Oct. 11, 1932. H. E. MORTON 1,882,158

BRACING MEANS FOR SHAPER RAMS

Filed March 13, 1930 2 Sheets-Sheet 1

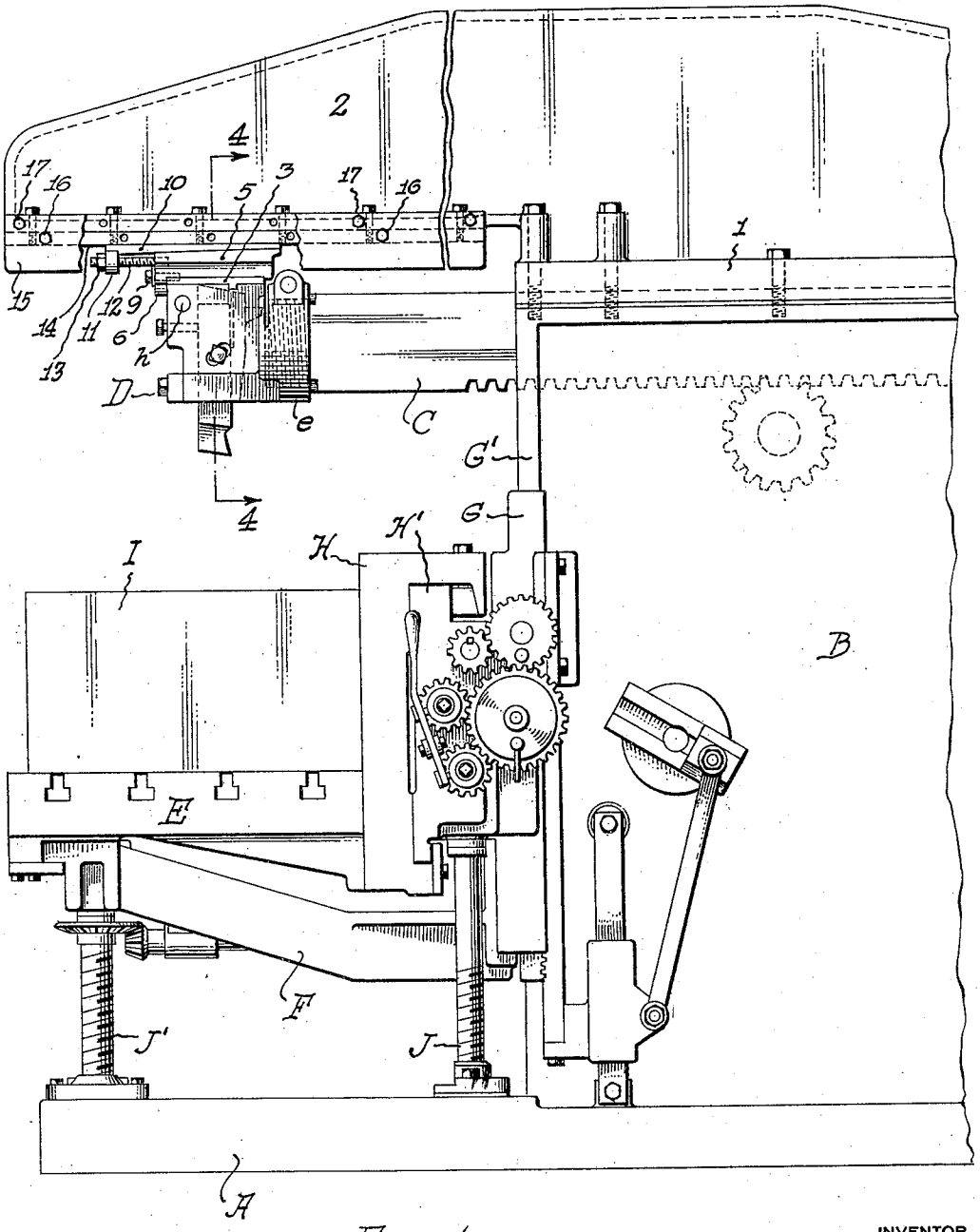


Fig. 1.

INVENTOR

Henry E. Morton,

BY

ATTORNEYS

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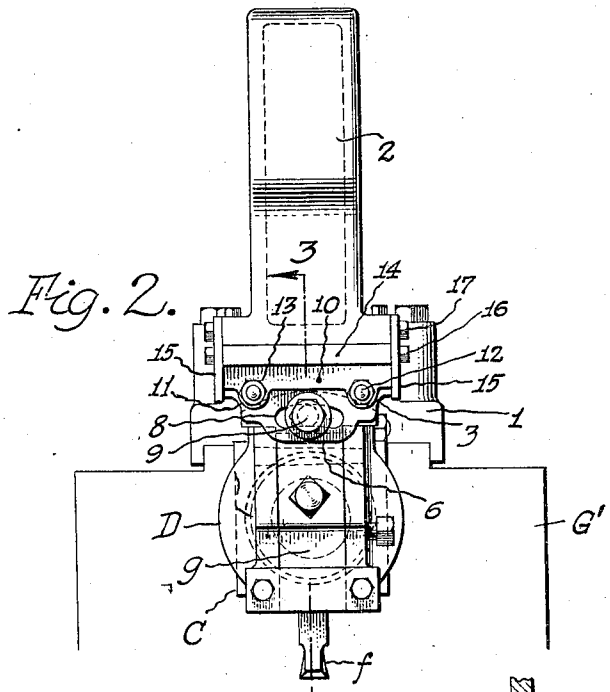


Fig. 2.

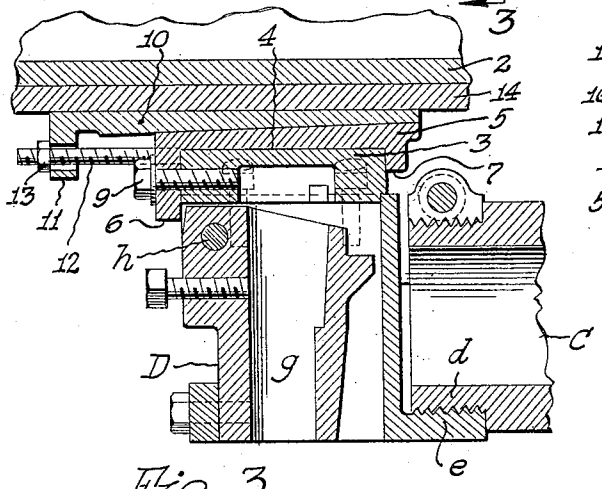


Fig. 3.

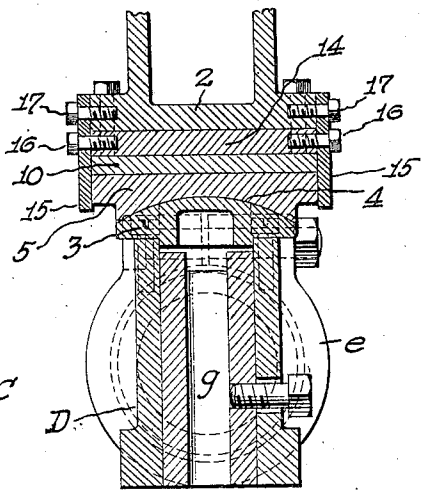


Fig. 4.

INVENTOR

Henry E. Morton,

BY

ATTORNEYS

Patented Oct. 11, 1932

1,882,158

UNITED STATES PATENT OFFICE

HENRY E. MORTON, OF MUSKEGON HEIGHTS, MICHIGAN

BRACING MEANS FOR SHAPER RAMS

Application filed March 13, 1930. Serial No. 435,621.

This invention relates to that class of metal working machines known as draw-cut shapers and particularly to those machines designed for very heavy work and employing a reciprocable ram supported at one end with its tool carrying end in overhanging relation to the work.

In this type of machine it has been found that there is liable to be a slight deflection of the ram under the very heavy strain imposed thereon during the cutting stroke, which deflection will affect the accuracy of the work, and the object of the present invention is to eliminate, in machines of this character, any possibility of such deflection. It is also an object to provide adjustable means for compensating for wear so that after long use, there will be no deflection of the ram due to such wear, and to provide an arrangement whereby such adjustment may be quickly and easily effected and will cooperate with either a fixed or rotatively adjustable tool carrying head on the ram, to effect such accurate adjustment.

With the above and other ends in view, the invention resides in the matters hereinafter set forth and more particularly pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a machine illustrative of an embodiment of the present invention;

Fig. 2 is an end elevation of the ram and adjacent parts;

Fig. 3 is a longitudinal section substantially upon the line 3—3 of Figure 2; and

Fig. 4 is a transverse section substantially upon the line 4—4 of Figure 1.

While the present invention is shown as applied to a draw-cut shaper of a particular construction such as that shown in my pending application filed January 25, 1928, Serial No. 249,282, it will be understood that the same may be applied to other shapers of this or of the push cut type designed for heavy work and including an overhanging ram subject to heavy lateral strains during the cutting stroke of the cutting tool carried by the free end thereof.

In the drawings, A indicates a suitable base for the machine, B the upright pedestal or body on the base provided with suitable bearings, not shown, at its upper end for a horizontally reciprocable ram C which ram is supported in said bearings on the pedestal at one end only, with its free end provided with a cutting tool carrying head indicated as a whole by the letter D in overhanging relation to a work supporting table E. This work table is supported by a supporting frame F extending therebeneath, said frame being secured to a vertically movable rail G guided by vertical guides G′ on the pedestal B, and in turn carrying a horizontally reciprocable apron H which is adapted to be reciprocated upon and guided by guides H′ on said rail G in its horizontal movement transversely of said ram, said table being secured to and movable with said apron relative to said supporting frame F and rail G, the vertical face of said apron extending at right angles to the upper face of the table to properly locate work I secured in place upon the table. The rail G and supporting frame F are rigidly supported and vertically adjusted by means of vertical supporting screws J and J′ mounted on the base A with the screws J supporting the rail and the screws J′ beneath the free end of the frame F.

As fully disclosed in said application above referred to, motion is transmitted from the drawing parts of the shaper for moving said table either vertically or horizontally with either a continuous or intermittent feed motion, such motion transmitting means being indicated in part as carried by said rail and in part, as mounted upon the adjacent part of said pedestal, but as said motion transmitting means forms no part of the present invention, the same is not fully shown in the accompanying drawings or described herein.

To provide an absolutely rigid abutment or backing for the projecting end of the ram so that it can not yield in the slightest under the extremely heavy strains imposed thereon during the cutting stroke of the ram, a cap member or head 1 is bolted or otherwise rigidly secured to the upper end of the pedestal B, or if found practicable to do so, may be formed integral with the pedestal, and this

cap member is formed with a laterally projecting portion or nose 2 which extends parallel with and in spaced relation to the upper side of the ram C to a point beyond the extreme outer end of the stroke of said ram, so that by providing a suitable filler between the tool carrying head D of the ram and a suitable guide on the lower side of the member 2, said head is backed up by said member throughout the stroke of the ram, said filler sliding along said way with the movement of the ram.

The tool carrying head D is of the usual construction, it being attached to the reduced and screw-threaded end *d* of the ram by a split and internally screw-threaded collar *e* on the head so that this head may be adjustably rotated upon the ram to set the tool *f* at an angle or swing it from side to side for performing certain operations, and said tool is secured within a socket member *g* which is pivotally supported in a slot in the head by means of a pivot pin *h* so that upon the idle or outstroke of the ram said holder may swing to relieve the tool upon that stroke, the swinging of said holder in an opposite direction or upon the working stroke of the ram, being limited to cause the tool to engage the work and take a cut therefrom, all being constructed and arranged in an old and well known manner.

Seated upon and rigidly secured in any suitable manner to the upper end of the head D is a seat block 3 and this block is formed with an upper seating surface 4 which is curved transversely of the head concentric with the axis about which the head is rotated upon the end of the ram for purposes of adjustment. A lower wedge member 5 is formed at its lower side with a correspondingly curved seating surface to seat upon the surface 4 of the block 3, and this wedge member is provided with end lips 6 and 7 to engage the ends of the block 3, the lip 6 being provided with a slot 8 curved in the direction of its length and through which slot a bolt 9 extends and is screwed into a screw-threaded opening in the adjacent end of the block 3. The seat block 3 may therefore swing with the head D relative to the wedge member 5 when said head is adjusted rotatively upon the ram, and the block and wedge member then locked in their relative positions by means of the bolt 9.

The upper flat surface of the wedge member 5 is inclined in the direction of its length or longitudinally of the ram and seated upon this inclined surface is an upper wedge member 10 having a lower surface which is inclined in the direction of the length of the member to seat upon the correspondingly inclined upper surface of the wedge 5, said member 10 being of greater length than the member 5 and provided at its end projecting beyond the lower wedge, with a downwardly extending lip 11 having openings therein through which bolts 12 firmly pass, and are anchored at their opposite ends in the member 5, nuts 13 being provided on the outer ends of said bolts to engage the outer side of said lip so that by turning up the nuts, the two wedge members may be shifted relatively in a longitudinal direction, the wedge 10 being thus driven in between the wedge 5 and a wear plate 14 secured upon the lower face of the nose or abutment member 2 extending substantially the full length of said face and secured in place between guide plates 15 by screw bolts 16 passing therethrough and into the edges of said plate 14, said guide plates being secured to the side edges of the nose member by screw bolts 17. These guide plates are of a width to extend down into contact with the side edges of the wedge members 5 and 10, thus forming a guide channel or way within which the wedges are guided as they are reciprocated therein with the tool carrying head upon reciprocation of the ram.

These wedge members 5 and 10 thus form an adjustable bearing for the head D upon the lower side of the nose member 2, and wear may be quickly compensated for by adjusting said wedge members relatively, and the nose or abutment 2 thus forms a rigid track for the head D regardless of the position to which it is rotatively adjusted upon the end of the ram and takes the heavy thrust of the cutting tool during the working stroke, so that the possibility of the ram yielding or springing upwardly under such heavy strains, is obviated as is also any yield or slight movement of the tool away from the work, due to wear of the parts or in the bearing for the ram.

Having thus fully described my invention, what I claim is:—

1. The combination with a metal working machine having a longitudinally reciprocable ram supported adjacent one end with its cutting tool carrying end in overhanging relation to work, of a rigid member extending throughout the length of the stroke of said ram longitudinally thereof and in spaced relation thereto and at the side thereof in the direction of the lateral thrust thereon of a tool carried by said ram and having a longitudinal guide, and a tool carrying head carried by the unsupported end portion of said ram to move therewith and guided by said guide in contact with said member to prevent said ram from yielding laterally in the direction of the lateral thrust of the tool thereon carried by said head.

2. The combination with a metal working machine having a body and a horizontally reciprocable ram supported by said body with its cutting tool carrying end projecting laterally from said body and unsupported, of a member rigidly supported by said body and extending laterally therefrom longitudinally of said ram at the side of said ram in the

direction of lateral thrust of a tool carried by said ram and extending in spaced relation to said ram and to the extreme outer end of the stroke of said ram, and separate bearing means carried by the unsupported end of said ram in sliding engagement with said member, said bearing means including relatively adjustable members for expanding said bearing means between said ram and member to compensate for wear.

3. The combination with a metal working machine having a body and a horizontally reciprocable ram supported by said body with its cutting tool carrying end projecting laterally from said body and unsupported, of a member rigidly supported by said body and extending laterally therefrom longitudinally of said ram in spaced relation thereto and to the extreme outer end of the stroke of said ram, a tool carrying head on said ram, and bearing means carried by said head to engage and slide along said member upon reciprocation of said ram, said bearing means including relatively adjustable members for expanding said bearing means between said head and member.

4. The combination with a metal working machine having a body and a horizontally reciprocable ram supported by said body with its cutting tool carrying end projecting laterally from said body and unsupported, of a member rigidly supported by said body and extending laterally therefrom longitudinally of said ram in spaced relation thereto and to the extreme outer end of the stroke of said ram, a tool carrying head adjustable rotatively upon said ram, a guideway extending along the lower side of said rigid member, and bearing means mounted upon said head to move with said ram along said guideway and in engagement with which said head is rotatively adjustable.

5. The combination with a metal working machine having a body and a horizontally reciprocable ram supported by said body with its cutting tool carrying end projecting laterally from said body and unsupported, of a member rigidly supported by said body and extending laterally therefrom longitudinally of said ram in spaced relation thereto and to the extreme outer end of the stroke of said ram, a tool carrying head rotatively adjustable upon the unsupported end of the said ram, bearing means interposed between said head and said rigid member and including a block secured to said head and formed with a surface curved concentric with the axis of rotation of said head on said ram and a member formed with a curved bearing surface to seat upon said curved surface of said block.

6. The combination with a metal working machine having a body and a horizontally reciprocable ram supported by said body with its cutting tool carrying end projecting laterally from said body and unsupported, of a member rigidly supported by said body and extending laterally therefrom longitudinally of said ram in spaced relation thereto and to the extreme outer end of the stroke of said ram, a tool carrying head upon the unsupported end of said ram, and bearing means interposed between said head and rigid member, said means including relatively and longitudinally movable wedge members and means for moving said wedge members relatively.

In testimony whereof I affix my signature.

HENRY E. MORTON.