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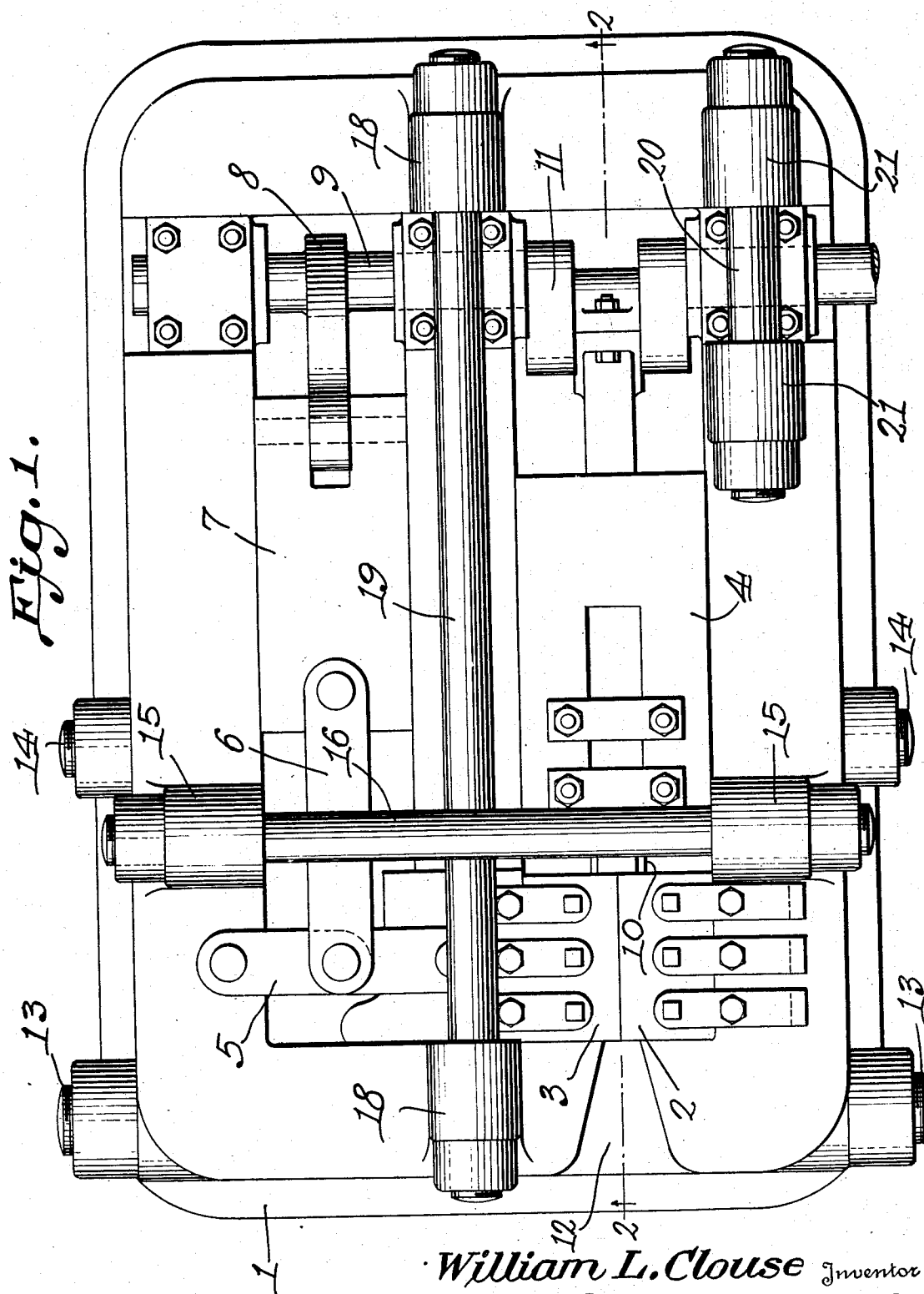
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1,905,620

FORGING MACHINE

Filed Oct. 9, 1929

3 Sheets-Sheet 1



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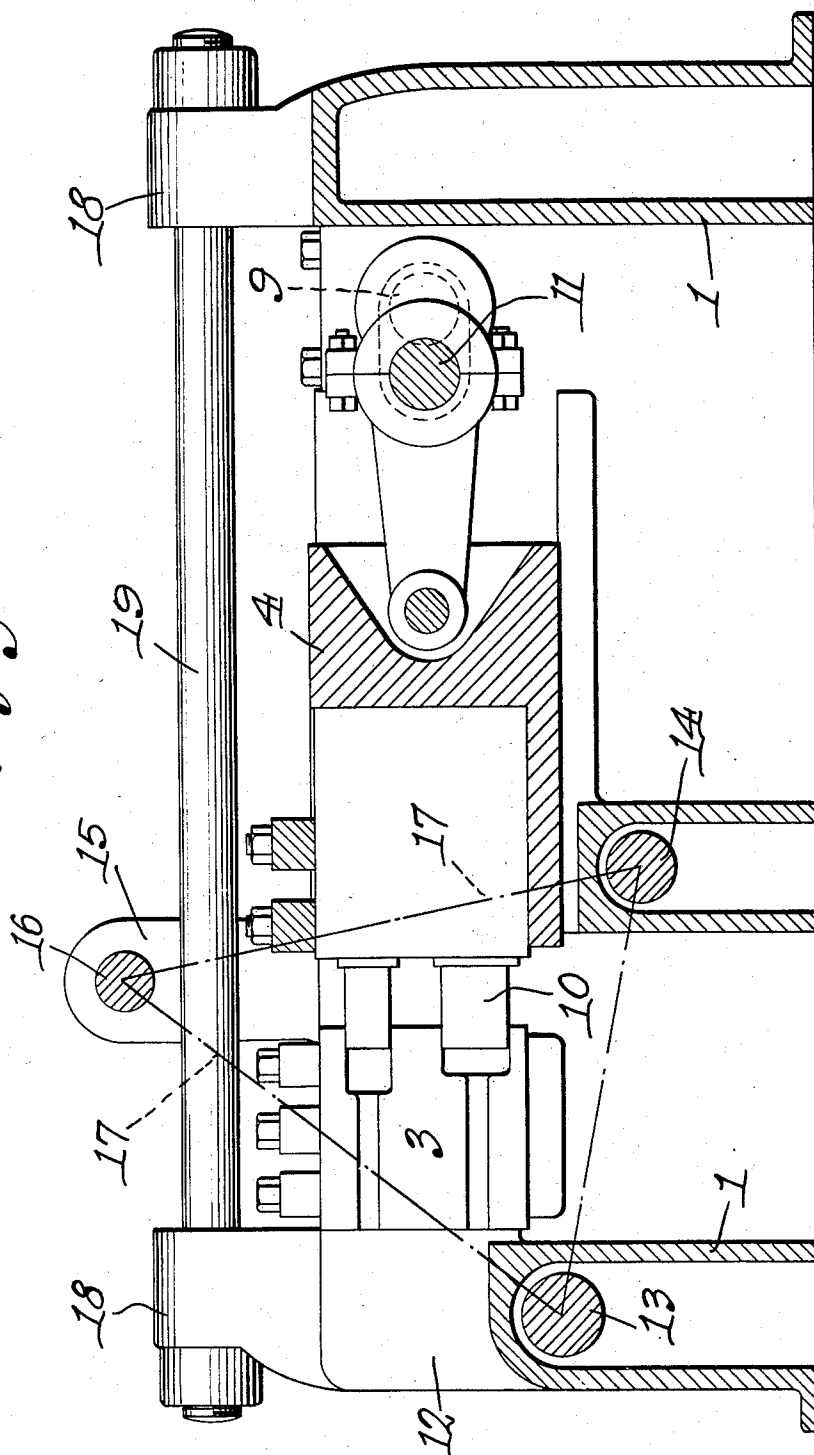
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Fig. 2.



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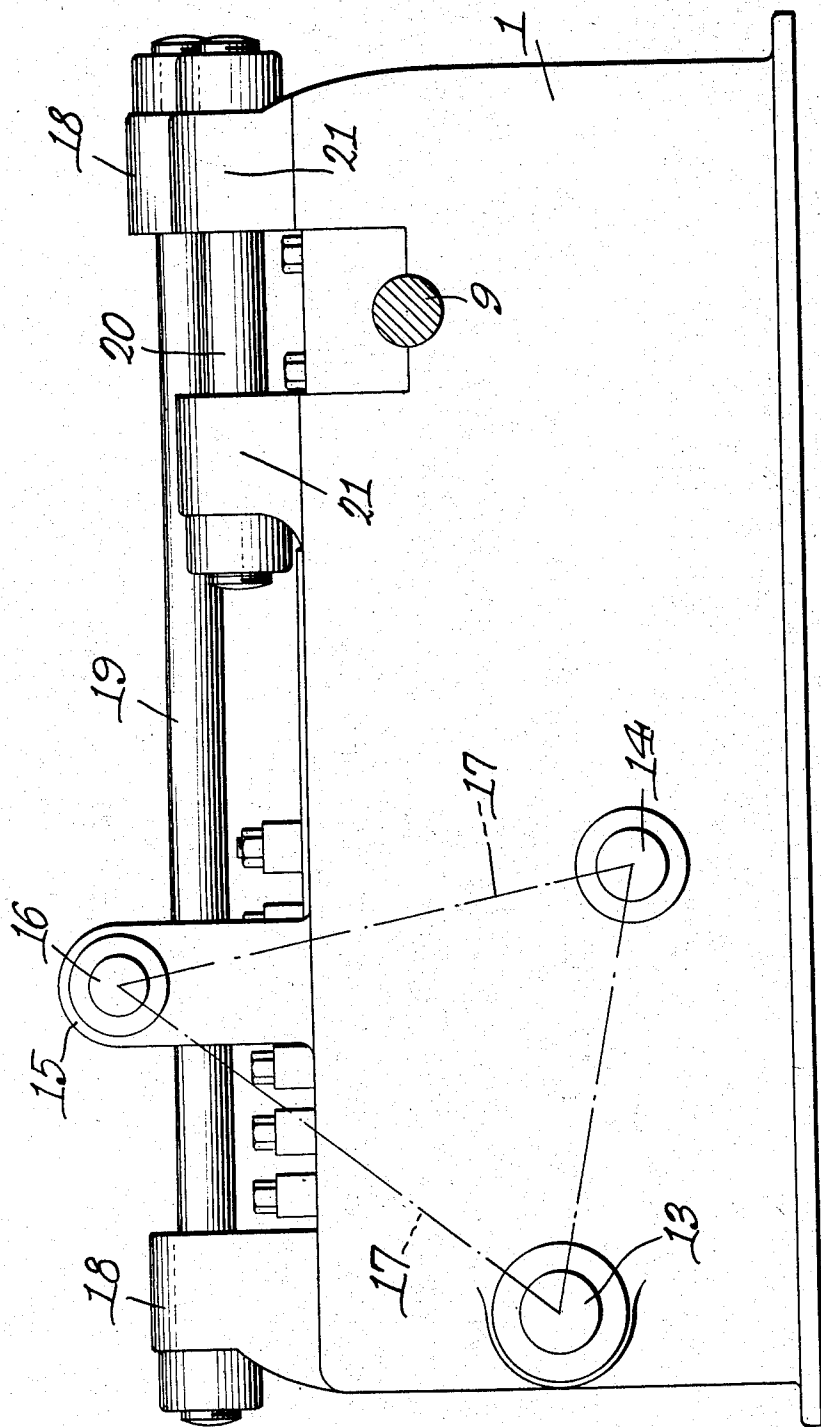
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Fig. 3.



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UNITED STATES PATENT OFFICE

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FORGING MACHINE

Application filed October 9, 1929. Serial No. 398,415.

This invention relates to forging machines. Manufacturers of machines of this type have had a difficult problem in attempting to make their bed frames sufficiently strong and stiff to withstand the pressures that are encountered in forging iron and steel. As is well known to those skilled in the art the bar stock is held in a forging machine by split dies. One of these gripping or split dies is usually operated by a toggle or other suitable mechanism and, obviously, when the stock is gripped between the two dies, heavy lateral strains are imparted to the bed frame. Furthermore while the stock is being gripped, the heading die, which is actuated by any suitable mechanism, moves forwardly to upset the stock in the die impressions. Thus a further pressure longitudinally of the bed is exerted. In addition thereto the heated material, being of a plastic nature, exerts a hydraulic action against the gripping dies so as to subject the bed to further lateral strains. As it is necessary that the transverse front portion of the bed of the machine be provided with a feeding gap leading to the dies, it becomes quite difficult to provide sufficient strength in the bed frame across the feeding gap without interference with the convenient operation of the machine.

Various means have been employed for strengthening the bed frame. For example, transverse tie bars have been mounted on the upper portions of the bed frame but these have been located where they seriously interfere with the handling of the stock in the feed gap and between the dies. Consequently machines equipped with these transverse tie bars have usually had one or more of the bars removed by the users so that the bed frame is thus correspondingly weakened. Other machines have been built with underslung portions for giving the requisite stiffness but these have possessed the disadvantage of being extremely heavy and rendering it necessary to extend the bed frame below the floor line in order to secure sufficient strength.

It is an object of the present invention to provide a construction of bed frame which will eliminate all of the objections heretofore

present in structures utilizing special strengthening means.

Another object is to provide a bed frame all parts of which can be above the floor line, there being a novel arrangement of tie bars whereby said bed frame is strengthened both transversely and longitudinally without interference with the stock being supplied to or removed from the machine.

A further object is to provide tie bars which define a triangle within the area of which are located those portions of the dies subjected to heavy strains, the said arrangement of tie bars adding great transverse strength to the machine without necessitating the location of a tie bar at the front of the bed frame where it would seriously interfere with the feeding and handling of the machine.

A still further object is to provide a novel arrangement of longitudinal tie bars giving maximum strength but offering minimum interference with the handling of the machine.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings,

Figure 1 is a plan view of the machine.

Figure 2 is a section on line 2—2, Figure 1.

Figure 3 is a side elevation.

Referring to the figures by characters of reference, 1 designates the bed frame of a forging machine provided with the usual stationary gripping die 2, movable gripping die 3, and heading slide 4. Any suitable mechanism can be used for operating these parts. For example, and as shown in Figure 1, the movable gripping die can be actuated by a toggle receiving motion through a link 5 from a slide 7 which, in turn, is oper-

ated by a cam 8 on the shaft 9. The heading slide 4, which carries the heading dies or tools 10, can be actuated by a crank 11 carried by the shaft 9.

5 A feeding gap 12 is formed in the front end of the bed frame and leads to the space between the gripping dies 2 and 3. As before explained this feeding gap weakens the frame so as to reduce its power of resistance to 10 transverse strains during forging operations.

For the purpose of reinforcing the frame transversely without interfering with the insertion or removal of stock, a transverse tie bar 13 is extended through the frame directly beneath the gap 12 and is suitably 15 secured at its ends to the outer sides of the frame. Another transverse tie bar 14 is extended through the frame beneath the slide 4 and is likewise secured at its ends to the 20 outer sides of the bed frame. Formed on the bed frame at the sides thereof are heavy ears or lugs 15 and secured in these is a third transverse tie bar 16. This bar is about 25 equidistant from the bars 13 and 14 and the three bars cooperate to define a triangle as indicated by broken lines at 17.

By referring particularly to Figure 2 it will be noted that those portions of the dies 2 and 3 that are subjected to the greatest resistance during the forging operation are 30 located within the triangle 17 and the active portions of the heading tools 10 are also located in this triangle. Tie bar 16, however, is spaced back from the gap 12 so as 35 not to overlie the gripping dies or the active ends of the tools 10 while entering the dies. Consequently this bar 16 will not interfere in any way with the handling of the stock while being placed in or removed from between the dies nor will it interfere with the 40 operation of the machine or the setting of either of the gripping dies or of the heading tools.

For the purpose of strengthening the machine transversely without adding to the 45 weight of the bed frame, the bars 13 and 14 have been used and it has been found in practice that by following the triangular arrangement of the bars 13, 14, and 16, adequate strength is provided which has heretofore been impossible without the use of heavy 50 underslung portions extending below the floor line or the use of one or more rods above the bed frame and above the gap 12.

For the purpose of reinforcing the bed frame longitudinally, upstanding lugs or ears 18 are provided at the front and back 55 ends thereof and are engaged by the end portions of a tie bar 19 extending longitudinally of the machine at the center thereof 60 and above the middle bearing of the shaft 9. In order that the machine may also be reinforced at the other side of the path of slide 4 where the bearing is located and where the 65 greatest danger of breakage under longitudi-

dinal strains is present, a short tie bar 20 has been provided, this being secured in upstanding ears or lugs 21. As the bar does not extend forwardly, it does not interfere with the handling of stock being supplied 70 to or taken from the machine nor does it interfere with the setting of the dies or the heading tools.

Importance is attached to the fact that the upper transverse tie bar 16 should be located 75 at a point between the gripping dies and the heading tool so that it will not interfere with the convenience of adjusting the heading tool as well as the gripping dies. This tie bar should be as nearly as possible at a point 80 between the front edge of the gripping die space and the front of the heading tool as this is the only possible location where it is not inconvenient. Under no circumstances will more than one cross tie bar be located 85 at the top of the machine.

Although a tie bar 20 has been shown located longitudinally of the bed frame and cut off or shortened for convenience, it is to be understood that a longitudinal tie bar 90 could be located on the outside of the bed frame at any other suitable point and be included in the scope of the present invention.

What is claimed is:

1. The combination with the bed frame of 95 a forging machine having a feed gap in one end, a tool-carrying heading slide movable toward and from the gap, and gripping dies for receiving stock from the gap and holding it in the path of the slide and tool, of 100 means for reinforcing the bed frame transversely against strains resulting from forging operations, said means including lower tie bars extending transversely through and connected at their ends to the bed frame and 105 an upper transverse tie bar connected to the side portions of the bed frame and positioned back from the feed gap and the gripping dies, all of said tie bars being parallel and defining a triangular area in which are 110 located the cooperating portions of the dies and tool all of the bars being substantially at right angles to the path of movement of the heading slide.

2. In a forging machine a bed frame hav- 115 ing a feed gap in one end and cooperating forging elements in the bed frame, and transverse tie bars connected to the sides of the frame, said bars being parallel to each other and the bed frame and defining a triangular 120 area within which are located the cooperating portions of the forging elements, the apex portion of the area being located above but back from the gap and over the space between the active portions of the forging 125 elements and the center of said area being positioned substantially at the point where the forging is shaped by said elements.

3. In a forging machine a bed frame hav- 130 ing a feed gap in one end and gripping and

heading elements, of a single transverse tie bar located above the bed frame and connected to the sides thereof, said bar being located adjacent to a point above the cooperating faces of the gripping and heading elements, and additional transverse tie bars connected to the sides of the frame and located below the top of the bed frame, the top tie bar and the lower tie bars being parallel and cooperating to define a substantially triangular area adjacent to the center of which are located the active portions of the gripping and heading elements, said bars being substantially at right angles to the path of movement of the heading element.

4. A metal working machine including a one-piece bed frame having a feed gap in one end, gripping element movable transversely relative to the gap, a heading element movable in the direction of the length of the gap, a single tie bar located above the bed frame and connected to the sides thereof, said bar being located over the space between the cooperating faces of the gripping and heading elements and extended transversely of the bed frame, and additional tie bars connected to the sides of and extending transversely through the bed frame below the top thereof, the top tie bar and the lower tie bars being parallel with each other, substantially parallel with the path of movement of the gripping element, and substantially at right angles to the path of movement of the heading element, all of said tie bars cooperating to define a triangular area extending transversely of the bed frame adjacent to the center of which area are located the cooperative work engaging portions of the gripping and heading elements.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature.

WILLIAM L. CLOUSE.

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