May 13, 1952 E. A. SKOWRON 2,596,734

RAIL CLIP FORMING MACHINE

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Fig. 1

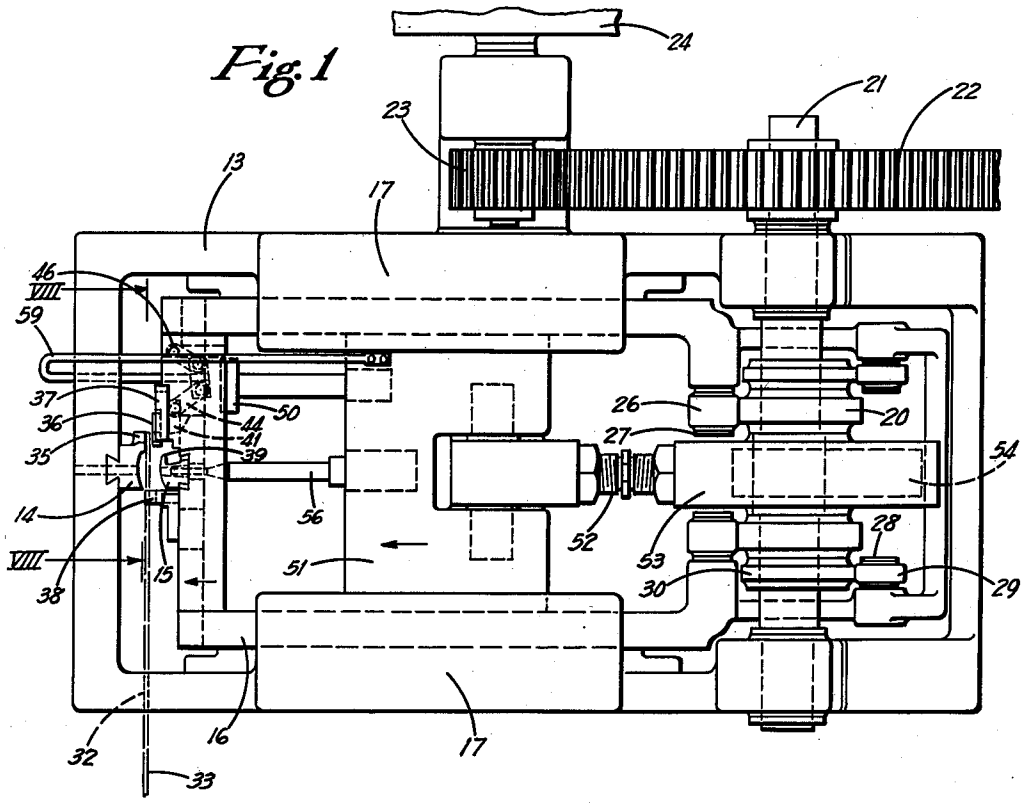
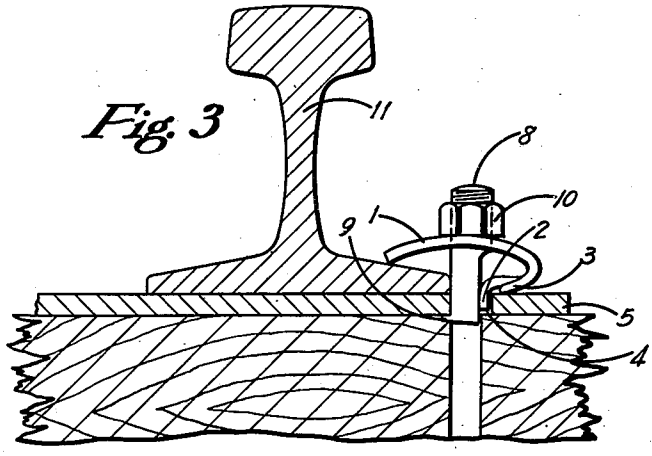


Fig. 3



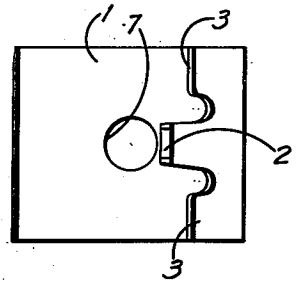


Fig. 2

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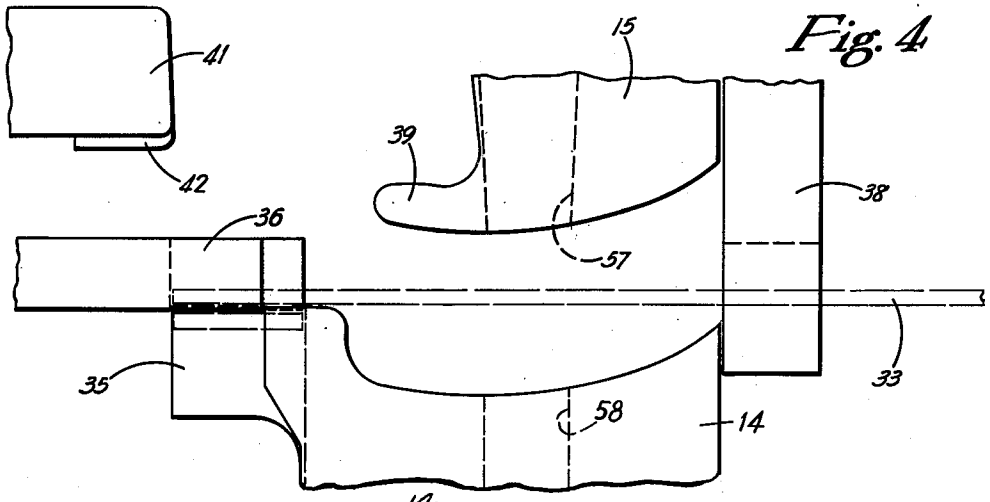


Fig. 4

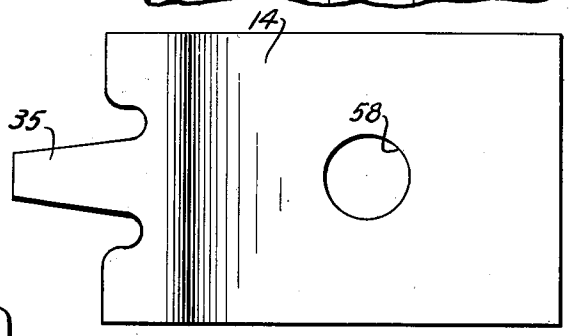


Fig. 10

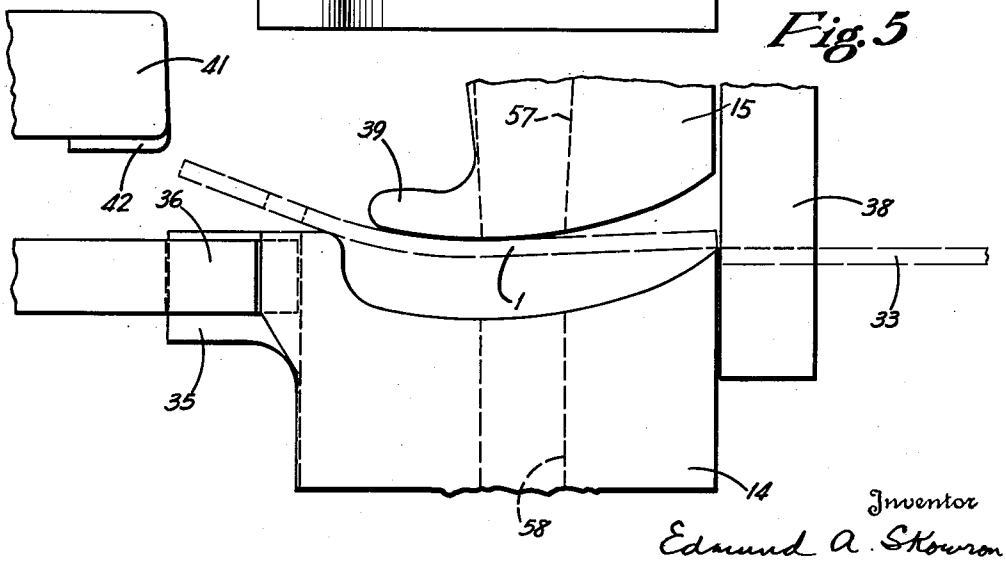


Fig. 5

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RAIL CLIP FORMING MACHINE

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Fig. 6

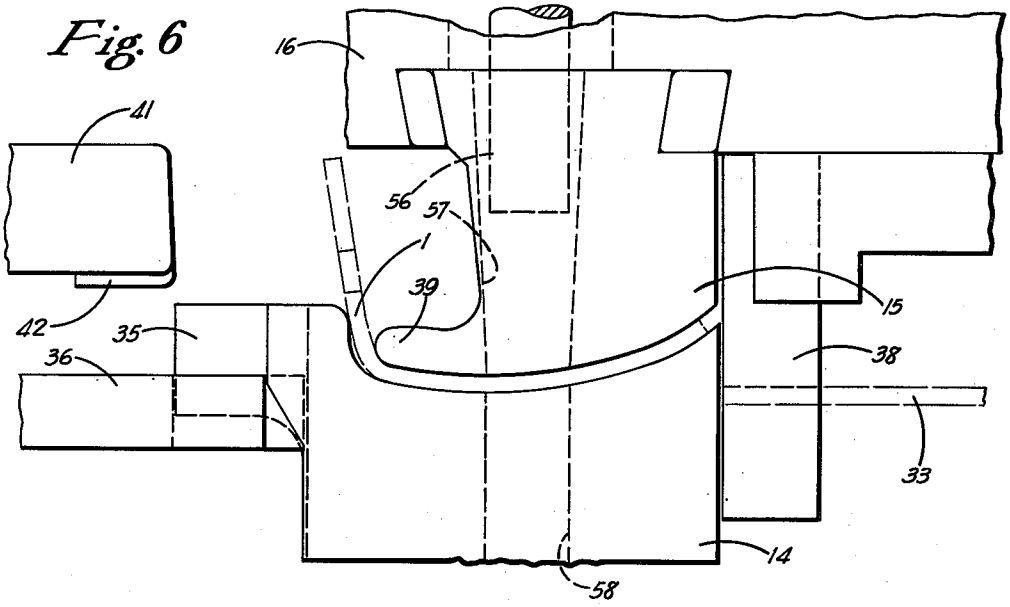
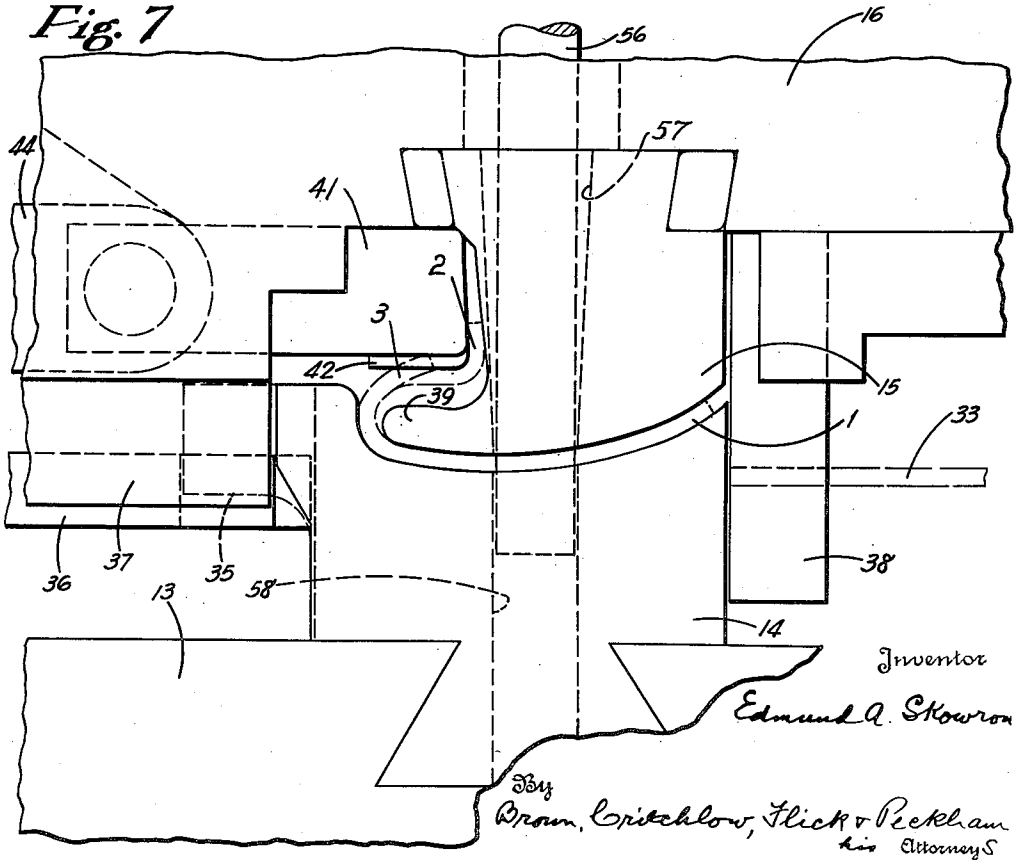


Fig. 7



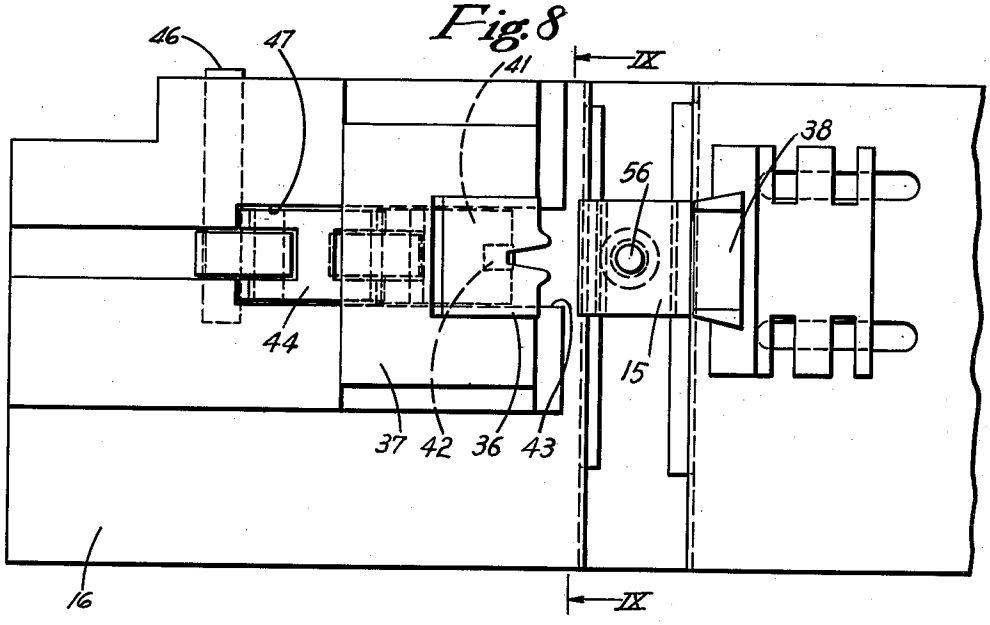
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RAIL CLIP FORMING MACHINE

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Fig. 8



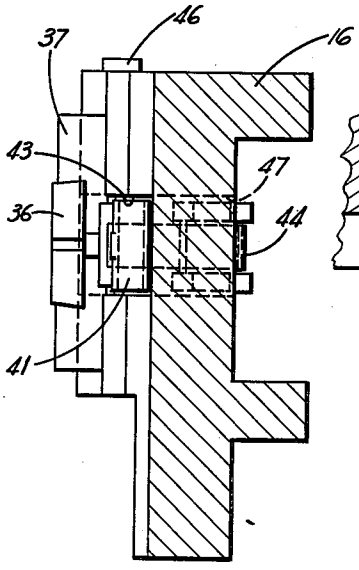


Fig. 9

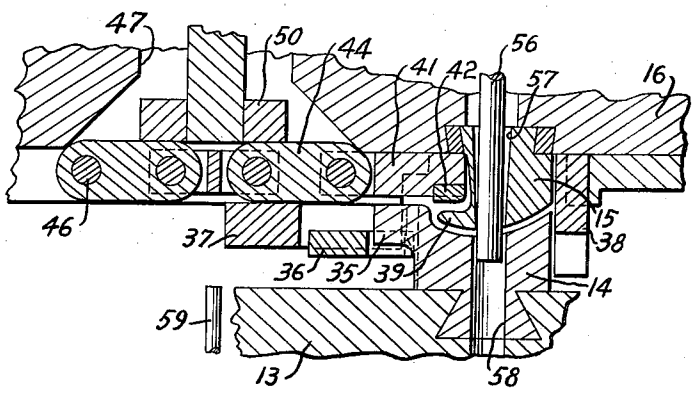


Fig. 11

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UNITED STATES PATENT OFFICE

2,596,734

RAIL CLIP FORMING MACHINE

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Application July 16, 1947, Serial No. 761,313

2 Claims. (Cl. 153—34)

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This invention relates to apparatus for forging from metal plates rail clips, each of which has a curved body with ends adapted to engage a rail base flange and a tie plate, and one end of the clip being bent downwardly and inwardly and terminating in a central downturned tongue adapted to project into a spike hole in the tie plate.

It is among the objects of this invention to provide forging apparatus by which rail clips of this type can be formed in rapid succession and in a single operation per clip.

The preferred embodiment of the invention is illustrated in the accompanying drawings in which Fig. 1 is a plan view of my forging apparatus; Fig. 2 is a bottom view of a rail clip forged by this apparatus; Fig. 3 is a vertical section through a rail and die showing such a clip in rail-retaining position; Figs. 4, 5, and 6 are enlarged fragmentary plan views of the elements that shape the clip, shown in successive positions; Fig. 7 is a view similar to those of the preceding group, but more complete and showing the clip completely formed; Fig. 8 is an enlarged front end view of the machine carriage taken on the line VIII—VIII of Fig. 1; Fig. 9 is a vertical section taken on the line IX—IX of Fig. 8; Fig. 10 is a view of the inner face of the concave die; and Fig. 11 is a horizontal section through the toggle mechanism shown in Fig. 8.

In accordance with this invention shears are provided for forming a central tongue on one end of a metal plate, preferably cut from a bar being fed into the machine intermittently. Relatively movable concave and convex dies bend the plate between them to provide it with a longitudinally arched body having its tongue-carrying end projecting from between the dies. In the preferred form the concave die is stationary, while the convex die with shear blades on opposite sides of it move toward and away from the stationary die. The convex die has a lateral projection extending toward the tongue on the plate, and suitable means forced in from the side bends the projecting portion of the plate back around the die projection and also bends the tongue substantially perpendicularly away from the adjoining portion of the plate. The two dies are provided with aligned passages in which a punch travels for punching a hole in the center of the plate so that a fastening member may extend through the clip for holding it in position on a rail.

Referring to Figs. 2 and 3 of the drawings, it will be seen that the spring clip formed by the apparatus disclosed herein has a longitudinally arched body 1 provided at its outer end with a

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downwardly and inwardly bent portion that terminates in a central tongue 2 between a pair of ears 3. The tongue is bent down and projects into the usual spike hole 4 in the tie plate 5. The ears beside the tongue press down on the tie plate. Directly above the tie plate hole the curved body of the clip is provided with a central opening 7 through which a suitable fastening member extends. This member may take the form of a bolt 8 having a laterally projecting integral lug 9 at its lower end projecting beneath the tie plate. The bolt is reduced in cross section by cutting away one side so that it can extend through the tie plate hole beside the tongue of the clip. A nut 10 is screwed on the upper end of the bolt to hold the clip in position. The pressure of the inner end of the clip on the rail 11 can be controlled by the distance that the nut is screwed down on the bolt.

As shown in Fig. 1, the apparatus for forming this clip includes a generally rectangular frame or base 13 the front end of which supports a concave die 14. Cooperating with this die is a convex die 15 carried by a frame-like carriage or support 16 reciprocable lengthwise in frame 13 between guide plate 17 secured to opposite sides of the frame. This carriage is moved forward toward the concave die by means of cams 20 rigidly mounted on a shaft 21 journaled in the rear of the frame and driven through a gear 22 and pinion 23 by a motor 24. The cams engage rollers 26 journaled on stub shafts 27 projecting inwardly from the sides of the carriage. To move the carriage away from the concave die, the rear portion of the carriage is provided with inwardly projecting stub shafts 28 on which are journaled rollers 29 which are engaged by a set of cams 30 rigidly mounted on drive shaft 21. The carriage therefore is positively reciprocated by the cams in both directions. One side of frame 13 is provided with a slot 32 extending horizontally through it and through which a metal stock bar 33 is fed forward between the dies intermittently by any suitable means (not shown). The width and thickness of this bar, which is disposed on edge, corresponds to the width and thickness of the rail clips that are formed from the plates cut from the bar.

The side of the stationary concave die farthest from frame slot 32 is provided with an integral projection 35 that forms the stationary element or blade of a shaping shear. As shown in Fig. 10, this shear element corresponds in shape to the tongue and ears that are formed on the rail clip. As shown in Fig. 1, the inner end of the

stock bar is located between this stationary shear element and a shear blade **36** mounted in a block **37** secured to the front end of carriage **16**. As shown in Fig. 8, the shape of this blade is complementary to the shape of projection **35** so that they will cut the tongue and ears on the inner end of the bar disposed between them (Fig. 4).

The opposite edge of the concave die serves as a shearing edge against which the bar is pressed immediately after its inner end has been cut by the shaping shear. This is accomplished by means of a shear blade **38** secured to the front end of the carriage. The front end of this blade is recessed so as to straddle the bar to keep the bar from moving up or down while the plate between the dies is being cut from it. This plate is retained between the dies by their pressure against its opposite sides, which causes its tongue end to be bent rearwardly as shown in Fig. 5. The curvature of the plate-engaging surfaces of the dies corresponds to that of the body of the clip which they form.

The side of the convex die adjacent the tongue end of the plate is in the form of a lateral projection or horn **39** between the outer end of which and the concave die the projecting portion of the plate is bent rearwardly into a position nearly parallel to the direction of movement of the horn, as shown in Fig. 6. It is this projecting portion of the plate that ultimately forms the downwardly and inwardly bent tongue-carrying portion of the rail clip. This is accomplished by bending the projecting portion of the plate backwardly around the horn, and at the same time bending the tongue **2** substantially perpendicularly away from the adjoining portion of the plate. The bending preferably is done by means of a bending member or ram **41** which is reciprocable at right angles to the path of movement of the convex die. The outer end of the tongue is pinched between the end of the ram and the side of the adjoining die. As shown in Fig. 7, the outer end of the ram has a central boss **42** on its front surface which engages the tongue and bends it back toward the body of the clip farther than the ears **3** that straddle the boss. Because of this, the ears, and not the tongue, press against the top of the tie plate when the clip is in rail-retaining position. The ram is slidable in a recess **43** in the front of the carriage directly behind block **37**. The ram is actuated by a toggle **44** composed of three pivotally connected links one of which is pivotally connected to the inner end of the ram. The opposite end of the toggle is pivotally mounted on a pin **46** extending down into the front end of the carriage. The toggle operates in a rectangular opening **47** extending through the front end of the carriage. When the toggle is straightened, the ram is forced against the projecting portion of the metal plate to bend it around the horn of the convex die in the manner just described.

For straightening the toggle, a pusher or actuating member **50** is supported behind it by means of a cross-head **51** slidably mounted inside the carriage in the carriage guide plates **17**. This cross-head is reciprocated lengthwise of the carriage by a link **52** pivoted at one end in the cross-head and provided at its opposite end with a ring **53** encircling drive shaft **21** and an eccentric **54** rigidly mounted thereon. The position of the eccentric is such, relative to cams **20**, that the pusher does not engage the center link of toggle **44** until the two dies close upon the plate that is being formed into a clip. The eccentric then moves the cross-head and pusher forward in the carriage to straighten the toggle so that ram **41** will be forced against the rearwardly projecting portion of the plate to complete the formation of the clip (Fig. 7). At the same time the hole **7** is punched in the center of the curved plate by means of a punch **56** carried by the cross-head. The punch moves forward in aligned passages **57** and **58** extending through the two dies and the front ends of the carriage and frame.

After the clip has been formed, the carriage and cross-head are retracted together, thereby carrying the clip with them because it is held on the convex die by means of ram **41** and the punch. When the carriage stops with the clip, the cross-head continues to move rearwardly to pull the punch out of the clip and to pull the pusher **50** away from the toggle. At the same time the front end of a hook-shape rod or actuating member **59**, carried by the cross-head and slidably mounted in the front of the frame, enters opening **47** in the carriage and strikes the front of the center link of the toggle and pushes it back. This breaks the toggle and thereby retracts ram **41** from engagement with the clip so that the clip can drop away from the convex die. The bar **33** then is fed forward between the dies, and the forging cycle that has been described herein is repeated. It will be seen that every time the carriage and cross-head move forward a clip is formed in a single operation, thereby making production fast and relatively inexpensive.

According to the provisions of the patent statutes, I have explained the principle and construction of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. A rail clip forming machine, comprising a base, a concave die, a shear blade beside said die, a convex die to cooperate with the concave die, a second shear blade beside the convex die to cooperate with the first blade, one of the dies and the blade beside it being rigidly mounted on said base, a movable support for the other die and blade, means for moving said support on said base toward and away from said rigidly mounted die to provide a metal plate between the dies with a longitudinally arched body and a sheared portion projecting laterally from the shear blade side of the dies, the convex die having a lateral projection extending away from its shear blade side, a bending member disposed adjacent said second blade and movable toward and away from the projection side of the convex die in a lateral direction transverse to the direction of movement of said support, a toggle connected to said bending member for reciprocating it laterally to bend said projecting portion of the plate around said die projection, a pair of movable actuating members positioned to engage opposite sides of the toggle alternately for straightening it and breaking it, and reciprocating means on said base, said last-mentioned means carrying said actuating members to move them in the same direction simultaneously.

2. A rail clip forming machine, comprising a base, a concave die, a stationary shear blade beside said die, said die and blade being rigidly mounted on said base, a convex die to cooperate

with the concave die, a movable shear blade to cooperate with the stationary blade, a carriage for the convex die and movable blade, means for moving said carriage on said base toward and away from the concave die to reciprocate the convex die and movable blade in order to provide a metal plate between the dies with a longitudinally arched body and a sheared portion projecting laterally from the shear blade side of the dies, the convex die having a lateral projection extending away from its shear blade side, a ram carried by said carriage adjacent said movable blade and movable toward and away from the projection side of the convex die in a lateral direction transverse to the direction of movement of said carriage, a toggle also carried by said carriage for reciprocating the ram laterally to bend said projecting portion of the plate around said die projection, a pair of actuating members movable relative to said carriage and positioned to engage opposite sides of the toggle alternately for straightening it and breaking it, and reciprocating means on said base, said last-mentioned means carrying said actuating members to move them in the same direction simultaneously.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
10,571	Gray	Feb. 28, 1854
231,209	Brooks	Aug. 17, 1880
757,197	Jeffrey	Apr. 12, 1904
1,326,852	Dallmeyer	Dec. 30, 1919
1,525,908	Beans	Feb. 10, 1925
1,706,274	Woodings	Mar. 19, 1929
1,790,951	Sampson	Feb. 3, 1931
1,969,514	Lehman	Aug. 7, 1934
2,051,640	Kruse	Aug. 18, 1936
2,116,670	Dawson	May 10, 1938
2,206,307	Schneider	July 2, 1940
2,228,448	Fader	Jan. 14, 1941
2,371,138	Harrison	Mar. 13, 1945
2,422,952	Dakin	June 24, 1947