Oct. 2, 1945. H. A. WEYER 2,386,155

DROP HAMMER FRAME CONSTRUCTION

Filed Sept. 28, 1944

FIG. 1.

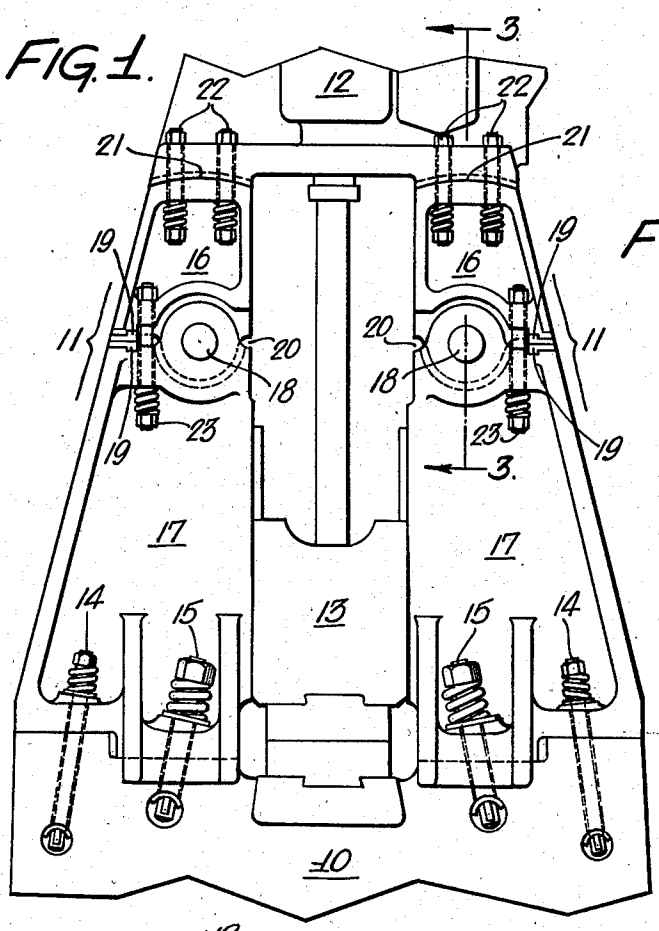


FIG. 2.

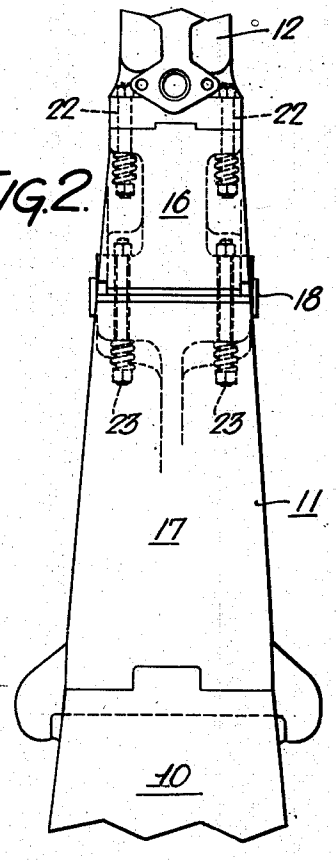


FIG. 3.

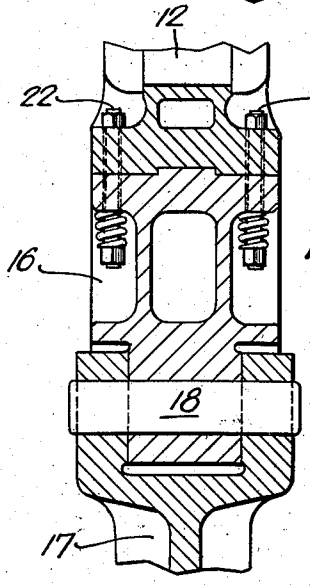
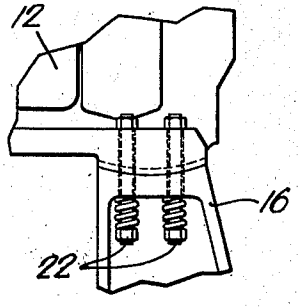


FIG. 4.



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DROP HAMMER FRAME CONSTRUCTION

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11 Claims. (Cl. 78—25)

This invention relates to improvements in power hammers and, more particularly, to an improvement in the frame construction thereof.

In drop hammer construction, in order to avoid internal strains, the frame was originally made quite flexible. However, production demands for forgings requiring very little finishing have necessitated revision of the frame structure along more rigid lines. Even in the more rigid structures in present day use there is still necessity for flexibility in the frame structure since otherwise the deterioration would be so rapid as to render the hammer substantially useless. It is, accordingly, the practice to connect the side frames of the hammer to the anvil and to the ram-reciprocating mechanism by a means which will insure return of the various elements to an accurate seating following each hammer blow but which will enable the frames at the moment of impact to give slightly and thus absorb the forces of impact. It has been noted that the side frames tend to rock on the anvil about the outer lower corners thereof with resultant separation of the upper ends of the frames. Constant repetition of this movement results in considerable wear and ultimate breakage of either the upper ends of the frames, the ram-reciprocating supporting means with which they are engaged or through misalinement of the head and anvil breakage of the rod.

An important object of the present invention is the provision of a structure eliminating such breakage and permitting greater flexibility in the frame structure while at the same time providing the necessary rigidity for accuracy.

A further and more specific object of the invention is the provision of a side-frame-to-head connection such that separation of the upper ends of the side frames may take place without placing any breaking strain upon either the side frames or the head construction.

A further and still more specific object of the invention is the provision in a hammer of side frames so articulated that freedom of movement is provided eliminating to the greatest possible extent internal strains without any substantial wear at the abutting faces of the side frames and head structure.

These and other objects I attain by the construction shown in the accompanying drawing wherein, for the purpose of illustration, I have shown a preferred embodiment of my invention and wherein:

Fig. 1 is a fragmentary front elevation of a hammer embodying my invention;

Fig. 2 is a fragmentary side elevation thereof;

Fig. 3 is a section on line 3—3 of Fig. 1; and

Fig. 4 is a fragmentary elevation illustrating a modification.

Referring now more particularly to the drawing, the numeral 10 generally designates an anvil on which is seated spaced side frames 11 upon the upper ends of which the head 12, including the usual operating cylinder for reciprocating the ram 13, is supported. In accordance with my invention the engagement between the side frames and anvil may be that ordinarily employed. As at present shown, the frames are suitably keyed to the anvil and are held in position upon the seating faces of the anvil by means of spring bolts 14 and 15 which, while permitting the necessary slight displacement of the side frames at the moment of impact, insure return of the lower ends of the side frames to a properly aligned position. The side frames 11, instead of being made in the form of unitary castings as is the usual practice, are formed in upper and lower sections 16 and 17 connected by a pivot or wrist pin 18 extending through suitable bearings formed in the sections in a direction from front to back of the anvil and in parallelism to the side frame seating surfaces thereof. The confronting surfaces of the sections 16 and 17 are, at the outer sides of the pivot, provided with meeting surfaces preferably including replaceable wear pltaes 19 which come into engagement when the sections are in proper alignment with one another. At the inner sides of the pivots the sections are relieved as at 20 so that the sections may jackknife outwardly at the pivots but are positively limited as to their approach at this point.

The upper ends of the upper sections are arcuately curved as at 21 to enable this movement to take place without any strain upon the head 12 which is provided with correspondingly curved seats and is secured to the upper ends of the side frames through spring bolts 22 loosely mounted in each of the head and side frames so as to permit the limited relative movement which is necessary. While the tension applied to the sections through spring bolts 14, 15 and 22 will serve to restore the sections to proper alignment following a displacement thereof, I prefer to employ spring bolts 23 extending through the sections outwardly of the pivots and constantly tending to maintain the wear plates 19 in engagement with one another.

While I have at present illustrated the curvature of the surface at the upper end of the upper section as being concentric to the axis of the pivot

18, it will be obvious that this curvature may readily be reversed as suggested in Fig. 4.

Since the construction illustrated is capable of considerable modification without departing from the spirit of my invention, I do not wish to be understood as limiting myself thereto except as hereinafter claimed.

I claim:

1. A power hammer comprising an anvil, spaced side frames seated thereon, a head seated on the upper ends of the side frames and including power-operating means, a ram operated by said means, said side frames each comprising a lower section having guides for said ram and an upper section affording a seat for said head, a pivot connecting said sections directed from front to back of the hammer in parallelism to the upper surface of the anvil, and connections between the sections and head and anvil yieldably resisting relative movement of said sections about the pivot.

2. A power hammer comprising an anvil, spaced side frames seated thereon, a head seated on the upper ends of the side frames and including power-operating means, a ram operated by said means, said side frames each comprising a lower section having guides for said ram and an upper section affording a seat for said head, a pivot connecting said sections directed from front to back of the hammer in parallelism to the upper surface of the anvil, connections between the sections and head and anvil yieldably resisting relative movement of said sections about the pivot, and connections between the sections of each side frame yieldably resisting pivotal movement of the sections in a direction causing separation of the upper ends of said lower sections.

3. A power hammer comprising an anvil, spaced side frames seated thereon, a head seated on the upper ends of the side frames and including power-operating means, a ram operated by said means, said side frames each comprising a lower section having guides for said ram and an upper section affording a seat for said head, a pivot connecting said sections directed from front to back of the hammer in parallelism to the upper surface of the anvil, connections between the sections and head and anvil yieldably resisting relative movement of said sections about the pivot, and means positively limiting pivotal movement of the sections causing approach of the upper ends of the lower sections.

4. A power hammer comprising an anvil, spaced side frames seated thereon, a head seated on the upper ends of the side frames and including power-operating means, a ram operated by said means, said side frames each comprising a lower section having guides for said ram and an upper section affording a seat for said head, a pivot connecting said sections directed from front to back of the hammer in parallelism to the upper surface of the anvil, and connections between the sections and head and anvil yieldably resisting relative movement of said sections about the pivot, the seating engagement between the head and each upper section comprising arcuate surfaces forming segments of a cylinder having as its center the axis of the associated pivot.

5. A power hammer comprising an anvil, spaced side frames seated thereon, a head seated on the upper ends of the side frames and including power-operating means, a ram operated by said means, said side frames each comprising a lower section having guides for said ram and an upper section affording a seat for said head, a pivot connecting said sections directed from front to back of the hammer in parallelism to the upper surface of the anvil and means resisting relative movement of said sections in directions causing separation of the upper ends of the lower sections.

6. A power hammer comprising an anvil, spaced side frames seated thereon, a head seated on the upper ends of the side frames and including power-operating means, a ram operated by said means, said side frames each comprising a lower section having guides for said ram and an upper section affording a seat for said head, a pivot connecting said sections directed from front to back of the hammer in parallelism to the upper surface of the anvil, means resisting relative movement of said sections in directions causing separation of the upper ends of the lower section, and means positively limiting pivotal movement of the sections causing approach of the upper ends of the lower sections.

7. A power hammer comprising an anvil, spaced side frames seated thereon, a head seated on the upper ends of the side frames and including power-operating means, a ram operated by said means, said side frames each comprising a lower section having guides for said ram and an upper section affording a seat for said head, a pivot connecting said sections directed from front to back of the hammer in parallelism to the upper surface of the anvil and means resisting relative movement of said sections in directions causing separation of the upper ends of the lower sections, the seating engagement between the head and each upper section comprising arcuate surfaces forming segments of a cylinder having as its center the axis of the associated pivot.

8. A power hammer comprising an anvil, spaced side frames seated thereon, a head seated on the upper ends of the side frames and including power-operating means, a ram operated by said means, said side frames each comprising a lower section having guides for said ram and an upper section affording a seat for said head, a pivot connecting said sections directed from front to back of the hammer in parallelism to the upper surface of the anvil, connections between the sections and head and anvil yieldably resisting relative movement of said sections about the pivot, connections between the sections of each side frame yieldably resisting pivotal movement of the sections in a direction causing separation of the upper ends of said lower sections, and means positively limiting pivotal movement of the sections causing approach of the upper ends of the lower sections.

9. A power hammer comprising an anvil, spaced side frames seated thereon, a head seated on the upper ends of the side frames and including power-operating means, a ram operated by said means, said side frames each comprising a lower section having guides for said ram and an upper section affording a seat for said head, a pivot connecting said sections directed from front to back of the hammer in parallelism to the upper surface of the anvil, connections between the sections and head and anvil yieldably resisting relative movement of said sections about the pivot, and connections between the sections of each side frame yieldably resisting pivotal movement of the sections in a direction causing separation of the upper ends of said lower sections, the seating engagement between the head and each upper section comprising arcuate surfaces forming seg-

ments of a cylinder having as its center the axis of the associated pivot.

10. A power hammer comprising an anvil, spaced side frames seated thereon, a head seated on the upper ends of the side frames and including power-operating means, a ram operated by said means, said side frames each comprising a lower section having guides for said ram and an upper section affording a seat for said head, a pivot connecting said sections directed from front to back of the hammer in parallelism to the upper surface of the anvil, connections between the sections and head and anvil yieldably resisting relative movement of said sections about the pivot, and means positively limiting pivotal movement of the sections causing approach of the upper ends of the lower sections, the seating engagement between the head and each upper section comprising arcuate surfaces forming segments of a cylinder having as its center the axis of the associated pivot.

11. A power hammer comprising an anvil, spaced side frames seated thereon, a head seated on the upper ends of the side frames and including power-operating means, a ram operated by said means, said side frames each comprising a lower section having guides for said ram and an upper section affording a seat for said head, a pivot connecting said sections directed from front to back of the hammer in parallelism to the upper surface of the anvil, means resisting relative movement of said sections in directions causing separation of the upper ends of the lower sections, and means positively limiting pivotal movement of the sections causing approach of the upper ends of the lower section, the seating engagement between the head and each upper section comprising arcuate surfaces forming segments of a cylinder having as its center the axis of the associated pivot.

HENRY A. WEYER.