May 19, 1953 V. C. NORQUIST ET AL 2,638,958

CORRUGATION CRIMPING DEVICE

Filed Feb. 15, 1952

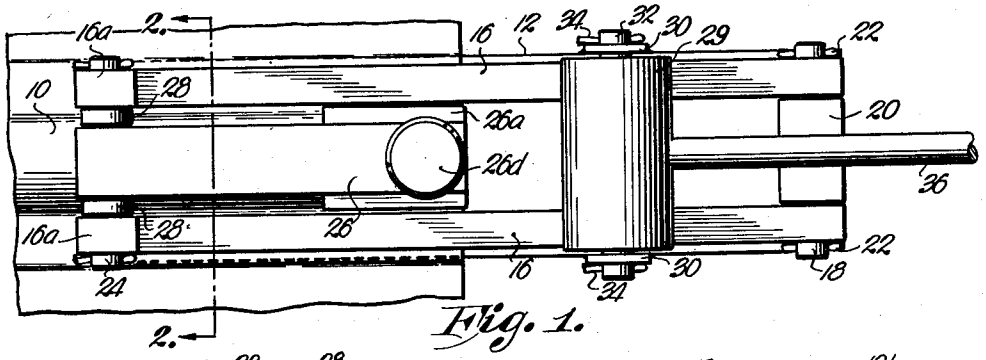


Fig. 1.

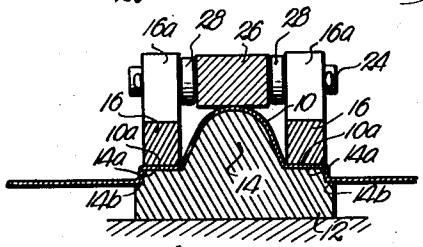


Fig. 2.

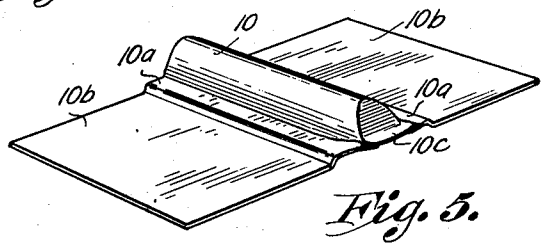


Fig. 5.

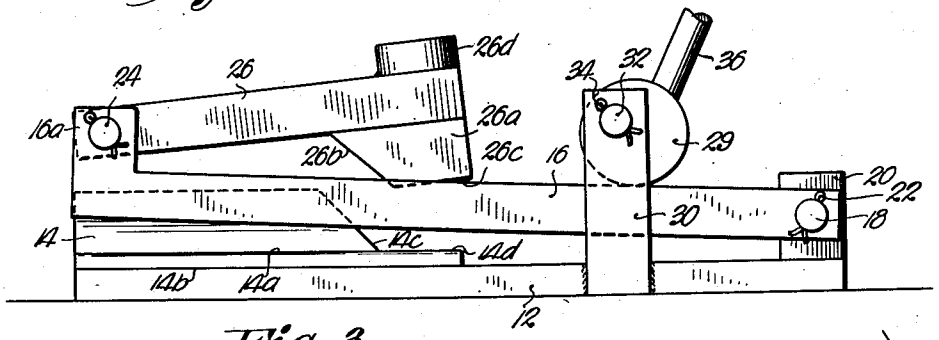


Fig. 3.

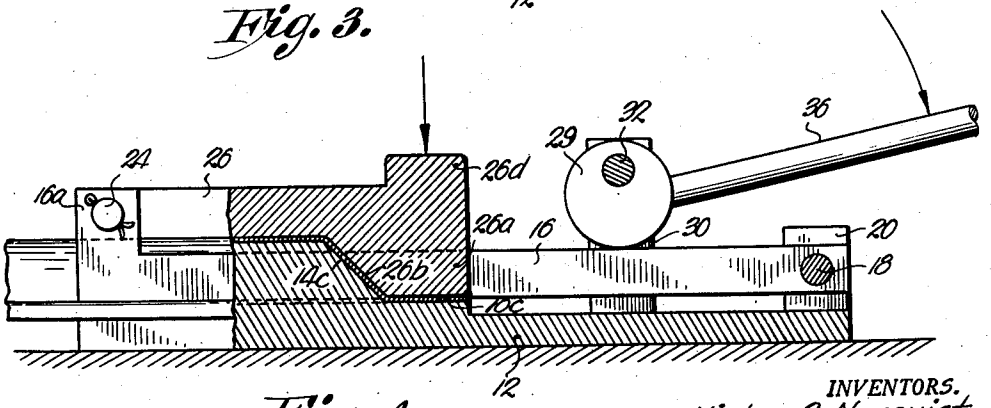


Fig. 4.

INVENTORS.
Victor C. Norquist
Harl S. Day
BY Thos. E. Scofield
ATTORNEY.

Patented May 19, 1953 2,638,958

UNITED STATES PATENT OFFICE

2,638,958

CORRUGATION CRIMPING DEVICE

Victor C. Norquist and Harl S. Day, Kansas City, Mo., assignors to Butler Manufacturing Company, Kansas City, Mo., a corporation of Missouri

Application February 15, 1952, Serial No. 271,692

8 Claims. (Cl. 153—16)

1

This invention relates to metal working tools, and refers more particularly to a device for flattening or crimping the ends of the corrugations along the edge of a corrugated metal sheet.

In using corrugated metal sheet as paneling for building structures, it often is desirable to flatten the ends of the corrugations along an edge of the sheet so as to provide a straight edge which can be inserted into a slot in some other structural part. This is particularly true in the case of buildings where the panel is to be joined to a window or door casing, a base board, or a foundation, in which case the joined surface is non-corrugated, and a relatively weather-tight seal is desired. Heretofore, this crimping or flattening operation has been accomplished by placing an anvil on the underside of the panel and striking the corrugations with a hammer or other suitable tool until the corrugation is flattened to the level of the sheet. However, this method has proved unsatisfactory in a number of respects, including a failure to obtain uniform crimps as well as presenting difficulties in holding the sheet in alignment with the anvil while the corrugation is being hammered down. This latter problem is probably the more serious, since the combined effort of at least two workers is generally required.

It is a primary object of this invention to provide a tool for the above purpose in which positive means is provided for holding the sheet in fixed relation to the anvil while the crimping takes place, and which is operable by one man. In this connection, it is also an object to provide a tool which by virtue of the above characteristics insures of a uniform crimp at each of the corrugations.

It is a further object to provide a tool in which crimping or flattening of the corrugations may be effected with ease and rapidity without severe weakening of the metal sheet.

Still another object is to provide a novel means whereby clamping of the sheet to the tool, and the subsequent release following the crimping action, is accomplished with facility and rapidity.

A further object is to provide a crimping tool which is simple in construction, of extreme durability, and fool-proof in operation.

Other and further objects, together with the appurtenant features of novelty, will appear in the course of the following description.

In the accompanying drawings, which form a part of the specification and are to be read in conjunction therewith, and in which like reference numerals are used to indicate like parts in the various views,

2

Fig. 1 is a top plan view of the preferred embodiment of my invention with a corrugated sheet properly positioned for crimping,

Fig. 2 is a vertical cross-section taken along the line 2—2 of Fig. 1 in the direction of the arrows,

Fig. 3 is a side elevation of the invention with the clamping means open and ready for insertion of the corrugated sheet,

Fig. 4 is a side elevation of the invention, partially in section, illustrating the position of the elements and the sheet immediately after the crimping operation has been completed,

Fig. 5 is a perspective view of a sheet which has been crimped with my invention.

Referring to the drawing, the preferred embodiment of my invention has been designed for use with a sheet having corrugations of the general character indicated in Fig. 5. The corrugation has an upwardly arched central portion 10 which is flanked on either side by flat portions 10a which are raised slightly above the level of the sheet 10b. It will be understood, of course, that only a portion of the sheet has been shown; in actual practice, the corrugations are spaced at suitable intervals across the sheet. As will appear hereinafter, the basic principle of my device is equally applicable to corrugations having entirely different conformations than the particular one shown, which has been selected solely for illustrative purposes.

Turning now to a description of the crimping tool, the main body or base thereof consists of a relatively thick elongated rectangular plate 12 having at one end an upwardly projecting mandrel 14 adapted to fit within the underside of the corrugation 10 of the sheet. As is best seen in Fig. 2, the mandrel 14 is formed identically with the cross-sectional outline of the corrugation, including shoulders 14a which engage the flat portions 10a of the corrugation and secondary shoulders 14b along the outer edges which support the sheet 10b. As clearly shown in Fig. 3, the length of the mandrel 14 is measurably less than that of plate 12, and its inner end is inclined downwardly as at 14c. Projecting forwardly of the inclined face 14c for a relatively short distance is a flat section 14d which is of equal height with shoulders 14a.

Positioned above and on either side of the mandrel 10 are two parallel arms 16 which extend to the opposite end of plate 12 where they are pivotally mounted by a pivot pin 18, forming in effect a yoke in which the legs are disposed on opposite sides of the mandrel. The pivot pin 18 is carried by a suitably bored upstanding block 20 affixed to

the upper surface of plate 12, and arms 16 are held on the pin by cotter keys 22 at each end of the latter.

The free ends of arms 16, which are located substantially above the rear or outer end of mandrel 14, are connected by means of another pin 24 which is received in upstanding ears or lugs 16a formed on the ends of arms 16. Carried by the pin 24 and extending between and parallel to the arms 16 is a pivotal member 26 in the form of a bar having on the underside of its free end a forming block 26a. The bar 26 is centered with respect to the arms 16 by washers 28 which are disposed on the pin 24 between the respective sides of the bar 26 and the adjacent arms. The width of the forming or striking block 26a is slightly less than the spacing between arms 16 to allow free movement therebetween, and its lower surface is complementary with the adjacent end of the mandrel 14, having an inclined face 26b adapted to register with the inclined face 14c of the mandrel and a flat bottom 26c corresponding to the flat section 14d. The upper surface of the bar 26 is provided with a cylindrical boss 26d which, as will be explained presently, serves as the striking surface for a hammer or other suitable tool when the device is in use.

As is believed evident from the description thus far, the pivotal mounting of the arms 16 provides a jaw-like arrangement in which the arms may be lifted to allow insertion of the edge of the sheet 10b with the corrugation 10 in position on the mandrel 14. Similarly, the striking or forming block 26a may be lifted above the arms 16 to allow the sheet to pass thereunder and be positioned with its edge substantially vertically above the end of the flat section 14d of the mandrel, as shown at Fig. 1.

Located between the end of the mandrel 14 and the pivot point for the arms 16 is an actuating mechanism for depressing the arms 16 to clamp the sheet firmly in position on the mandrel 14. Basically, this mechanism comprises a cylindrical member 29 disposed transversely across the upper surface of the arms and carried at opposite ends by upstanding legs 30 secured at their lower ends to the sides of the base plate 12. The cylinder 28 is mounted for rotation about a longitudinal axis offset from its central axis in the form of an eccentric, being carried by a pin 32 journaled in the legs 30 and retained in position by cotter keys 34 at each end. An elongate handle 36 projects substantially radially from the center of the cylinder 29; and when the handle 36 is drawn downwardly (in the direction shown by the arrow in Fig. 4), the periphery of the cylinder 28 serves as a camming surface engaging the upper surfaces of arms 16 to depress the arms 16 downwardly and thereby clamp the flat portions 10a of the corrugation between the bottoms of the arms 16 and the shoulders 14a of the mandrel.

The operation of the striking block 26a is thought to be evident from the drawings and the foregoing description. With the sheet 10b clamped in position in the manner described above, the block rests on the unsupported portion of the corrugation 10 extending past the inclined face 14c of the mandrel 14. To effect the flattening or crimping, the boss 22d above the block is struck sharply by a hammer or other suitable tool thereby causing the unsupported portion of the corrugation to collapse. As the hammering continues, the side walls of the corrugation fold inwardly (the sides of the arms 16 preventing an outward fold) until a flat configuration similar to that indicated at 10c in Fig. 5 is obtained. The complementary inclined faces 14c and 26c of the mandrel and striking block provide a gradual decrease in height which militates against the possibility of shearing of the sheet material during the crimping operation.

It will be obvious that by positioning the sheet as desired relative the mandrel 14, the length of the flattened section 10c can be varied within a relatively wide range. For example, it is possible to eliminate the flat, folded section 10c, and bring the taper down to the edge of the sheet, by inserting the sheet only far enough to bring its edge in vertical alignment with the base of the inclined face 14c of the mandrel 14. With the sheet in this position, the only effect obtained by the striking block 26a would be to produce a closed end on the corrugation. Adjustment of the sheet longitudinally of the mandrel therefore can be used to obtain the particular effect sought. In any of these situations, only one worker is required. The clamping of the sheet to the mandrel is carried out by one hand through the handle 36 while the other hand is free to wield the hammer. Once clamped into position, the sheet cannot shift or slide, thus insuring that the operation can be carried out quickly and that uniformity in the crimp will be obtained.

From the foregoing it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth together with other advantages which are obvious and which are inherent to the structure.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described our invention, we claim:

1. In a device of the character described, a mandrel adapted to be fitted into the concave side of a corrugation of a corrugated metal sheet, a member cooperating with said mandrel comprising a yoke aligned with said mandrel and having its legs disposed on opposite sides thereof, said yoke being movable vertically with respect to said mandrel to permit the placing of the corrugated sheet therebetween with a portion of said corrugation extending beyond the end of said mandrel, means for drawing said yoke and mandrel together thereby to clamp said sheet firmly on said mandrel, and a forming block normally positioned above and beyond one end of the mandrel and movable vertically relative thereto whereby any portion of said corrugation projecting past the end of said mandrel can be reduced in height under the impact of said forming block.

2. A device as in claim 1 wherein said yoke is pivotally connected with said mandrel to form a jaw-like structure for receiving the corrugated sheet.

3. A device as in claim 1 wherein said forming block is connected to and carried by said yoke.

4. A device as in claim 1 wherein said forming block and the adjacent end of said mandrel are

provided with complementary inclined surfaces.

5. In a device of the character described, a mandrel adapted to fit into the concave side of a corrugation of a corrugated metal sheet, a support for said mandrel having its edges adapted to underlie the sheet on each side of the corrugation, a yoke pivotally connected with said support at a point remote from the end of the mandrel, said yoke having its legs disposed on opposite sides of said mandrel and above the sheet, means operable to draw said yoke and said support together thereby to clamp the sheet tightly therebetween, and a vertically movable forming block carried between the legs of said yoke adjacent one end of the mandrel, said forming block being adapted to be lifted to a position where its lowest point is above the level of the highest point on the mandrel whereby it overlies any portion of the corrugation extending beyond the end of the mandrel.

6. A device as in claim 5 wherein said means comprises a camming member connected with said support and having its camming surface adapted to engage the top of the yoke.

7. A device as in claim 6 wherein said camming member comprises a cylinder extending transversely across the top of said yoke and overlying same, said cylinder being mounted for rotation about an eccentric axis.

8. A device as in claim 5 including an arm pivoted at one end between the legs of the yoke above the mandrel and substantially aligned therewith, the forming block being mounted on the free end of said arm.

VICTOR C. NORQUIST.
HARL S. DAY.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
722,186	Rowland	Mar. 3, 1903
1,462,474	Atkinson	July 24, 1923
1,704,326	Junkers	Mar. 5, 1929
1,741,907	Beck	Dec. 31, 1929
2,373,057	Shinn	Apr. 3, 1945

FOREIGN PATENTS

Number	Country	Date
303,139	Germany	Jan. 23, 1918
81,339	Switzerland	June 2, 1919