

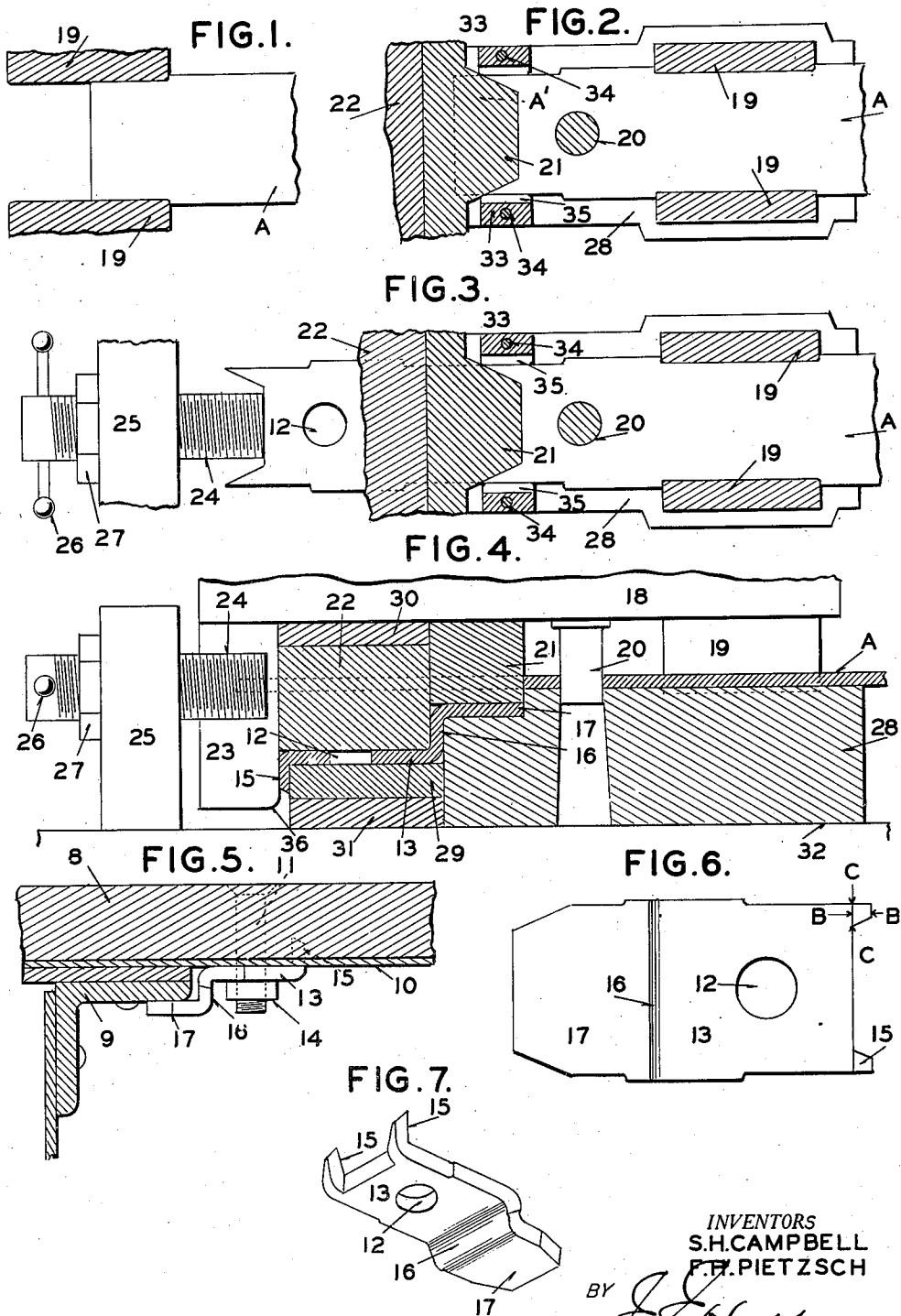
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METHOD OF MANUFACTURING FLOOR CLIPS

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METHOD OF MANUFACTURING FLOOR CLIPS

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Our invention relates to a method of manufacturing floor clips of the type used to secure the floor boards of railway cars to the sills by means of which such clips may be accurately and economically made, particularly from stock the width of which varies appreciably. Stock of this kind is less expensive than that which is gauged accurately to size and its utilization in the manufacture of clips, therefore, results in a substantial saving in cost.

A floor clip of the type above referred to is provided with one or more prongs adapted to enter the floor board to prevent the rotation of the clip around the bolt securing it to the board and its consequent disengagement from the sill. The cross section of these prongs should be small enough not to offer undue resistance to the entry of the prong or prongs into the board under the pressure applied to the under face of the clip by tightening the nut on the bolt. One of the difficulties heretofore encountered in making floor clips has been that of blanking a long relatively thin prong out of the heavy metal bar forming the body of the clip at a single operation. This is due to the fact that one of the blades of the blanking die must necessarily be of the same contour as the prong and so is liable to crumble under the excessive strain to which it is subjected. This difficulty has recently been accentuated by the practice by car builders of inserting a strip of felt paper between the floor boards and the sills, thus necessitating the use of longer prongs than were heretofore required.

Another difficulty encountered in case the clips are each provided with two prongs, the outer sides of which are coincident with the sides of the clip, results from the variation in the width of the stock above referred to which renders proper centering of the bar difficult, if not impossible, so that in the completed article the prongs are of different lengths.

In carrying out our invention we subject the stock to a preliminary sizing operation so it may be accurately centered to secure uniform sized prongs, such sizing operation also blanking the outer sides of the prongs. We complete the prongs by a second blanking operation which also forms the opposite end of the clip. Both these operations, as well as other necessary operations, are performed by a compound sizing, blanking, punching and bending die, so that after the preliminary operations, necessary only at the end of the bar, each stroke of such compound die results in the formation of a complete clip.

In the accompanying drawing in which the die structure is semi-diagrammatically illustrated, Figure 1 is a plan view illustrating the first preliminary operation; Figure 2 is a plan view illustrating the second preliminary operation; Figure 3 is a plan view illustrating a normal operation of the die; Figure 4 is a vertical section through the parts shown in Figure 3; Figure 5 is a vertical section showing the clip in position in a car structure; Figure 6 is a plan view of the clip; and Figure 7 is a perspective view of the clip.

Referring first to Figures 5, 6 and 7, the numeral 8 represents one of the floor boards of a railway car supported above a sill 9, between which parts is placed a sheet 10 of felt paper. Passing down through the board adjacent the edge of the sill is a bolt 11 which projects through a bolt hole 12 in the body 13 of the clip and is engaged by a nut 14 by means of which the body of the clip is clamped firmly against the lower face of the floor board. The action of the nut also causes the prongs to enter the floor board. The clip is provided with an offset 16 terminating in a lip 17 which projects under the flange of the sill.

The movable parts of the die are carried on a reciprocating plunger 18 (Figure 4). These dies include a pair of trimming or sizing dies 19, a punch 20, a blanking die 21, a body bending die 22 and a pair of prong bending dies 23. Adjacent the dies 23 is an adjustable stop which consists of a bar 24 threaded in an upright 25. The bar is provided with a handle 26 and with a lock nut 27 by means of which it may be secured in proper adjustment. The trimming dies 19, punch 20 and blanking die 21 cooperate with a lower fixed die 28 and the bending die 22 with a lower bending die 29. The upper bending die 22 may be in fixed relation to the plunger 18 and the lower bending die 29 in fixed relation to die 28 in case all the clips to be formed have the same depth of offset 16. In order, however, that the same dies may be used to form clips having different depths of offset, we prefer to provide for adjustment in the height of dies 22 and 29 relative to the other dies by the use of shims 30 and 31 placed between die 22 and plunger 18 and between die 29 and lower die supporting member 32, respectively.

In carrying out our invention, the bar of stock "A" from which the clips are to be formed is inserted between the trimming dies 19 and die 28 so far that the end of the stock extends to about the middle point of the trimming dies (as shown

in Figure 1) and the plunger is actuated to perform the first preliminary operation which consists in trimming or sizing the front end of the bar of stock. It will be understood that the distance between the two trimming dies 19 is slightly less than the minimum width of the stock. After this operation, the stock is advanced to the position shown in Figure 2, the bar being accurately positioned laterally by engagement of the sized forward end of the bar with a pair of stops 33, the distance between these stops being exactly the same as that between the trimming dies 19. The plunger is again actuated to perform the second preliminary operation which consists in punching the hole 12 in the stock by means of the punch 20 and removing a portion A' of the front end of the bar by means of the forming die 21. This latter operation completes the shaping or contouring of the prongs 15. As the outer sides of these prongs have been formed by the previous action of the dies 19, die 28 may be extended laterally as far as necessary to provide the required strength to resist the strain due to the shearing action. By forming the prongs by two independent operations, we are enabled to produce prongs of greater length than the thickness of the stock from which they are formed. The stops 33 are secured to the laterally extending portion of die 28 by any suitable means such as pins 34. These stops not only center the stock but prevent the spreading of the prongs under the action of die 21. The portions of the stops 33 which engage with the edges of the stock are of a height substantially equal to the thickness of the stock and above these portions the stops are provided with ways 35 of sufficient width to permit the passage of the untrimmed portions of stock of maximum width.

After the preliminary operations above described, the stock is advanced at each stroke of the plunger until its end contacts the stop 24 as shown in Figure 3. This results in the formation of a complete clip for each stroke until the entire bar is used up. The severing of the clip from the bar by die 21 is not completed until the offset 16 is sufficiently formed to prevent longitudinal movement of the clip relative to the dies. The prong bending dies 23 have rounded corners 36 to prevent injury to the prongs and the distance between the faces of these dies and the end of die 29 is somewhat less than the thickness of the stock so that the action of these dies not only bends the prongs at right angles to the body 13 of the clip but also exerts a squeezing or upsetting action upon them. This action not only appreciably increases the length of the prongs but improves their contour.

It will be seen that by our method we are en-

abled to form a complete clip at each stroke of the die, after the preliminary operations performed only at the end of the stock. Further, we are enabled to produce a clip in which the prongs are of greater length than the thickness of the stock from which the clip is formed and in which the greatest cross-sectional dimensions of said prongs, both in the longitudinal direction B—B (Figure 6) and in the transverse direction C—C, are less than said thickness. Further, by use of the shims 30, 31 and the adjustable stop 24, we are enabled to utilize the same dies to form a wide range of clips having different depths of offset but otherwise alike.

Having fully described our invention, what we claim as new and desire to secure by Letters Patent of the United States is:

1. The method of forming floor clips which includes shearing the sides of a strip of metal of uniform thickness to reduce its width to a predetermined dimension and to partially form a pair of prongs, and removing a portion of the stock between the prongs to complete their contour and to sever the strip transversely.

2. The method of forming floor clips which includes shearing the sides of a strip of metal of uniform thickness to reduce its width to a predetermined dimension and to partially form a pair of prongs, and removing a portion of stock between the prongs to form an end portion of a second clip, said removal completing the contour of the prongs and severing the strip transversely.

3. The method of forming floor clips which includes shearing the sides of a strip of metal of uniform thickness to reduce its width to a predetermined dimension and to partially form a pair of prongs, removing a portion of stock between the prongs to form an end portion of a second clip, said removal completing the contour of the prongs and severing the strip transversely, and bending said prongs at right angles to the clip and simultaneously compressing them to reduce their thickness in the direction of the length of the clip.

4. The method of forming floor clips which includes shearing the sides of a strip of metal of uniform thickness to reduce its width to a predetermined dimension and to partially form a pair of prongs, and removing a portion of stock between the prongs to form an end portion of a second clip, said removal completing the contour of the prongs and severing the strip transversely and simultaneously with said removal offsetting a portion of the clip and bending the prongs at right angles to the body of the clip.

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