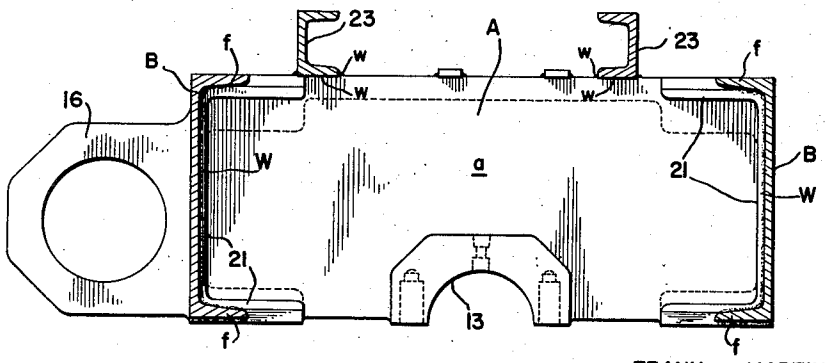


FIG. 5.

FIG. 6.



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2,890,648

ASSEMBLED HEAD FOR METAL-WORKING PRESS

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Application March 4, 1957, Serial No. 643,856
4 Claims. (Cl. 100—214)

This invention relates to an assembled head or crown for presses and more particularly to such a box-type head employed in heavy-duty presses for the cutting, punching, shaping, forming, embossing, et cetera, of metal and like materials. Such a head is usually supported and secured at its ends to spaced vertical columns of the press frame upon which it rests and receives the reaction thrust from the power-actuated work-performing ram or the like, as well as supports press accessories or components such as motors, clutch-brake mechanisms, shaft bearings and the like.

Heretofore, press heads or crowns have been formed of a single massive casting of iron or steel having great weight and, in some instances, have been fabricated entirely of steel plates which are welded together, such as in the patent to Simmons and Sherman, No. 1,954,653. When the entire head is made of a casting, its pattern is extremely large, requiring especially large molds and, because of the large size and great weight of the resultant casting, numerous other problems are encountered, among which—in addition to the attendant expense and unusual facilities required to produce the same—are the difficulties of handling such a large casting for machining purposes, of errors in machining one portion of the casting, of foundry defects such as shrinkage, cracks, porosity, harmful stresses and distortions and of improper centering, spacing or positioning—any one of which may cause the large and expensive casting to be unsuitable for use. And, when such heads are entirely fabricated of steel plates, secured by weldments, the expense is much greater unless the weldment is large and continuous because, as is well known to those skilled in the art, where there are a great many small attachments on the head which also require welding—such as bosses, pads, mounting plates and the like, causing an irregular configuration—the cost is disproportionate with respect to castings.

The primary object of this invention, therefore, is to eliminate or minimize the difficulties with prior practices in producing press-heads of the types described, some of which difficulties have been briefly enumerated above; and is to provide a unitary and integral press-head construction which makes use of the advantages of casting to provide, as relatively small units, those portions of the head having irregular shapes and subjected to the greatest stresses and strains and which further makes use of structural steel units, having thinner cross-sectional areas than possible to cast practically, for joining the cast units in spatial relation. The result is a less expensive press-head of less weight, having the same or greater strength than comparable press-heads produced by prior practices; and the separately cast and relatively small units of said press-head are substantially free of defects and may be machined with greater ease, facility and celerity before assembly and, should one unit be defective, the whole press-head is not a loss.

This novel concept with respect to press-heads is accomplished by casting the end portions or sections of a press-head as two separate units, preferably of ductile or nodular iron (sometimes called "Nickel-iron") and joining these end portions or units with flanged structural steel members by welding them to said castings at their ends

to provide the front and back sides of the head. This procedure not only reduces the amount of expensive iron or steel in the sides of the head—because in a casting these portions would be necessarily over-sized by reason of the difficulty of casting thin webs of sufficient strength—but retains all of the advantages of casting in producing the complicated forms usually required for the end portions of the press-head. While cast steel is easier to weld but more difficult to machine than is cast iron, and while cast iron is easier to machine but more difficult to weld, I take advantage of the properties of nodular iron from which to form the end section castings of my press-head because it is readily welded and most easy to machine, and greatly reduces the cost over making such end sections with their necessary appurtenant accessories from welded steel plate.

An additional advantage of this invention, over prior procedures, is that, in constructing presses of different widths between the columns of their frames but requiring the same type of head, the same patterns may be employed to cast the ends of the head and it is only necessary to connect said end castings by structural steel side members of greater or lesser length as may be required, thus further resulting in greater saving in time, labor, and material.

The above outlined and further objects, advantages, features and details of invention will be more fully and more easily understood from the embodiment of the invention, as at present devised, illustrated in the attached drawings and described in the following specification.

In the drawings—

Figure 1 is a side elevation of the upper portion of a press frame equipped with the head of the present invention, the clutch and brake mechanism indicated in dot and dash lines being removed to show details of construction;

Figure 2 is a front elevation of the structure shown in Figure 1 but showing the locations of the power drive and the clutch-brake mechanism;

Figure 3 is a perspective view of the press-head in accordance with the present invention, showing more particularly the top, one side and one end portion of the press-head;

Figure 4 is a perspective view of the present invention and illustrating more particularly the under side, the end and one side wall or surface of the press-head;

Figure 5 is a disassembled perspective view of the units constituting the press-head of the present invention; and

Figure 6 is a slightly enlarged transverse sectional view taken substantially along line 6—6 of Figure 3.

Referring specifically to the drawings, in which like characters of reference refer to similar parts throughout the several views, and following customary practice, the press-head 10 of this invention is shown, in Figures 1 and 2, as spanning and mounted upon and secured to the upper ends of two spaced columns 11 of a press frame by stay bolts 12 which extend through or along said columns and have their lower ends secured or anchored to the base of the press (not shown). The type of press-head shown is for that which is known as a "vertical column press" and where the ram (not shown) is positioned within the area defined by said columns and the journal bearings 13 of a shaft 14, which reciprocates said ram through a pitman 15 (or a toggle), are carried by the end portions of the head 10 and usually aligned with the longitudinal center of the head.

Nevertheless, the present invention is not limited to use with such a vertical column press as it may be of the type employed with a "Gap-Press" (either of the tilting or non-tilting kind)—that is, where the journal bearing 13 overhangs the front of the press forward of the columns of its

frame and the ram is disposed forward of said columns **11**, as is well-known in the art. In either case, the head may be constructed in accordance with the present invention as only the design configuration of the head will vary. For the sake of simplification and convenience, the head only of the so-called vertical column press is illustrated and described in detail herein, although it will be understood that, by obvious changes in design, which are fully within the spirit of this invention, the head may be made for other types of presses.

Broadly, according to the present invention, the head **10** is substantially oblong or rectangular in plan, as shown in Figures 5 and 6 (being illustrated therein for convenience as a head for a vertical column press), and comprises two spaced elongated end sections A, each designed to rest upon and to be anchored to one of the two spaced side members **11** of a press frame, or their equivalent, respectively, thus providing the end walls of said head. Each end portion of each section A is connected to the corresponding end portion of the other section by a relatively thin spacer or stretcher bar B of prefabricated structural steel, which is preferably flanged as at *f* for strengthening purposes, and provide, respectively, the front and rear walls of the head, spanning the side members **11** of the press frame, the joining of the end sections A and the stretchers B being by weldments W.

More specifically, the end sections A are cast from ductile or nodular iron (sometimes called "Nickel-iron") according to the design or pattern required for the press with which the head is to be employed and, as shown, each end-section cast is formed with any extensions, bearing bosses, abutments, pads and recesses or apertures that may be required therefor as, for instance, the recessed bearing pads **13** for the crank shaft **14**, the apertured extensions **16** for the bearing of a back-shaft **17**, arms carrying **18** for tapping and to which clutch-brake mechanism **19** is bolted, and apertures **20** for the reception of centering studs and the passage of the stay-rods or bolts **12**.

Thus, by casting the end-sections A as separate units of ductile or nodular iron—which is stronger than cast iron but which is machinable with the same ease and facility as cast iron and much more so than steel—all the advantages of casting the necessarily irregular shapes, with their apertures, recesses, pad extensions, bosses, etc., in a one-piece homogeneous unit, are obtained while producing a casting of less size and weight, less likely to have defects therein, more readily handled and machinable and, should one end section be defective or spoiled in machining, the whole head is not lost.

By using prefabricated flanged structural steel members B as stretchers of the required length, width and thickness to have the required tensile and yield strength for any given head **10**, the head will be of much less weight and much cheaper to produce than when the stretcher members B are cast integral with the end-sections A. This is so because of the practical difficulties of casting thin web-like stretchers B from steel or iron of a thickness that is only sufficient for their purpose.

In order that the weldments W may be accomplished without undue stresses produced in the end-sections A or in the stretchers B, and to make it unnecessary to heat the castings A to a high degree, when welding, each end-section A is formed with a lip **21** extending laterally from its inner face *a* adjacent its end portions where the stretcher member B is to be joined thereto. This lip **21** is of a thickness comparable to the thickness of the end portion of stretcher member B to which it is to be joined, and each end of the stretchers B is brought into aligned and juxtaposed relation with the end edge of said lip **21**, so that a complete end-to-end bond or weldment may be obtained therebetween. When the parts are so arranged, the welding may be performed in any suitable or desired manner; however, electric-arc welding is now employed. As shown, the lips **21** are preferably of a configuration corresponding to the cross-sectional shape of the ends of the stretcher B to be welded thereto—this shape being shown therein as channel-form.

The head **10** of the press, of the type above described, often has other components of the press mounted thereon, such as the driving motor **22** or other motors or controllers. For this purpose, one or more channel members **23** of structural steel are placed upon the head to span the end section A and are welded thereto, as at *w*, to afford a support for said components and serve to stiffen the head against the reaction thrust of the ram operating upon the work.

From the foregoing, it will be manifest that an improved press-head has been devised by which all of the above stated objects are attained and, while there has been described and shown herein one type of press-head, it is to be understood that many and various changes and modifications in form, arrangement of parts and details of construction thereof may be made without departing from the spirit of this invention, and that all such changes and modifications as fall within the scope of the appended claims are contemplated as a part of this invention.

That which is claimed, as new and to be secured by Letters Patent, is:

1. An assembled box-type head for a ram-type heavy-duty metal-working press comprising spaced and hollow elongated end sections of cast nodular iron formed with projections, apertures and bosses required for said head and each of an appropriate shape and design for the press with which it is to be employed and which end sections are adapted to be mounted, respectively, upon side frame members of a press, and stretcher members of flanged structural steel and of pre-determined lengths each disposed to span between said sections to connect corresponding opposite end portions of said sections, respectively, and of a height corresponding substantially to the height of said end sections and with their flanges projecting generally longitudinally with respect to said end sections, and weldments securing the ends of said stretcher members and their flanges to adjacent portions of said end sections, thus forming an integral unit.

2. The device recited in claim 1 and further comprising structural bars spanning said end sections intermediate their end portions and welded to the top portions of said end sections.

3. The subject matter of claim 1, wherein each steel stretcher member is channel shaped and of a thickness only to withstand the maximum compression loads of the press without buckling.

4. An assembled box-type press-head for a heavy-duty metal-working press comprising a pair of elongated and spaced end sections of cast nodular iron having cast therewith appurtenant accessories, projections, enlargements, recesses and openings for said head and each end section having a lip at opposite end portions extending laterally from opposing inner surfaces of said end sections, and a relatively thin stretcher member of channel-form structural steel disposed between each of the corresponding end portions of said end sections to form the side walls of said box-type head with its flanges extending inwardly of the head, said lips being substantially coextensive with the end portions of said channel-form stretcher members, and weldments securing the ends of said stretcher members to adjacent lips on said end sections, thus forming an integral unit.

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