

July 29, 1924.

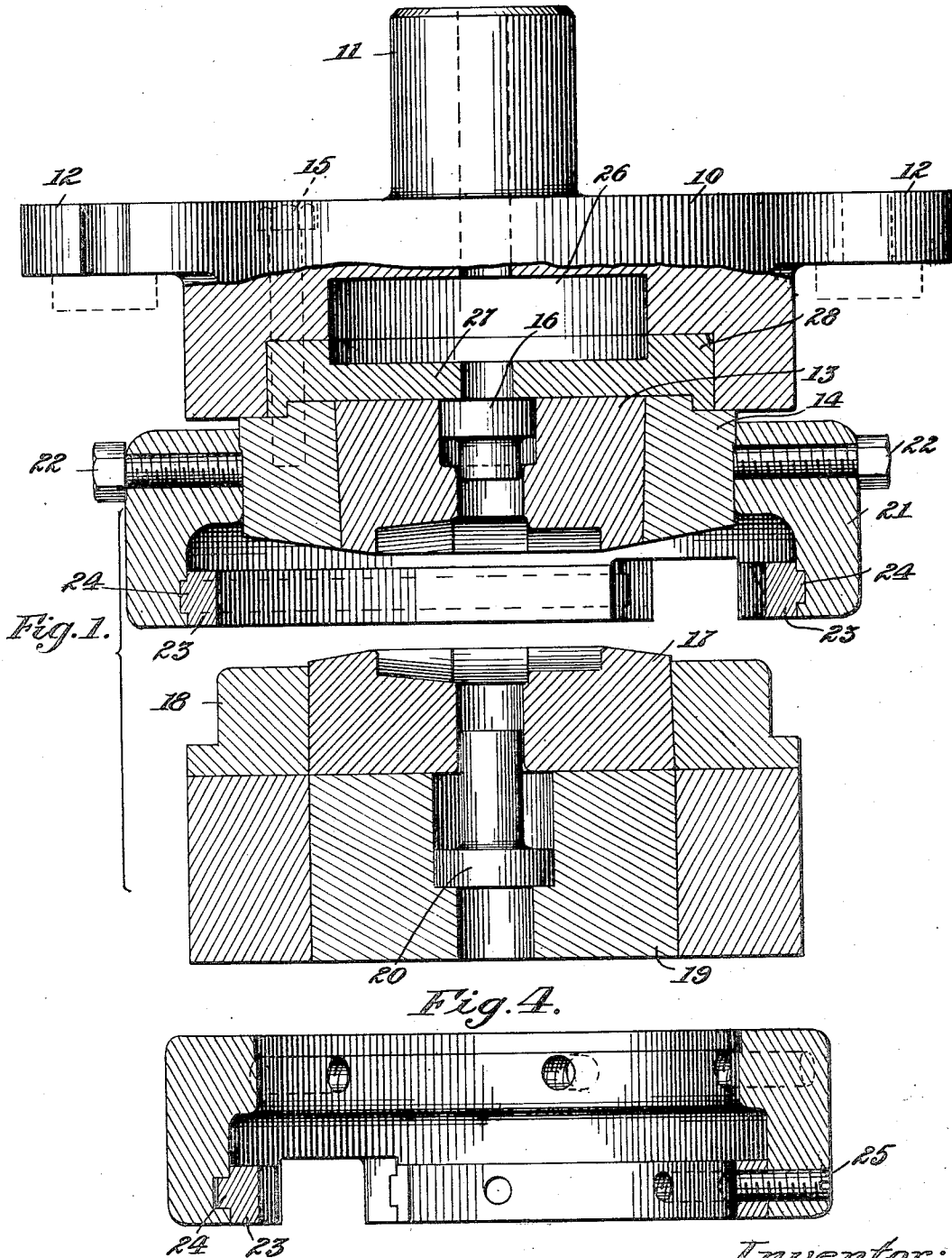
1,502,722

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DIE GUIDING MEANS FOR FORGING PRESSES

Filed Jan. 3, 1922

2 Sheets-Sheet 1



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1,502,722

DIE GUIDING MEANS FOR FORGING PRESSES

2 Sheets-Sheet 2



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Patented July 29, 1924.

1,502,722

UNITED STATES PATENT OFFICE.

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DIE-GUIDING MEANS FOR FORGING PRESSES.

Application filed January 3, 1922. Serial No. 526,692.

To all whom it may concern:

Be it known that CHARLES A. HILL, a citizen of the United States, residing at Port Huron, in the county of St. Clair and State of Michigan, has invented certain new and useful Improvements in Die-Guiding Means for Forging Presses, of which the following is a specification.

In forging presses, difficulty is experienced in producing symmetrical forgings because of the fact that the complementary die members will frequently become distorted, or out of line, and will not, in operation, give truly aligned surfaces, and imperfect forgings result. Because of this difficulty many articles are produced on single acting presses, necessitating the use of a much heavier and more powerful press than where a double acting press is used.

The present invention has for its object to provide means whereby the die members of a press may be always centered and brought into proper alignment so that perfect forgings result, this being accomplished by providing guiding means which control the movement of the dies with respect to one another, the guiding means being so constructed that it may be installed at slight expense, and when worn or broken, be readily replaced without the necessity of renewing any of the more costly parts of the press or dies.

In order that the invention may be clear to those skilled in the art, there is shown, in the accompanying drawings, one embodiment of the invention, but it will be understood that mechanical expedients and constructions other than those herein disclosed may be adopted without departing from the range of the invention.

In the drawings:—

Fig. 1 is a view of the dies and die holders of a single press with the improvements applied thereto.

Fig. 2 is a view in bottom plan of the upper die member and its associated parts shown in Fig. 1.

Fig. 3 is a detail bottom plan view of the die guiding and aligning means.

Fig. 4 is a transverse sectional view substantially on the line 4—4 of Fig. 3.

Referring to the drawings by numbers, like numbers indicating like parts in the several views, 10 indicates the ram engaging head of the upper die which may be held

to the ram in any suitable manner, as by the central post 11 and the slotted ears 12. Mounted on the under side of the head 10 is the upper die member 13 and its carrier 14, the face of the die member 13 being appropriately formed for the work to be done. The die member and its carrier are secured to the head in any suitable manner, as by the bolts 15, and there may be provided, if desired, the knockout block 16.

The lower die member 17 and its carrier 18 are mounted upon any suitable bed block 19, the face of the die 17 being complementarily formed to meet the formation of the upper die member 13, and, if desired, a knock-out block 20 may be provided for the lower die.

In order that the dies 13 and 17 may be centered and aligned always accurately, there is provided the guide ring carrier 21 which, as here shown, is circular and of substantially inverted L-shape in cross section with an aperture in its top, so that it slides with a close sliding fit over the die carrier 14 and may be adjusted vertically and circumferentially thereon, the said carrier ring 21 being held in any adjusted position by means of the screw 22 passing through the relatively long threaded apertures in the base of the inverted L-shape guide ring, as shown in Fig. 1.

The depending flange of the said carrier ring 21 is cut away, as shown at one or more points in its circumference, primarily for the purpose of giving access to the dies by tongs or other tools or bars of material, and these cut away portions or openings permit also the easy manipulation of the guide elements proper, presently to be described.

The guide ring 21 depends below the die 13, as shown in Fig. 1, forming an open bottom recess or housing surrounding the die, said guide ring carrier extending downwardly a sufficient distance so that, as the dies move together, it will envelop the die carrier 18 for the lower die 17. The carrier ring 21 may be made of an inexpensive material, since it is not subjected to direct wear, but serves merely as a carrier. The guiding element proper comprises, as here shown, the ring-like members 23, two being shown in the present instance, although more than two may be used, if desired, these members being secured within the skirt of the carrier 21, and, when so secured,

forming a diameter equal to the diameter of the die carrier 18 of the lower die so that, as the dies come together, the members 23, forming the guiding element, will engage and bring the dies always into perfect alignment.

While the guide members 23 may be mounted in various ways, one convenient and satisfactory manner of mounting consists, as here shown, of forming an annular recess on the inner wall of the carrier ring 21, and providing the members 23 with an annular projection 24 on their outer peripheries which seats in the recess formed in the wall of the carrier ring so that the members 23 are very effectively held against vertical movement under the thrust and pull of the closing and opening dies. To retain the members 23 in place, there are provided holding screws 25 which pass through the skirt of the carrier ring 21 and into the members 23.

The guiding members 23 are preferably made, as best shown in Figs. 2 and 3, so that their combined arcs are less than a complete circle, and it will be observed that preferably the members 23 are of a length which spans the flange of the guide ring between the openings in that flange, so as not to obstruct those openings but to give free access to the die parts. These guide sections 23 may be readily removed and inserted in the recesses in the inner wall of the skirt of the carrier ring 21, and so replaced and repaired without the necessity of taking down any of the other parts of the press, it being necessary only to loosen the screws 25, slip the members 23 from their recesses, and repair or replace them if worn. These sections 23 may be made of a metal which will stand, without undue wear, the constant friction of the reciprocating die parts which they guide, and since they are relatively small, the cost of material and labor for replacement or repair of these guiding sections is very considerably reduced over what the cost would be if the entire carrier ring, or a correspondingly heavy part, had to be replaced.

With this arrangement it will be seen that standard parts may be very readily and economically equipped with means for guiding the die members, and that when once installed, the cost of maintenance of such guiding devices is very small. The invention ensures, therefore, in the production of forgings, that the die parts will be correctly aligned in operation and the articles produced symmetrically forged.

In order that danger of breakage of the press parts may be eliminated, there is provided a break out web which, if excessive pressure be exerted, which is dangerous to the press parts, will at once relieve give way under such pressure, and, in the present dis-

closure, it is shown as applied to the upper die member; although it might be applied to the lower die member if desired.

The die head 10, heretofore referred to, is provided at its under side with a recess 26 which is spanned by a web 27 against which the die block 13 proper seats. The web 27 is provided with an annular portion 28 seated in an annular recess in the under side of the die head surrounding the recess 26 so that the relatively thin web 27 lies in proper position to be broken out or sheared off in event of excessive pressure being exerted on the die block 13. The recess 26 provides ample clearance for the web 27, if, under pressure, it breaks out or shears off, and the parts will be so proportioned, of course, that the shearing strain necessary to break out or shear the web 27 will be the maximum strain to which the press may be subjected without danger of injury. Immediately that maximum is reached, the break out web 27 will relieve the press parts.

With this arrangement and following this disclosure, it will be seen that a press is provided in which absolute accuracy in the meeting of the dies and consequent symmetry of the articles forged is secured, and, furthermore, all danger of breakage of the main press parts by reason of excessive pressure is avoided.

It will be understood that mechanical changes and expedients which are the equivalent of those here shown may be adopted and still be within the scope of my development.

I claim:

1. In apparatus of the class described, the combination of relatively movable dies, a carrier on one of said dies, a guide member removably mounted on said carrier, and a member on the opposing die adapted to engage said guide member.

2. In apparatus of the class described, the combination of relatively movable dies, a carrier on one of said dies, a plurality of guide members removably mounted on said carrier, and a member on the opposing die adapted to engage said guide members.

3. In apparatus of the class described, the combination of relatively movable dies, a carrier connected to one of said dies, a guide ring formed of a plurality of curved members removably mounted on said carrier, and a member connected with the opposing die adapted to engage said curved guide members.

4. In apparatus of the class described, the combination of relatively movable dies, a carrier connected to one of said dies and having an annular section extending beyond the face of the die, a plurality of curved guide members removably mounted on said extended annular section, and a member on

the opposing die to engage said curved guide members.

5. In apparatus of the class described, the combination of relatively movable dies, a carrier removably secured to one of said dies and having a section extending beyond the face of the die, a plurality of guide members removably mounted on the inner wall of said extended section, and a member connected with the opposing die adapted to engage said guide members.

6. In apparatus of the class described, the combination of relatively movable dies, a carrier connected with one of said dies and having an annular section extending beyond the face of said die, a plurality of curved guide members removably mounted on the inner wall of said annular section, and a member connected with the opposing die adapted to engage said curved guide members.

7. In apparatus of the class described, the combination of relatively movable dies, a guide carrier substantially L-shaped in cross section connected with one of said dies and having a section extending beyond the face of said die to form a recess surrounding said die, a plurality of guide members removably mounted on the wall of said recesses, and a member connected with the opposing die adapted to engage said curved guide members.

8. In apparatus of the class described, the combination of relatively movable dies, a guide carrier substantially L-shaped in cross section connected with one of said dies and having an annular section extending beyond the face of said die to form a recess surrounding said die, a plurality of curved guide members removably mounted on the inner wall of said extended section, and a member connected with the opposing die adapted to engage said curved guide members.

9. In apparatus of the class described, the combination of relatively movable dies, die carriers for said dies, a guide carrier removably secured to the die carrier of one of said dies and having a section extending beyond the face of said die to form a recess surrounding said die, and curved guide members removably secured to the wall of said recess and adapted to receive the die carrier of the opposing die in advance of the meeting of the dies.

10. In apparatus of the class described, the combination of relatively movable dies, a guide carrier removably mounted with respect to one of said dies and having a section extending beyond the face of the dies and forming a recess surrounding said die, guide members removably mounted on the extended portion of said carrier, and a member connected with the opposing die adapted to engage said remov-

able guide members in advance of the meeting of the dies.

11. In apparatus of the class described, the combination of relatively stationary and movable dies, a carrier supported to move with the movable die, a guide member removably mounted on said carrier, and a member on the relatively stationary die adapted to engage said guide member.

12. In apparatus of the class described, the combination of relatively stationary and movable dies, a guide carrier supported to move with the movable die and projecting beyond the face thereof, a guide member removably mounted on said carrier, and a member adjacent the relatively stationary die adapted to engage said guide member.

13. In apparatus of the class described, the combination of relatively movable and stationary dies, a carrier connected with the movable die and having an annular section extending beyond the face of the die, a guide member removably mounted on said extended annular section, and a member on the relatively stationary die to engage said guide member.

14. A guide member for forging presses comprising a collar adapted to be secured in fixed relation to a die and having a guide supporting extension, and a guide member removably mounted on said extension.

15. A guide member for forging presses, comprising a body portion, adapted to be secured in fixed relation to a die and having a guide supporting extension extending therefrom, and guiding members removably mounted on said extension.

16. Guiding means for forging presses, comprising an annular body portion provided with means for securing it in fixed position relative to a die, an annular portion extending from said body portion, and guide members removably secured to the inner face of said extensions.

17. Guiding means for forging presses, comprising a body portion having means for securing it in fixed relation to a die, a substantially annular guide carrying section extending from said body portion, and a plurality of guide members removably secured to the inner wall of said annular section.

18. Guiding means for forging presses, comprising a body portion provided with means for securing it in fixed position relative to a die, a substantially annular guide carrying section extending from said body portion, and a plurality of guide members in interlocked engagement with the inner wall of said guide carrying section.

19. Guiding means for forging presses comprising a collar substantially L-shaped in cross section having means for securing

it in fixed position relative to a die and provided with a guide receiving groove in the face of its inner wall, and a plurality of guide members fitted to and secured in
5 said groove.

20. Guiding means for forging presses comprising an annular collar substantially L-shaped in cross section adapted to be secured in fixed position relative to a die
10 and having an annular groove in the face of its inner wall and a plurality of arc-shaped guide members secured in said groove and extending around a portion only of said annular collar.

15 21. Guiding means for forging presses comprising a collar adapted to be positioned in fixed relation to a die and having a recess therein, a groove in the wall of said recess, a plurality of guide rings having curved
20 engaging projections mounted in said groove, and securing means for said guide members.

22. A guide member for forging dies extending beyond the face of the die and

having a section of its wall cut away to permit access to the die. 25

23. A guide member for forging presses having a circumferential flange extending beyond the face of the die and having a section cut away to permit access to the die. 30

24. Guiding means for forging presses comprising a removable carrier ring having a circumferential flange extending beyond the face of the die, and having a section of that circumferential flange cut away to permit access to the die, and a guide member
35 mounted on the inner face of said flange.

25. Guiding means for forging presses comprising a carrier ring having a circumferential flange extending beyond the face of
40 the die and having sections cut away to permit access to the die, and a plurality of guide members secured to the inner faces of the flange sections.

In testimony whereof I have hereunto set
45 my hand.

CHARLES A. HILL.