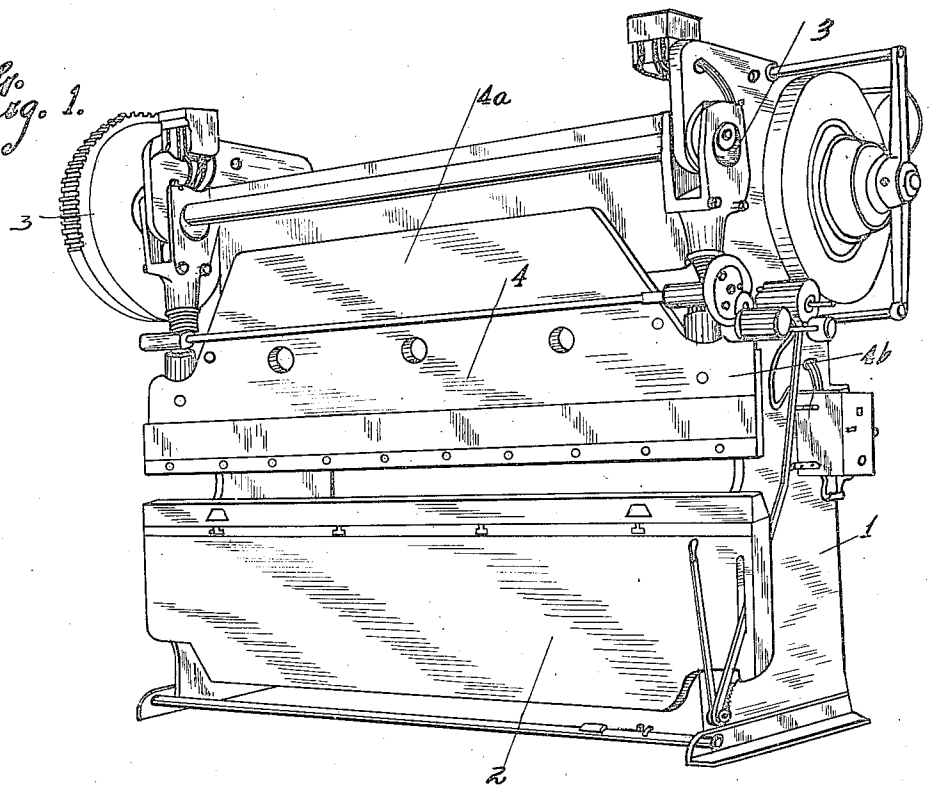
Feb. 2, 1932. R. T. HAZELTON 1,843,362

BACK BRACE FOR MACHINE TOOL RAMS

Filed Nov. 29, 1929 3 Sheets-Sheet 1

Fig. 1.



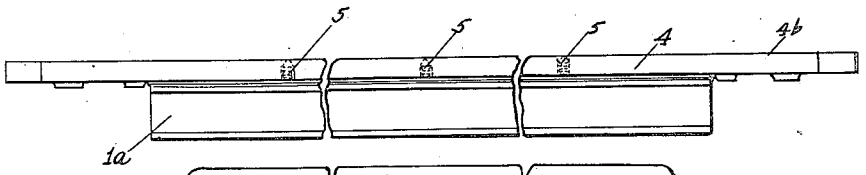


Fig. 2.

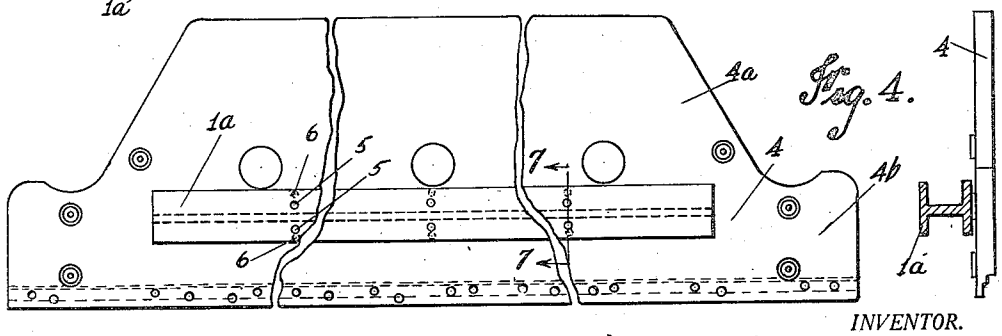


Fig. 4.

Fig. 3.

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Feb. 2, 1932. R. T. HAZELTON 1,843,362

BACK BRACE FOR MACHINE TOOL RAMS

Filed Nov. 29, 1929 3 Sheets-Sheet 2

Fig. 5

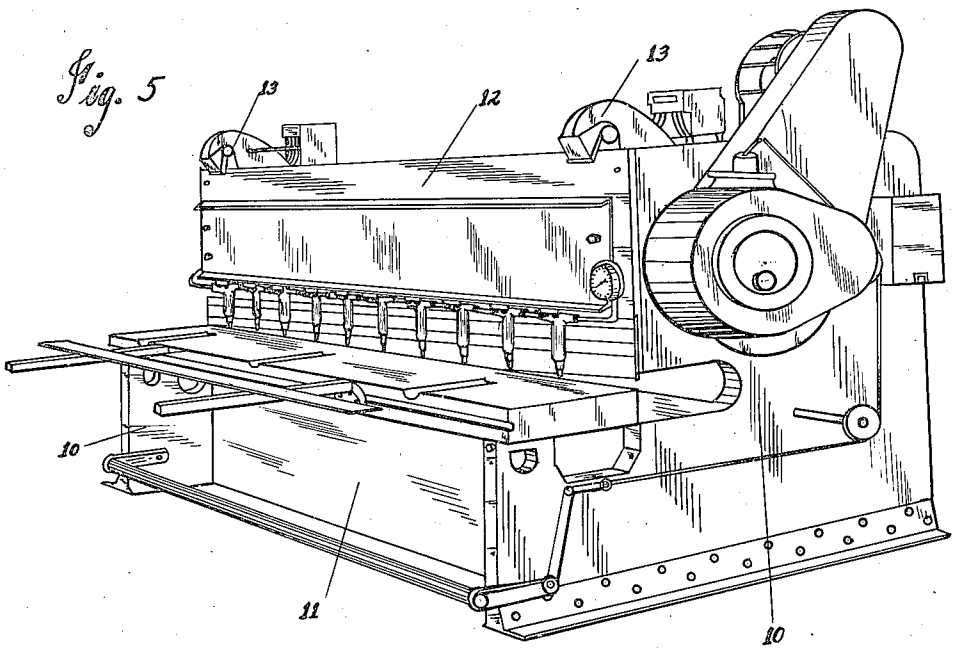


Fig. 6.

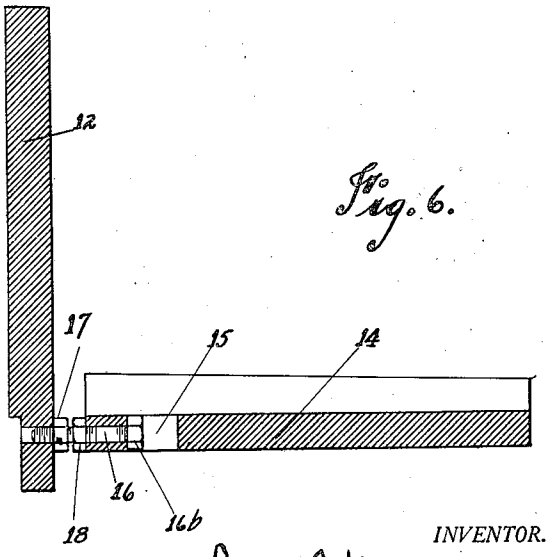
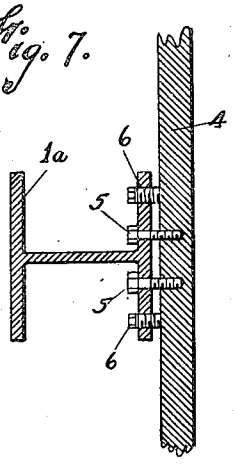


Fig. 7.



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Feb. 2, 1932. R. T. HAZELTON 1,843,362

BACK BRACE FOR MACHINE TOOL RAMS

Filed Nov. 29, 1929 3 Sheets-Sheet 3

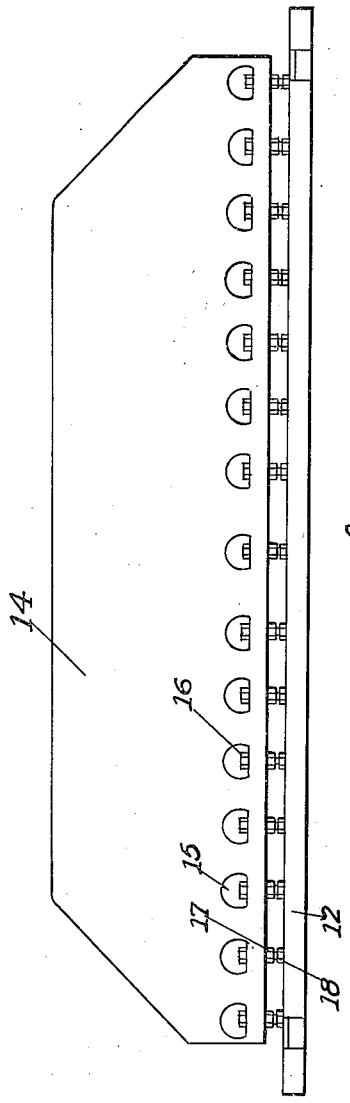


Fig. 9

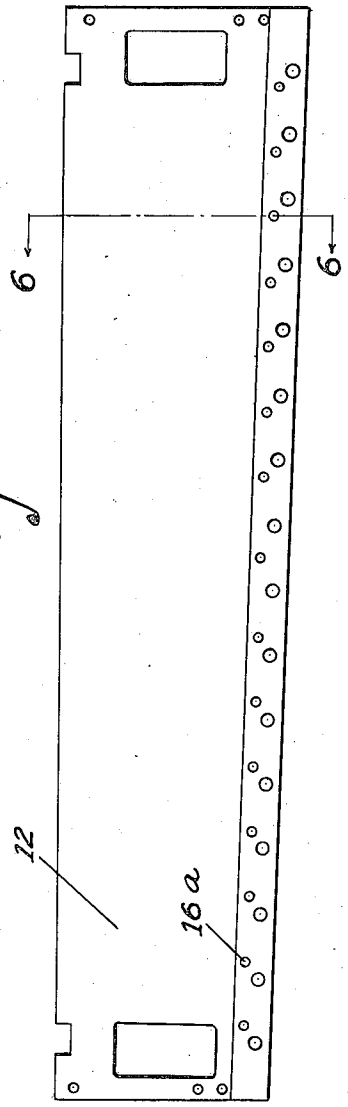


Fig. 8

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UNITED STATES PATENT OFFICE

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BACK BRACE FOR MACHINE TOOL RAMS

Application filed November 29, 1929. Serial No. 410,436.

My invention relates to back braces for the rams in machine tools such as the rams in press brakes and shears.

In the application of great force to the rams in such machines as shears and brakes, there is a great force developed tending to cause deflections of the ram bodies out of a true straight line position. This tendency is resisted by back braces which are designed to possess greatest strength against deflection in the direction of lateral bending of the rams.

The rams themselves also become permanently bent out of a straight line due to various causes, and the operation of a shears, for example with a ram which is bent even very slightly, is not satisfactory.

It is the object of my invention to provide a back brace for rams which, instead of being welded to the rams or fixedly secured thereto, is held in place by means of suitable attaching means interspaced along the connecting zone, which attaching means are adjustable so that any slight permanent bends in the rams can be straightened out.

I have illustrated two forms of my back brace, one as applied to a shears and one as applied to a press brake. These devices have the essential features of my device in common, and I prefer the arrangement shown in each instance for the type of machine with which its use is illustrated. The arrangements, however, are to a degree interchangeable, and the description of the two uses is intended to fully develop at least two of the many possible structures which will serve the purpose and accomplish the objects of my invention.

In the drawings:—

Figure 1 is a perspective view of a press brake.

Figure 2 is a top plan view of the ram thereof.

Figures 3 and 4 are rear and side elevations of the said ram.

Figure 5 is a perspective of a shears.

Figure 6 is a section of the shears ram on the line 6—6 of Figure 8.

Figure 7 is a section of the brake ram on the line 7—7 of Figure 3.

Figure 8 is a rear elevation of the shears ram without a plate.

Figure 9 is a top plan view of the shears ram.

In Figure 1 is shown a press brake in which the side housings are shown at 1, the bed at 2, the operating devices for the ram at 3, 3, and the ram itself at 4. The ram in this case is formed with a central portion 4*a* of considerable depth for stiffness, which has lateral projections 4*b*, to which projections the ram operating devices are suitably secured.

The back brace for the ram is arranged to lie across the back of the ram, generally paralleling the working edge of the tool bar thereon, and traversing at least the distance of the deeper portion of the ram and lying near the lower end of the ram.

In this case the back brace is formed of a metal beam 1*a* of H-section, and the mode of mounting it upon the back of the ram is best shown in Figure 7. The bolts 5, 5 extend through the base of the H-section beam and thread into the back of the ram. The set screws 6, 6 extend through the base of the beam and abut against the back of the ram. There are a series of these bolts and set screw arrangements across the ram, there being three shown in the drawings herewith, although more could be employed.

With the back brace bolted against the back of the ram, the stiffening feature of the back brace is fully effective. If the ram becomes distorted, the operator, by loosening some of the set screws and bolts and tightening others, can bend the ram back into shape, while maintaining the stiffening feature as effectively as before.

Referring next to the shears, I have shown a device having side housing 10, 10, a bed 11, and a ram 12. The ram is in this case actuated by pitmen 13, and moves up and down along vertical faces of the housings.

The back plate 14 in this instance is formed of a wide plate of metal of considerable depth projecting in a direction at right angles to the ram so as to resist lateral deflection of the ram. The plate parallels the shear blade on the ram, and hence is at a small

slant to the horizontal. It lies at the lower edge of the ram in order to be most effective.

The method of attaching the back plate in this instance, is different in structure but like in principle to that shown with relation to the press brake. The back plate is provided with a series of hand holes or apertures 15. Bolts 16 are set into these apertures so as to project through the edge of the backing plate and into the ram itself, which has holes 16*a* tapped to receive them. Nuts 18 are set over the bolts which bear against the back plate, and nuts 17 which bear against the face of the ram, or the nuts 17 can be fixed and the device now shown as a bolt head 16*b* may be used as a nut.

This construction is such that when mounted and in place, the plate serves as a suitable back brace, while the distortions which take place in the ram and would otherwise result in improper registration of the shear blades, can be eliminated by adjustment of the bolted connection.

Thus any bolt can be freed for adjustment and screwed further in or backed further out of the ram; whereupon the two nuts are tightened down to retain the bolts in their new position. When the nut 17 is fixed and, for example, welded to the ram, the same adjustment can be made by backing off or advancing the nuts 18 and 16*b*. This will place some of the bolts under tension and some under compression, whereas in the instance of the back brace for the brake ram, there are bolts under tension and under compression in each set of mounting bolts and screws. The resulting action is the same, however, and results in providing a back brace and at the same time permits of forcing the ram to assume a proper shape at its working end without in any wise destroying the backing up action.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In combination with a ram, a back brace therefor, and means for securing the brace to the ram, independently adjustable to space the brace and ram differently at different points along the brace.

2. In combination with a ram, a back brace therefor, bolts located at a series of points for securing the brace to the ram, and means for locking the bolted connection between ram and brace with the bolts in independent adjusted relation to said ram and brace.

3. In combination with a ram, a brace plate, a series of bolts located in the brace plate and threaded into the ram, for securing the ram and brace together, and nuts on the bolts engaging the brace for holding the ram and brace in adjusted relation.

4. In combination with a ram, a brace, bolts passing through one of said members and tapped into the other, there being a series of said bolts along the brace, and nuts for locking the bolts in adjusted position with relation to the said parts.

5. In combination with a ram, a brace, bolts passing through one of said members and tapped into the other, there being a series of said bolts along the brace, and nuts for locking the bolts in adjusted position with relation to the said parts, said brace having hand holes therein, and the bolts having their heads available for adjustment within the hand holes.

6. In a back brace for a ram, the combination with the ram of a brace extending along the ram, a series of means for securing the brace to the ram and spacing it therefrom, and means for independently adjusting the spacing feature of said securing means.

7. In a back brace for a ram, the combination with the ram of a brace secured to and extending along the ram, a series of spacing means extending between the brace and the ram and spacing the ram from the brace, said spacing means being independently adjustable to vary the spacing at a plurality of points, for the purpose described.

ROBERT T. HAZELTON.