Oct. 12, 1971 H. M. MOORE ET AL 3,611,708

TWO-LEGGED WIRE STAPLE AND METHOD OF MANUFACTURE INVOLVING ROLL-FORMING

Filed Jan. 13, 1969

FIG. 1

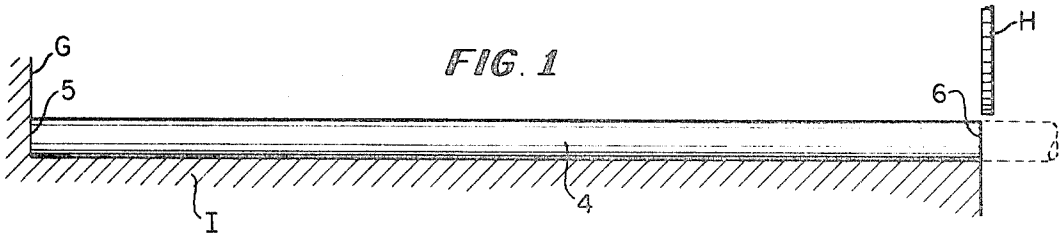


FIG. 2

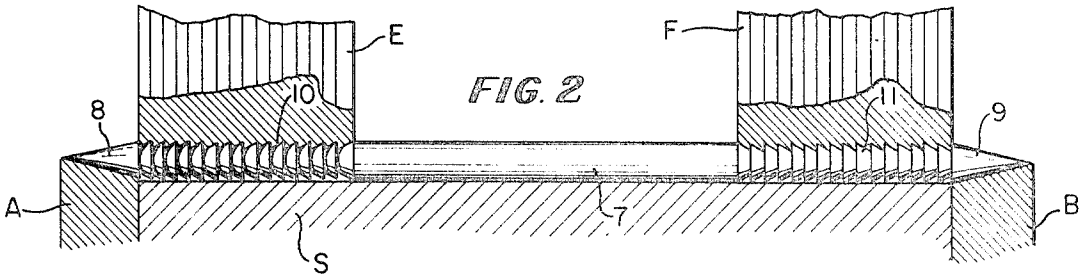
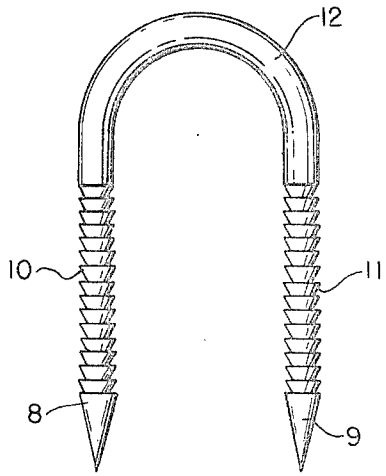


FIG. 3



INVENTORS:
HADEN M. MOORE
ROBERT H. REED

Andrew F. Wintercorn
Attorney

United States Patent Office 3,611,708
Patented Oct. 12, 1971

3,611,708

TWO-LEGGED WIRE STAPLE AND METHOD OF MANUFACTURE INVOLVING ROLL-FORMING

Haden M. Moore and Robert H. Reed, Sterling, Ill., assignors to Redmore Products Company, Sterling, Ill.

Filed Jan. 13, 1969, Ser. No. 790,801
Int. Cl. B21g 7/02
U.S. Cl. 59—77 2 Claims

ABSTRACT OF THE DISCLOSURE

The opposite ends of a straight elongated round wire blank are roll-swaged between dies to provide conical points while the adjacent end portions are simultaneously ring-formed against other dies to produce annular ridges and grooves for greater holding power of the staple in wood, these latter dies serving incidentally to grip the blank to prevent endwise displacement relative to the first dies. A two-legged staple is then produced in a U-bending operation. This method involves lowest possible manufacturing cost and there is a big saving by virtue of the virtual elimination of wasted material, while the resulting staple is of superior quality, easier to drive and with less likelihood of splitting the wood, and possessing stronger holding power than other two-legged staples.

This invention relates to two-legged wire staples having ring shanks for greater holding power in work, and the novel method of manufacture involving roll-forming. The straight round wire blanks after they are cut at right angles to their length, have their ends swaged by forcing the wire to flow to a point as the ends are rolled between moving dies, or one moving and one fixed die at each end, the rings on the shanks being formed at the same time at both ends inwardly relative to the points, the formed wires being thereafter bent to U-shape.

The invention is illustrated in the accompanying drawings, in which:

FIG. 1 is a view of a straight round wire blank cut to the required length at righ angles;

FIG. 2 is a view of the roll-formed blank with conical points at both ends next to the rolled ring shank portions formed at the same time with the points;

FIG. 3 is a side view of the finished two-legged staple produced by bending the intermediate portion of the straight formed blank of FIG. 2 to a U-shape.

The same reference numerals are applied to corresponding parts throughout the views.

Referring to the drawing, the straight round wire blank 4 shown in FIG. 1 is cut to the desired length at right angles to the ends, as shown at 5 and 6, sufficiently short of the overall length of the swaged and roll-formed blank 7 seen in FIG. 2 that when the two end portions of conical form shown at 8 and 9 are roll-swaged between moving dies, or one moving die and the other one fixed, the overall length is a trifle longer than the blank 4, due to the swaging of the ends to conical form. Thus, in FIG. 1, as diagrammatically indicated at G an end stop is provided for the blank 4 and serves to hold it against endwise movement while at H a cutoff saw cuts the blank to the prescribed length, the blank being supported on a table or other support, as indicated at I during this cutoff operation. The conical form of the two end portions 8 and 9 as diagrammatically shown in FIG. 2, is produced in a roll-forming operation by stationary swaging dies A and B relative to which the blank is turned during the ring-forming operation at 10 and 11. The angle of the inner die face, as seen in FIG. 2, is at the exit end of the dies A and B, at the end of the roll-forming operation. The angle

of inner die face, of course, gradually increases from a zero inclination at the start to the maximum at the exit end. Ring-forming at 10 and 11 is done in the same operation with the swaging of the ends and, in fact, it is due to this secondary ring-forming that there is a better grip on the wire blank for the roll-forming of the points 8 and 9. E and F in FIG. 2 diagrammatically illustrate driven die-rollers that turn together on a single shaft for ring-forming the elongated end portion 10 and 11 next to and inwardly relative to the conical points 8 and 9, as by rolling the blank between these die rollers and a stationary support S. Here again, the illustration shows the end of the roll-forming operation at the point of exit. Of course, the ring-forming at 10 and 11 is with a view to greater holding power of the staple in wood. The rolled points make the staple have the same driving characteristics as a conventional diamond point staple, without any of the high scrap loss common with diamond points, bearing in mind that as much as 15% of the wire, by weight, is removed in forming diamond point staples. The present rolled point staples are produced by swaging with substantially no scrap loss. On the other hand, while there is no scrap loss involved with cut or slash point staples, it is well known that they do not drive as easily or as straight and tend to spit the wood more than the diamond point style.

It is, of course, an easy matter in the final operation to form the U-bend 12 in the middle portion of the formed blank 7 to produce the two-legged staple illustrated in FIG. 3.

Two-legged diamond point and cut or slash point staples without ring shanks hav been available for many years. Nails and several styles of one-legged staples with ring shanks have also been available, but, to our knowledge, no one has ever produced two-legged staples with ring shanks nor two-legged staples with ring shanks and concurrently formed rolled points as herein disclosed. To form a two-legged staple with ring shanks by any other method than the one proposed here would require a secondary operation and would entail greatly added manufacturing cost.

It is clear that a variety of different ring styles for the shanks could be provided. The buttress form illustrated at 10 and 11 is for easy driving and, at the same time, greater holding power.

In operation, it should be clear that by our single combination swaging operation the opposite ends of the straight round wire blank 4 are roll-formed between dies, the conical points 8 and 9 for better driving with less danger of splitting wood, while the adjacent shank portions are simultaneously ring-formed against other dies to provide annular ridges and grooves 10 and 11 for good holding power in wood, the latter dies serving incidentally to hold the blank against endwise displacement for the roll-forming of the points. Only one more low cost operation is required to bend the roll and ring-formed blank 7 to the U-form of FIG. 3. This all involves lowest possible cost and there is a big saving because of the virtual elimination of wasted material, while the resulting staple is of superior quality, easier to drive and with less likelihood of splitting the wood and possessing stronger holding power than other two-legged staples.

It is believed the foregoing description conveys a good understanding of the objects and advantages of my invention. The appended claims have been drawn to cover all legitimate modifications and adaptations.

We claim:

1. The method of manufacturing a two-legged wire staple consisting in first cutting a straight elongated round wire blank to suitable length at right angles at both ends, then roll-forming the ends of the blank on dies to swage

the same to conical point form while simultaneously ring-forming elongated end portions next to and inwardly relative to the points between other dies, to form ridges and grooves, whereby the ridges and grooves being defined in the two end portions by the latter dies serve to grip the blank to preclude endwise displacement during the roll-forming of the points, the blank thus formed being adapted to be bent thereafter to U-shape to define a two-legged wire staple.

2. The method set forth in claim **1** wherein the ridges and grooves roll-formed in the opposite end portions are of buttress shape each smaller in diameter at the end toward the adjacent conically pointed end for easier driving into wood and better holding power.

References Cited

UNITED STATES PATENTS

175,087	3/1876	Harvey	59—73
330,364	11/1885	Adt	59—73
334,909	1/1886	Thomson	59—73
3,017,634	1/1962	Hauck	59—76

CHARLES W. LANHAM, Primary Examiner

G. P. CROSBY, Assistant Examiner

U.S. Cl. X.R.

85—21, 49