Sept. 18, 1951 M. RACHLIN 2,568,027

METHOD OF MAKING DOWNSPOUT HOOKS

Filed June 18, 1948

2 Sheets-Sheet 1

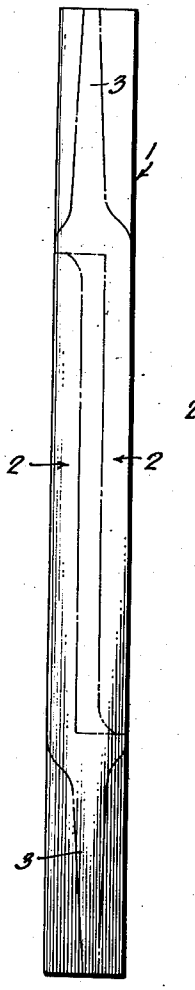
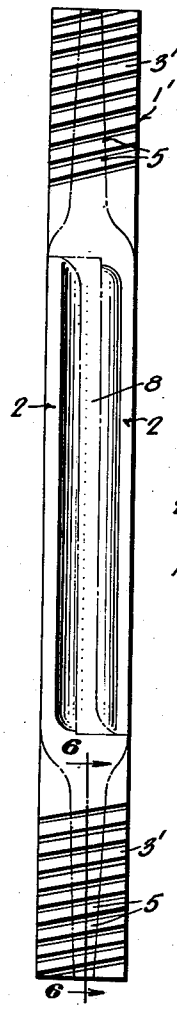


Fig. 1.



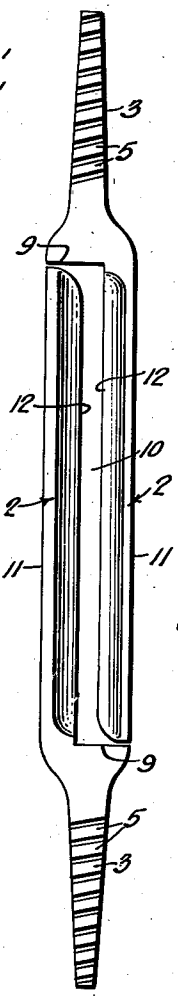


Fig. 4. Fig. 5.



Fig. 6.

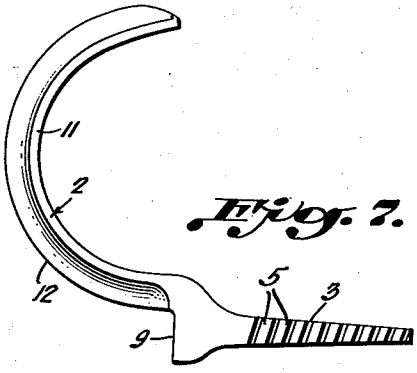


Fig. 7.



Fig. 8.

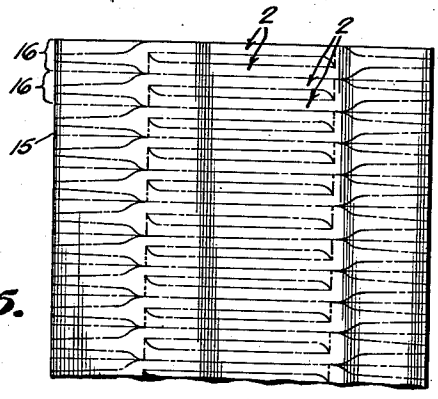


Fig. 9.

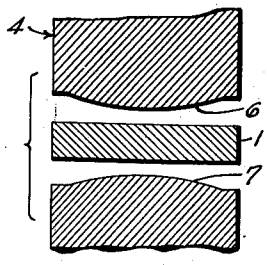


Fig. 2.

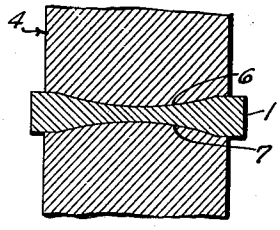


Fig. 3.

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Fig. 10.

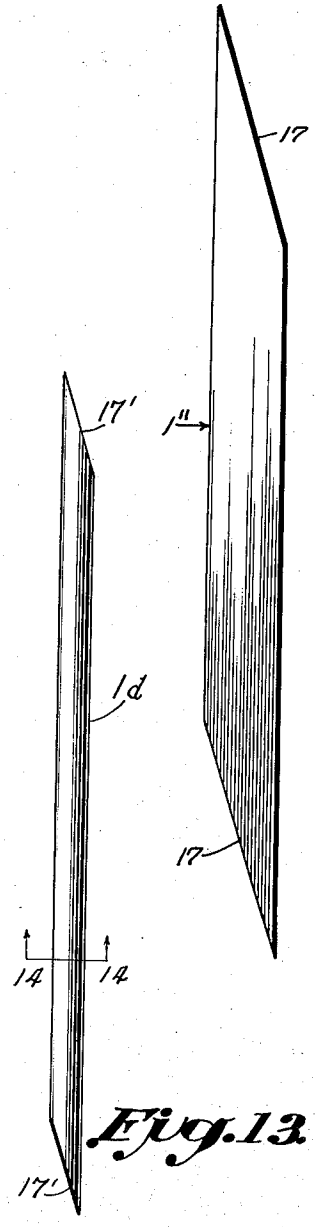


Fig. 13.

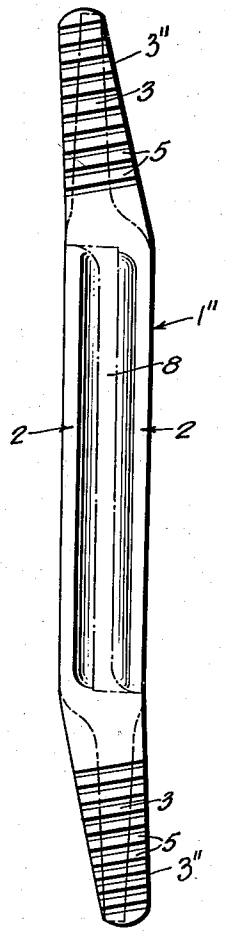


Fig. 11.

Fig. 12.

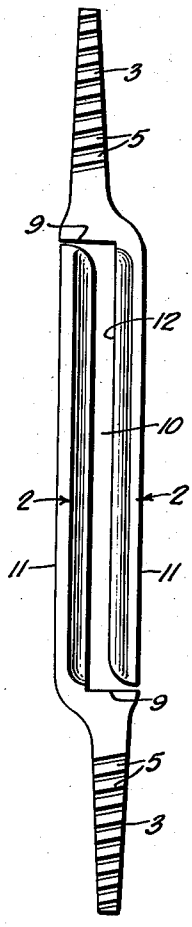




Fig. 14.

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METHOD OF MAKING DOWNSPOUT HOOKS

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Application June 18, 1948, Serial No. 33,897

2 Claims. (Cl. 29—150)

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This invention relates to methods of making downspout hooks and the articles formed thereby, and the primary object of the invention is to provide new and improved hooks and processes of their manufacture from flat metal such as strip or sheet metal, or from wire, whereby strong, hardened hooks are produced with a minimum number of forming operations and a minimum of waste in material, thereby resulting in a lower cost of manufacture than hooks as heretofore manufactured. More particularly, the downspout hooks may be made from hot-rolled, cold rolled or drawn strip metal; from hot-rolled or cold-rolled sheet metal; or from wire having any desired cross-sectional configuration, such as round, square, triangular, etc.

Another object of the invention is to simultaneously partially form and harden a plurality of downspout hooks with a single operation of a die press, thereby reducing the number of forming operations per completed hook from 4 to 2½ or 2.

A further object of the invention is to provide a downspout hook made from flat metal or wire which possesses greater strength than the strength of the metal initially, and one which has no weakened twisted portions and is not damaged by hammering.

An additional object of the invention is to provide a downspout hook formed from flat metal or wire in which the driving tang and hook portion are flattened in the same direction whereby both are hardened and materially strengthened and there is no weakened point of connection between the two.

Another object of the invention is to provide a downspout hook formed from flat metal or wire in which the driving tang is offset from one end of the hook portion, and the hook portion is reinforced by an exterior flattened rib portion, and as thus strengthened, insures a permanent configuration, whether semi-circular, semi-hexagonal, or any other configuration.

Other objects of the invention will become apparent as the description proceeds, reference being made to the accompanying drawing forming a part of the present disclosure, wherein:

Fig. 1 is a plan view of a strip of metal cut to proper length illustrating the first step performed in the formation of my downspout hooks in accordance with one method, and showing in broken lines the two hooks to be made therefrom;

Fig. 2 is a fragmentary central sectional view through the die press with the strip of metal of Fig. 1 positioned therein ready to be pressed;

Fig. 3 is a view similar to Fig. 2 showing the

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press in closed position and illustrating the cross-section given to the central portion of the strip of metal by the die press;

Fig. 4 is a plan view of the strip of metal after it has been die-pressed, illustrating the second step in the formation of the two hooks;

Fig. 5 is a plan view of the strip of metal after it has been cut out and trimmed, illustrating the third step in the formation of the two hooks;

Fig. 6 is an enlarged fragmentary sectional view taken on the line 6—6 of Fig. 4, looking in the direction of the arrows, illustrating the taper and serrations formed in the end portions of the strip of metal in the die press;

Fig. 7 is a side elevational view of one of the completed hooks, illustrating in this instance the hook portion bent into the form of a semi-circle, which is the final step, and is performed on each of the two hooks separately;

Fig. 8 is a front view of the hook as illustrated in Fig. 7;

Fig. 9 is a view illustrating how a sheet of metal, rather than a narrow strip, may be used in making my hook;

Fig. 10 is a plan view illustrating an alternative manner of cutting a strip of metal to proper length in the first step of my method;

Fig. 11 is a plan view of the strip of metal illustrated in Fig. 10, after it has been die-pressed;

Fig. 12 is a plan view of the latter strip of metal after it has been cut out and trimmed;

Fig. 13 is a plan view of a wire blank that may be used in making my hook; and

Fig. 14 is a sectional view taken on the line 14—14 of Fig. 13, looking in the direction of the arrows.

Referring now to the drawing, wherein Figs. 1 to 8 illustrate the hook and one manner of making it, a strip of flat metal such as steel, stainless steel, copper, or any other metal, e. g., ⅝'' to ⅞'' wide by ⅛'' to $\frac{3}{16}$'' thick, or thicker, is first cut to proper length to form the blank or strip of metal 1 illustrated in Fig. 1. In this instance, the ends of the blank 1 are cut on a line perpendicular to the longitudinal axis of the blank, and the blank is therefore rectangular in plan view.

As indicated by the broken lines representing the two hooks 2, 2 to be formed therefrom, the length of the blank 1 is equal to substantially the axial length of one entire hook 2 plus an additional length equal to the length of the driving tang 3 thereof.

The blank 1 is fed to a die press 4 such as

illustrated in Figs. 2 and 3, in which the blank 1 is given the shape illustrated in Figs. 3, 4 and 6. As indicated in these figures, the end or tang portions 3' of the partially formed blank 1' are tapered and provided with transverse retaining serrations 5, while the longitudinally extending central portion of the blank 1 is pressed with at least one and preferably two convex die members 6 and 7 to form concave surfaces or elongated recessed or reduced portions 8 at opposite sides of the central portion of the blank 1' lying between the end portions 3'.

The next step is to cut or trim the partially formed blank 1', and Fig. 5 illustrates how the blank 1' is trimmed or cut longitudinally along the axis of the reduced portions 8 and laterally from the ends of such longitudinal cut to separate the two hooks or members 2, to form the driving tangs 3, to provide the offset portions or shoulders 9, and to cut out the central portion 10 lying between the hook portions 11 of the hooks 2.

The next step in the process is to bend the elongate narrow hook portion 11 of each hook 2 into its desired configuration. The downspout hook of the present invention is adapted to be used with downspouts of various cross-section, such as circular, rectangular, hexagonal or any other particular shape. The form of hook chosen for illustration is adapted to be used with a circular downspout and hence as illustrated, the hook portion 11 is bent into the form of a semi-circle. Obviously, however, the hook portion 11 may be given substantially a U-shape to receive a rectangular downspout, or it may be given a semi-hexagonal shape to receive a hexagonal downspout.

Figs. 10 to 12 illustrate an alternative manner of cutting the strip of metal to further reduce the waste in metal. In this modification, as before, the strip of metal is first cut to proper length to form the blank or strip of metal 1'' illustrated in Fig. 10. However, in this instance, the ends 17 of the blank are cut on a line inclined relative to the longitudinal axis of the blank. The ends 17 are parallel and may be considered to be cut on a bias, or diagonally, and the blank in plan view has the shape of a parallelogram.

Figs. 13 and 14 illustrate a blank 1^d formed from wire of any desired metal such as steel, stainless steel, copper, etc., from which my downspout hook may be made. As illustrated, the wire is first cut to proper length and the ends 17' of the wire are cut on a line inclined relative to the longitudinal axis of the blank as previously described in connection with the blank 1''. It will of course be obvious, however, that the ends of the blank may be cut on a line perpendicular to the longitudinal axis of the blank if desired, as previously described in connection with the blank 1. It will also be obvious that the cross-sectional configuration of the blank 1^d, instead of being round, as illustrated, may be square, triangular, or of any other desired configuration, and the cross-sectional area thereof is preferably within the range previously described in connection with the strip of flat metal, e. g., $^5/_{64}$ to $^{21}/_{128}$ square inch, or larger.

As previously described in connection with the blank 1, each of the blanks 1'' and 1^d has a length equal to substantially the axial length of one entire hook 2 plus an additional length equal to the length of the driving tang 3 thereof.

The blank 1'' or 1^d is fed to the die press 4 as previously described, in which it is given the shape illustrated in Fig. 11. The end or tang portions 3'' of the partially formed blank 1''' are tapered and provided with transverse retaining serrations 5 while the longitudinally extending central portion of the blank 1'' or 1^d is pressed to form concave surfaces or elongated recessed portions 8 at opposite sides of the central portion of the blank 1''' lying between the end portions 3''.

The next step is to cut or trim the partially formed blank 1''', and Fig. 12 illustrates how the blank 1''' is trimmed or cut longitudinally along the axis of the reduced portions 8 and laterally from the ends of such longitudinal cut to separate the two hooks or members 2, to form the driving tangs 3, to provide the offset portions or shoulders 9 and to cut out the central portion 10 lying between the hook portions 11 of the hooks 2.

The next step in the process is to bend the elongate narrow hook portion 11 of each hook 2 into its desired configuration as previously described.

It will be obvious that by cutting the ends of the blanks diagonally as just described, less metal will be trimmed from the ends of the blank than if the ends of the blank are cut on a line perpendicular to the longitudinal axis of the blank as previously described. In addition, less power is required to press the end portions of the blank. For these reasons, the diagonal cutting of the ends of the blanks is preferred.

From the foregoing it will be clear that my method comprises the following steps or operations to form two hooks; (1) cutting the strip of flat metal or metal wire to form the blank; (2) die-pressing the blank to simultaneously harden the metal in the two hooks; (3) trimming both hooks simultaneously; (4) bending the hook portion of one of the hooks; and (5) bending the hook portion of the other of the two hooks. The first three operations are performed on both hooks simultaneously and hence by my method the total number of operations to form two hooks is reduced from 8 to 5, or, the number of operations per completed hook is reduced from 4 to 2½.

It will also be clear from the foregoing description that waste in material is practically eliminated in my method. Merely the relatively thin metal removed from the central portion 10 of the blank and the trim at the ends 3' or 3'' is discarded. The latter will be even less than that illustrated when the hooks made are to be used in brick or concrete walls. The hooks 2 illustrated are for use in wood and thus have relatively narrow driving tangs 3, whereas hooks to be used in brick or concrete are provided with much wider driving tangs and there is thus less material wasted at the ends 3' and 3'' when the latter type hooks are made.

Fig. 9 illustrates how a sheet of metal, rather than a narrow strip thereof, may be used in my method.

The sheet of metal 15 therein illustrated has a width equal to the length of the blank 1 and is not cut into blanks prior to being fed to the die press as is the blank 1.

In this form of the invention, the sheet of metal 15 is fed directly to the die press, intermittently or step-by-step, and each time the die press is actuated, a strip or incremental length 16 of the sheet 15 is given the form or

shape illustrated in Fig. 4, partially forming two hooks 2 as indicated by broken lines.

After the sheet of metal 15 is passed through the die press, the partially formed blanks defined by the strips or incremental lengths 16 may be cut from the sheet 15, and subjected to the trimming and bending operations previously described in connection with the blank 1'. Alternatively, if desired, the partially formed blank cutting operation can be combined with the trimming operation and thus reduce the total number of operations per completed hook to two, rather than two and one-half.

It will be obvious, of course, that a sheet of metal such as the sheet 15 may be used to form the blanks 1, rather than an elongated strip of metal, if desired.

From the preceding description, it will be seen that I have provided a downspout hook which is cold worked and composed entirely of either flat sheet metal or metal wire, in which no metal weakening operations are employed since the pressure applied to the metal to form the hook is all applied in the same direction and no twisting action takes place during the course of making the hook. The hook that I have provided, as illustrated in Figs. 7 and 8, will be seen to have been strengthened during the course of its manufacture since the flattening and pressing of the metal materially strengthens the hook. Attention is particularly directed to the hardened exterior rib portion 12 of the hook portion 11 which functions to reinforce the hook portion so that the same will permanently retain its shape whether it be semi-circular, or any other shape.

It is to be particularly observed that the driving tang 3 is in general spaced radially outward from the hook portion 11 and thus all blows received by the offset portion or driving head 9 are transmitted directly to the driving tang 3 with no ill effect upon the hook portion 11. If any effect should occur with respect to the hook portion, it will be advantageous because the hook will be forced snugly against the downspout.

In the appended claims, the terminology "strip of metal" is intended to include both flat metal and metal wire of any cross-sectional configuration.

This application is a continuation-in-part of my application Serial No. 767,424, filed August 8, 1947, now abandoned, for Downspout Hook.

Other modes of applying the principle of my invention may be employed instead of the ones explained, change being made as regards the article and the steps herein disclosed, provided those stated by any of the following claims or their equivalent be employed.

I claim:

1. A method of making downspout hooks, which comprises, die-pressing an elongate strip of metal defining a blank to taper each end portion of said blank and to form an elongated longitudinally extending central reduced portion between said end portions, then cutting and trimming said blank to form two said hooks including trimming said end portions and cutting said blank longitudinally along the axis of said reduced portion and laterally from the ends of such longitudinal cut to the opposite edges of said blank to separate said blank into two members each having a shoulder, a tapered end portion defining a driving tang with said shoulder, and an elongate narrow portion, and finally bending said elongate narrow portion of each said member into a hook of desired shape.

2. A method of making downspout hooks, which comprises, feeding a sheet of flat metal through a die-press in a step-by-step movement, die-pressing said sheet of metal in strips or incremental lengths defining blanks to taper each said end portion thereof and to form an elongated longitudinally extending central reduced portion between said end portions, then cutting and trimming each said blank to form a plurality of hooks including, trimming said end portions and cutting each said blank longitudinally along the axis of said reduced portion and laterally from the ends of such longitudinal cut to the opposite edges of each said blank to separate each said blank into two members each having a shoulder, a tapered end portion defining a driving tang with said shoulder, and an elongate narrow portion, and finally bending said elongate narrow portion of each said member into a hook of desired shape.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
2,365,971	Rachlin	Dec. 26, 1944