Dec. 16, 1930. C. FASSINGER 1,785,116

DIE MECHANISM

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Fig. 1.

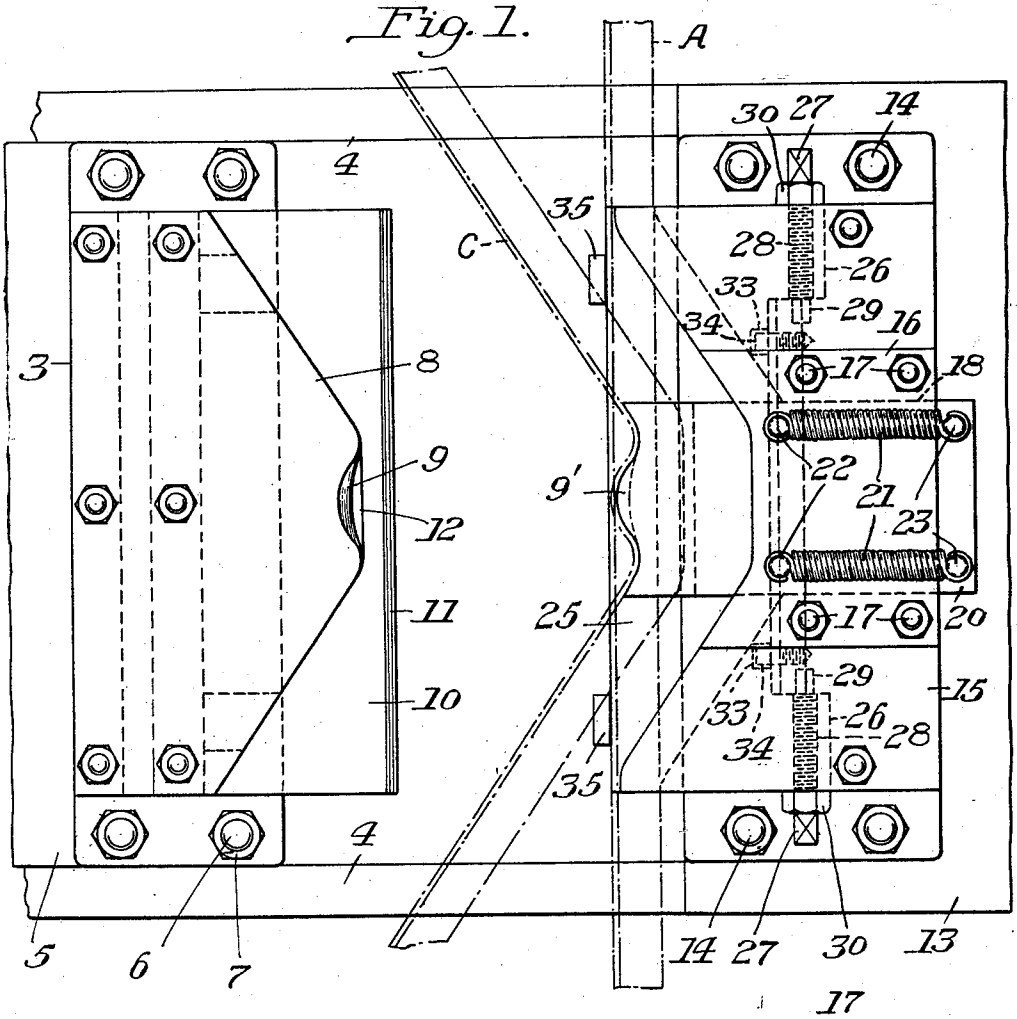
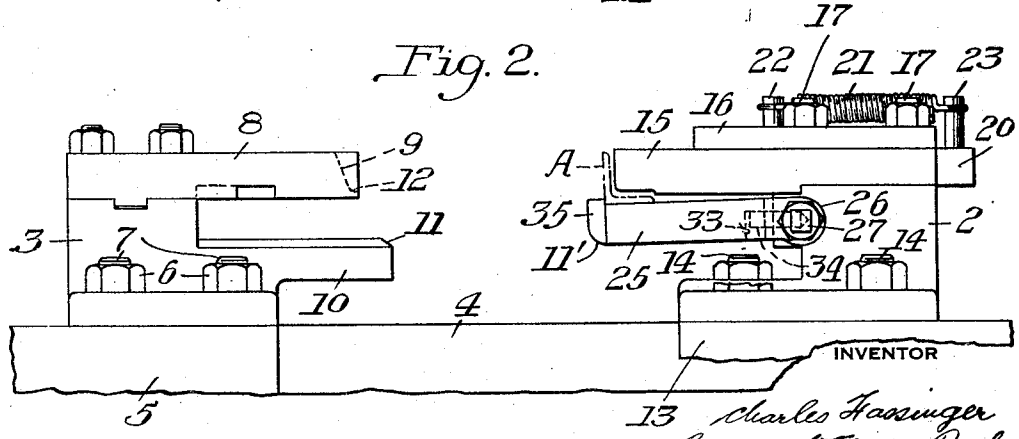


Fig. 2.



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Fig. 3.

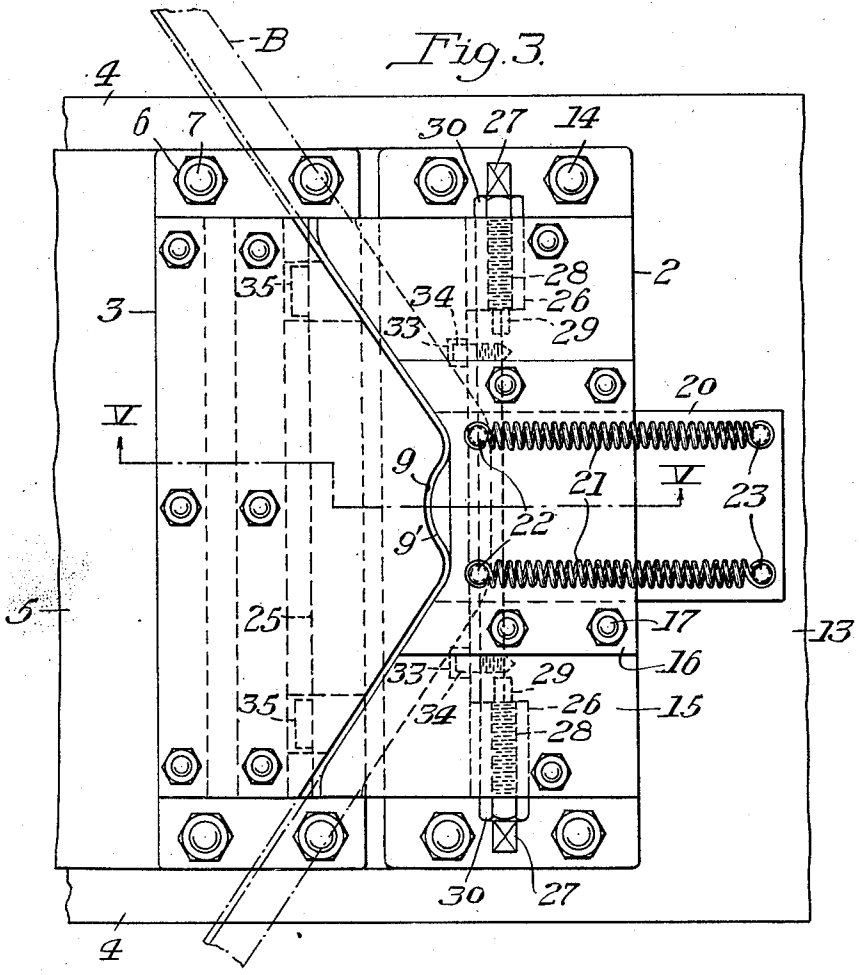
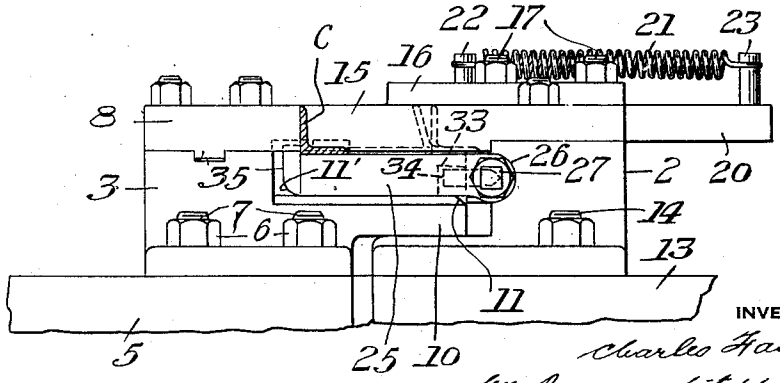


Fig. 4.



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DIE MECHANISM

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Fig. 5.

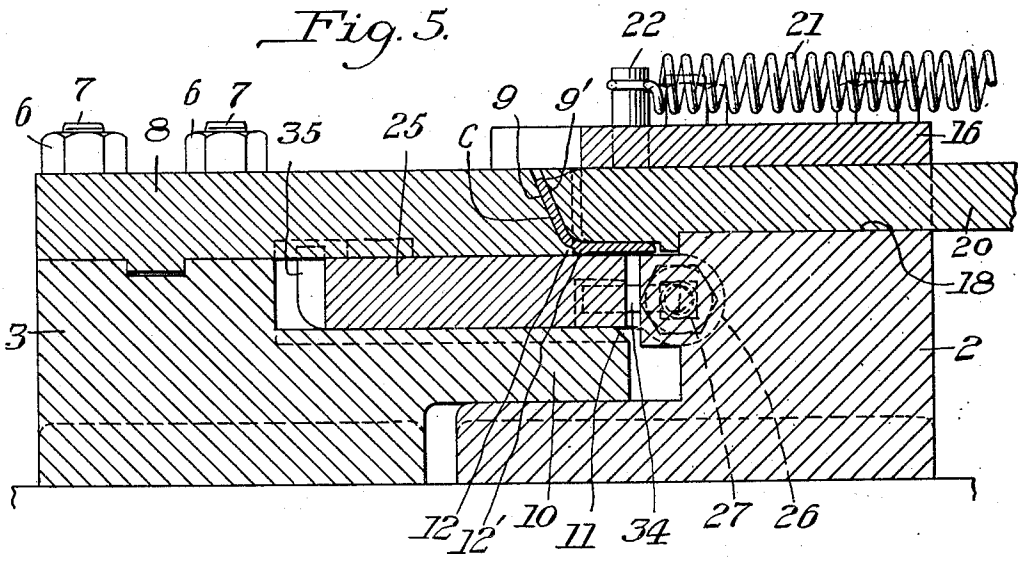


Fig. 6.

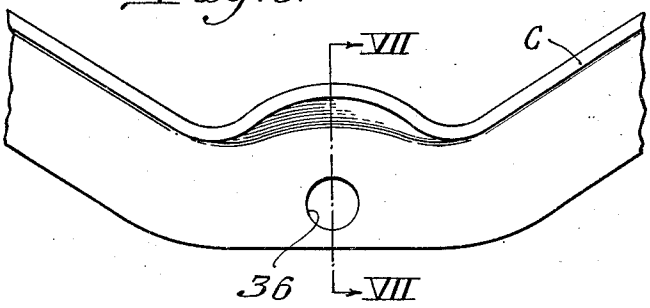


Fig. 7.

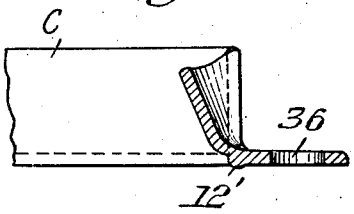
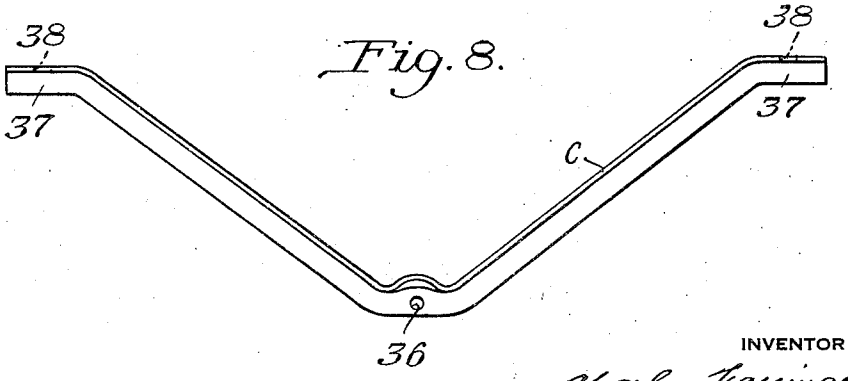


Fig. 8.



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Patented Dec. 16, 1930 1,785,116

UNITED STATES PATENT OFFICE

CHARLES FASSINGER, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO OLIVER IRON & STEEL CORPORATION, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

DIE MECHANISM

Application filed November 17, 1928. Serial No. 320,077.

This invention relates generally to dies and more particularly to dies especially adapted for bending structural shapes such as angle bars in order to form supports for cross arms commonly used to support cables.

In bending angle bars so as to make them suitable for supporting cross arms it is difficult to prevent buckling or warping of the flanges of the angle bars. This difficulty may be overcome by practicing my invention.

In accordance with my invention a straight angle bar is bent into a form suitable for supporting a cross arm. The angle bar is placed between dies so that one flange is in a horizontal position and the other flange is in a vertical position and the dies are then brought together to bend the angle bar into the desired shape. The tendency of the horizontal flange to buckle or warp during bending of the angle bar is overcome by holding the horizontal flange between members which maintain it substantially flat.

In the accompanying drawings which illustrate the present preferred embodiment of my invention Figure 1 is a partial plan view of the device showing the dies spaced apart.

Figure 2 is a side elevation of the device shown in Figure 1.

Figure 3 is a view similar to Figure 1 but showing the position of the dies after the angle bar has been bent.

Figure 4 is a side elevation of the device shown in Figure 3.

Figure 5 is a view in cross-section on the line V—V of Figure 3.

Figure 6 is an enlarged view showing a part of an angle bar support bent in accordance with my invention.

Figure 7 is a sectional view on the line VII—VII of Figure 6 and,

Figure 8 is a view of the complete angle bar support.

Referring to the drawings, the device comprises a stationary die 2 and a movable die 3. The movable die is arranged to slide toward and away from the stationary die within guides 4 of a bulldozer. Any usual or desired form of mechanism for moving the movable die toward and away from the stationary die may be employed, and as this means forms no part of my invention it is not described in detail. The movable die 3 is mounted on a base 5 by means of bolts 6 and nuts 7. The die 3 has a top plate 8 so formed as to bend the angle bar to the desired shape. The plate 8 is provided with a substantially cup-shaped portion 9, which cooperates with a projecting portion on the top plate of the stationary die in order to form the vertical flange of the angle bar into substantially a cup shape. The movable die also has a lower plate 10 arranged below the top plate 9 and extending toward the stationary die. The forward edge 11 of the plate 10 is beveled in order to co-operate when the dies are brought together with a hinge plate connected to the stationary die, in order to clamp the horizontal flange of the angle bar to prevent it from buckling.

The stationary die 2 which is secured to a base 13, as by means of bolts 14, is provided with a top plate 15. The top plate has a plate 16 secured thereto by means of bolts 17, and extends upwardly beyond the plate 15 to form a housing having an opening 18 in which a retractable slide 20 is arranged. The retractable slide is normally maintained in the position indicated in Figure 1 by means of springs 21 connected to bolts 22 and 23 secured respectively to the plate 16 and the retractable slide 20. The forward edge 9′ of the slide is shaped to cooperate with the cup-shaped portion 9 of the movable die in order to form the vertical flange of the angle bar to a substantial cup shape.

A hinge plate 25 is connected to the stationary die 2. As shown, the right hand end of the hinge plate is mounted in cylindrical recesses 26 provided in the die 2. Threaded pins 27 extend through screw threaded openings 28 in the side portions of the plate 25. Each of the pins 27 has a cylindrical projection 29 fitting into a recess formed in the die 2. The opposite ends of the pins 27 are squared and are provided with nuts 30 to maintain the pins in position. This arrangement provides a pivotal mounting for the hinge plate 25. The hinge plate has recesses 33 formed therein which are adapted to re-

ceive one end of pins 34. The opposite ends of the pins are secured in recesses provided in the die 2. The pins 34 limit the downward movement of the hinge plate 25.

In bending an angle iron to the shape shown in Figures 6, 7 and 8, the angle iron A is placed (see Fig. 1) on the hinge plate 25 and held in position by means of the lugs 35. The movable die 3 is then moved toward the stationary die 2. Before the cup-shaped portion 9 of the movable die reaches the angle iron, the beveled edge 11 of the plate 10 contacts with the rounded forward portion 11′ of the hinge plate 25, thereby moving it upward and wedging the horizontal flange of the angle iron between the top surface of the hinge plate and the bottom surface of the top plate 15. As the movable die continues to move forward the angle iron is gripped between the cup-shaped portion 9 of the movable die and the corresponding projecting portion 9′ of the retractable slide 20. The angle iron is bent and the slide moves to the right as shown in the drawings until, when the movable die has moved to its ultimate position, the slide and the dies assume the positions indicated in Figure 3. In this position the springs 21 are stretched out of their normal position. During the bending operation the horizontal flange of the angle iron is gripped between the slide 20 and the hinge plate 25 from the moment that the cup-shaped portion 9 contacts with the angle iron. The middle portion of the angle iron while gripped, slides over the top surface of the hinge plate until the angle iron assumes the position B, indicated in Figure 3 and the cup-shaped portion of the angle iron is formed. The lower, forward edge of the top plate 8 of the movable die is formed with a shoulder 12. If it were formed at a sharp angle it would not stand up in use. During the bending operation the shoulder 12 causes a portion of the metal adjacent the horizontal flange to flow, thereby forming a bead 12′. The movable die is then moved to the left as viewed in Figure 1 and the retractable die under the influence of the springs 21 force the slide 20 forward so as to dispose the bent angle iron in the position indicated by C in Figure 1.

The bent angle iron is then removed from the die and if desired a hole 36 is formed in the horizontal flange for connecting the support to a pole. The ends 37 of the support are then bent, as shown in Figure 8, and holes 38 are punched therein for the reception of screws to connect the cross arm and support.

By the provision of means for gripping the horizontal flange and maintaining it flat during bending of the angle iron, warping or buckling of the angle iron is prevented. In accordance with my invention an angle iron or other structural shape is bent to the desired form and during the bending a cup-shaped portion is formed in one of the flanges of the angle iron so as to provide sufficient room for the reception and tightening of a bolt and nut used to secure the support to the pole.

I have illustrated and described the present preferred embodiment of my invention. It is to be understood however, that it may be otherwise embodied without departing from the spirit of the invention or the scope of the following claims.

I claim:

1. A die mechanism for bending structural shapes, which comprises a plurality of dies, means for causing relative movement of said dies toward and away from each other, and means including a hinge plate and a spring-controlled slide for preventing warping of the shapes during bending.

2. A die mechanism for bending angle bars, which comprises a plurality of dies, means for causing relative movement of said dies toward and away from each other, a hinge plate connected to one of said dies, and a spring-controlled slide associated with said last mentioned die, said hinge plate and slide preventing warping of the angle bar during bending.

3. A die mechanism for bending angle bars, which comprises a plurality of dies, means for causing relative movement of said dies toward and away from each other, a hinge plate connected to one of said dies, a slide associated with said last mentioned die, said hinge plate and slide being adapted to grip opposite surfaces of a flange of the angle bar to prevent warping thereof during bending and means urging said slide in a direction to free the bent bar as the dies are drawn apart.

4. A die mechanism for bending angle bars, which comprises a plurality of dies, means for causing relative movement of said dies toward and away from each other, a hinge plate connected to one of said dies, a slide associated with said last mentioned die, means cooperating with said hinge plate as the dies approach each other for causing the hinge plate to wedge a flange of the angle bar between said hinge plate and slide to prevent warping of the flange during bending.

5. A die mechanism for bending angle bars, which comprises a plurality of dies, means for causing relative movement of said dies toward and away from each other, a hinge plate connected to one of said dies, a slide associated with said last mentioned die, means secured to the other die for cooperation with said hinge plate as the dies approach each other for causing the hinge plate to wedge a flange of the angle bar between said hinge plate and said slide to prevent warping of the flange during bending.

6. A die mechanism for bending angle

bars, which comprises a stationary die and a movable die, means for moving said movable die toward and away from said stationary die, a hinge plate connected to said stationary die, a retractable slide associated with said stationary die, and resilient means tending to force said slide toward said movable die.

7. A die mechanism for bending angle bars, including two dies, means for causing relative movement of the dies toward and away from each other, a hinge plate connected to the first die, a slide mounted on said first die, said slide and hinge plate being arranged to grip opposite surfaces of a flange of the bar to prevent warping, means on the second die for swinging the hinge plate toward the slide to wedge the bar as the dies are brought together, and means urging the slide toward the second die to free the bent bar when the dies are drawn apart.

8. A die mechanism for bending angle bars, including two dies, means for causing relative movement of the dies toward and away from each other, a hinge plate connected to the first die, a slide mounted on the first die above the hinge plate, means on the second die for raising the hinge plate toward the slide to grip a flange of the bar therebetween as the dies are brought together, and means urging the slide toward the second die to free the bent bar when the dies are drawn apart.

In testimony whereof I have hereunto set my hand.

CHARLES FASSINGER.