Dec. 22, 1931. W. T. NEWTON 1,837,629

METHOD AND APPARATUS FOR PRODUCING RAISED CONFIGURATIONS ON METALLIC SURFACES

Filed Sept. 5, 1930

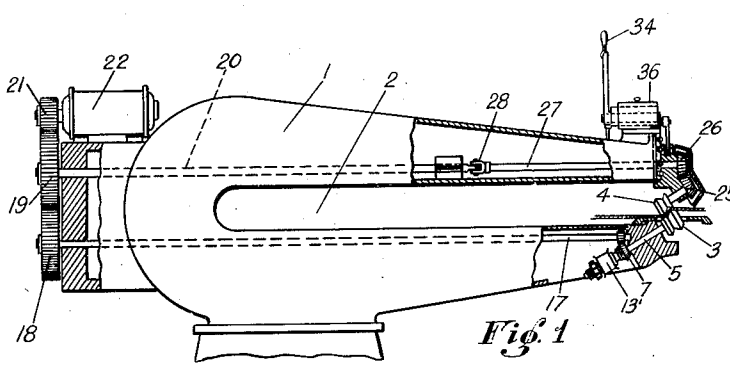


Fig. 1

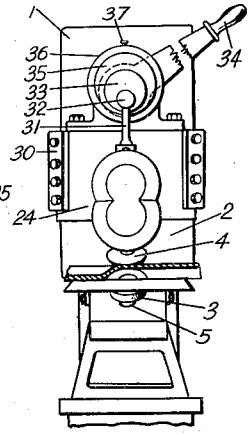


Fig. 2

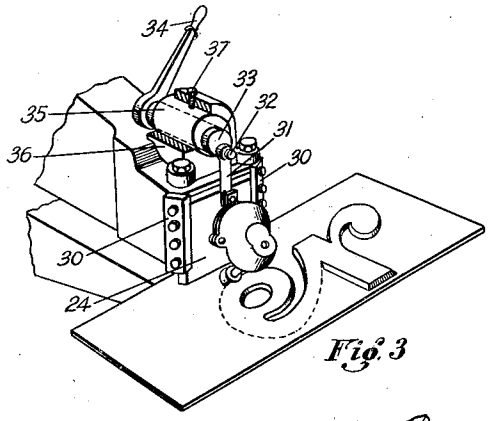


Fig. 3

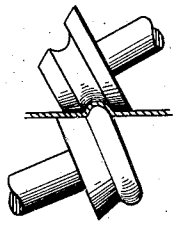


Fig. 6

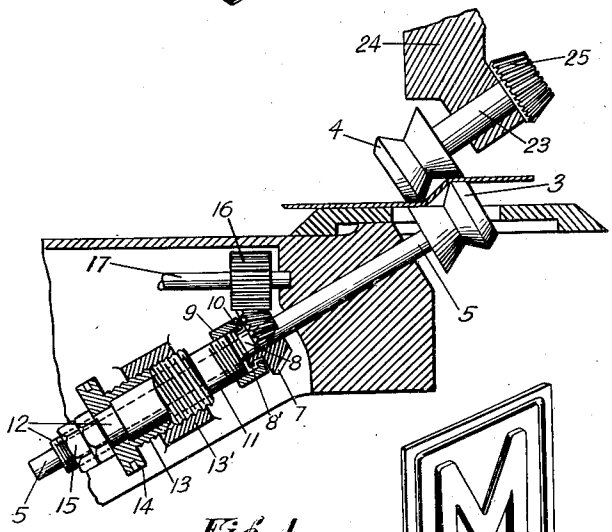


Fig. 4

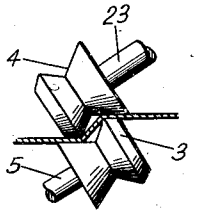


Fig. 5

Fig. 7

INVENTOR.
William T. Newton.

BY Edwin P. Coffin

ATTORNEY

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UNITED STATES PATENT OFFICE

WILLIAM T. NEWTON, OF LIMA, OHIO, ASSIGNOR TO THE ARTKRAFT SIGN COMPANY, OF LIMA, OHIO, A CORPORATION OF OHIO

METHOD AND APPARATUS FOR PRODUCING RAISED CONFIGURATIONS ON METALLIC SURFACES

Application filed September 5, 1930. Serial No. 479,840.

This invention relates to a method and apparatus for producing raised configurations on metallic surfaces. It has to do more particularly with the provision of a novel apparatus for creating symbols, borders and the like on the display surface of a sign, although it is not limited to such application and may be employed to produce beads, borders and the like, on metallic panels and sheets utilized in other capacities.

In the past, it has been customary in the making of metallic signs involving more than one letter or involving designs or letters above a predetermined size, to use several different methods. One method has consisted in constructing the individual letters of wood and then affixing them to a panel in proper order. Another method has been to stamp or fabricate a panel for each letter from a piece of sheet metal and to thereafter affix these stamped panels to a background of wood or metal.

Obviously, the sign made up of wooden letters, symbols or designs has certain drawbacks such as lack of durability and tendency for the letters, designs or symbols to become detached. Furthermore, signs constructed in this manner require frequent painting and, on the whole, are unduly costly.

The process of making signs by stamping sections thereof upon sheet metal panels to be afterwards affixed to a main panel is even more costly, particularly in the making of letters, designs or symbols which are of unusual size. In order to produce signs of this type, the manufacturer finds it necessary to have a separate die for each letter or panel section and these dies are expensive. This is particularly so where the letters are large. It will also be apparent that there are some letters, designs or symbols which cannot be fully made by one stamping operation and which must be made by stamping sections of such letters, designs or symbols and subsequently assembling them. This is a laborious process and is always attended by the possibility that objectionable cracks or crevices will appear between the sections of such letters, designs or symbols.

One object of this invention is to provide a method and apparatus for producing characters on a sheet of metal in an economical manner and without the necessity for producing dies in advance.

Another object of this invention is to provide a method and apparatus for producing raised characters on a sheet of metal in such a manner that the letters of a word or the lines of any given design may be produced, if desired, by one continuous operation.

A still further object of my invention is to provide a method and apparatus which are equally adapted to the production of small size letters, designs or symbols or large size letters, designs or symbols without altering the structure or apparatus used, at least for a substantial range of sizes of letters, designs or symbols.

My invention preferably contemplates the formation of raised or depressed characters upon a sheet of metal by means of a rolling process wherein any given letter, design or symbol may be started and completed practically without interruption. In accomplishing this, I preferably use an apparatus embodying offset rollers effective to press a portion of a metal sheet out of its normal plane, these rollers being so supported that the metal may be so turned while being operated upon, as to cause these rollers to produce any desired design which has preferably been previously traced upon the metal. Frequently, it may be desirable to form each letter by two or more operations, as by raising one edge of the letter by one operation and then raising another edge of the letter by another operation. Nevertheless, the operations when once started are practically continuous and they have a flexibility entirely lacking in previously known methods and apparatus for producing letters, designs or symbols.

The apparatus which I preferably use for performing my method is shown in the accompanying drawings wherein similar characters of reference designate corresponding parts and wherein:

Figure 1 is a side elevation partially broken away of my preferred type of apparatus, shown operating upon a sheet of metal.

Figure 2 is an end elevation of the structure shown in Figure 1.

Figure 3 is a perspective view of the roller end of the structure shown in Figure 1 with the rollers shown operating upon metal.

Figure 4 is an enlarged section of the roller end of my apparatus.

Figure 5 is a detail view of the rollers of my apparatus adjusted to a position to vary the angle of inclination of the edge of the letter.

Figure 6 is a detail view illustrating a modified pair of rollers that may be utilized in producing designs in metal.

Figure 7 is a perspective view of a completed letter formed in metal by my method and apparatus.

With reference to the drawings, I have shown my apparatus as comprising a casting 1 which is equipped with a throat 2. At the entrance end of this throat 2 are provided normally spaced rollers 3 and 4.

The lower roller 3 is mounted upon a shaft 5 which is journalled at an angle in the lower jaw of the casting. This shaft 5 extends downwardly and rearwardly into an open space 6 in this lower jaw of the casting and it carries a bevel gear 7 which is keyed thereon and is rotatable therewith, such gear being located intermediate the length of the shaft and normally lying in the open space 6. The bevel gear 7 is provided with an integral collar 8 upon its rear surface provided with a raised flange 8′ and this collar and flange are embraced by a complemental cap 9 having a flange 10 upon its forward end.

The cap 9 is threaded upon the sleeve 11 which extends rearwardly and has a reduced extension 12 thereon, the reduced portion being threaded externally. The connection between the collar 8 and the cap 9 is such as to permit rotation of the bevel gear with the shaft 5 independently of the cap 9, the purpose of the collar being to position the gear on the shaft in such a manner as to prevent longitudinal movement thereof with relation thereto, unless moved bodily with the cap in a manner hereinafter described.

Embracing the sleeve 11 is an externally threaded sleeve 13 that is threaded into an annular extension 13′ and formed as a part of the jaw casting and located in the open space 6. Furthermore, the sleeve 11 is provided with a collar 14 integrally formed upon its lower end, the collar 14 being apertured to fit the reduced portion 12 of the sleeve 11. Lock nuts 15 are threaded upon the reduced portion 12 and serve to hold the integral collar 14 firmly against the shoulder produced by the reduced extension 12 upon the sleeve 11.

This structure is such as to permit of the ready adjustment of the bevel gear 7 and the shaft 5, along the axis of this shaft 5 by merely rotating the collar 14 in the extension 13′ located in the open space 6. The effect of such an adjustment is illustrated by comparing Figures 4 and 5, which show that the rolls 3 and 4 thereby assume different positions so as to vary the angle of inclination of the edge of a letter, symbol or design to vary the appearance thereof. The teeth of the bevel gear 7 and the gear which drives it are of such depth in proportion to the necessary adjustment that these gears will always remain adequately in mesh to maintain the driving action.

This lower roller 3 is driven through the medium of the bevel gear 7 by means of a driving gear 16 rigidly secured to a shaft 17. This shaft 17 is provided on its opposite end with a rigidly mounted gear 18 which is in mesh with a gear 19 upon a parallel shaft 20. The gear 19 is driven by a gear 21 directly mounted upon the rotor shaft of a motor 22 mounted upon the casting 1.

The upper roller 4 has a shank 23 which is angularly mounted in a slide 24 and which is provided upon its outermost end with a bevel gear 25. The bevel gear 25 is in mesh with a bevel gear 26 mounted upon a shaft 27. The shaft 27 is connected by means of a universal connection 28 to the shaft 20, after passing to the slide 24 and into a hollow portion 29 of the upper jaw member of my apparatus.

The slide 24 is held in vertical position by means of guides 30 upon the outer end of the upper jaw of the casting 1. It may be vertically adjusted in these guides through the medium of a link 31 whose lower end is connected to this slide 24. The upper end of this link 31 is enlarged and apertured for the reception of a crank pin 32 eccentrically mounted upon a shaft 33, to the opposite end of which is secured a handle 34. Raising or lowering of this handle is effective to move the upper roller 4 out of or into operative position, by raising or lowering the slide 24.

The initial position of the slide 24 and consequently of the roller 4 may be altered, owing to the fact that the shaft 33 is eccentrically mounted in a sleeve 35 which is carried within the housing 36. This sleeve 35 may be rotated manually upon its release from the restraint of the set screw 37. When adjusted to the desired position, the set screw may again be adjusted to secure the sleeve 35 in its adjusted position.

In operation, it is ordinarily desirable to trace the letter, design or symbol to be formed upon the metal sheet on which it is to be formed by means of a pencil or other marking means. Then, the sheet of metal may be introduced into the throat 2 in such a manner as to bring the sheet into proper relation to the rollers 3 and 4, ordinarily at the beginning of the initial stroke of the letter. When the metal is in this position, the hand lever is depressed and, with the rollers positively driven, the sheet of metal is slowly moved and

turned to cause the cooperating edges of the rollers 3 and 4 to follow the edge of the letter to be formed. This movement is preferably continued until the edge of the letter is completely formed and if a series of continuous script letters are being formed, the operation may be continued until all of the letters have been formed.

The contour of the cooperating surfaces of the rollers 3 and 4 is preferably such that the metal is so rolled as to form an obtuse angle along each edge of the letter, design or symbol, although the angle may be varied by adjusting the lower roll axially as hereinbefore mentioned. When the edge of the letter, design or symbol is so formed, there results a plateau-like letter, design or symbol although it will be apparent that the formation of these letters may be varied by varying the cooperating contour of the rollers.

It will be apparent from this that I have provided an extremely simple method and apparatus which permits the formation of letters of metal without stamping and by a continuous process. Likewise, it will be obvious that no dies are necessary and that there is practically no limitation upon the size of the letters which may be formed, it being only necessary to have the throat 2 of any depth necessary to afford adequate clearance. Obviously, I may utilize a machine having a throat of greater or less depth than that shown, depending upon the class of work to be performed.

It will be apparent that several adjustments are possible with my apparatus. For one thing, the rolls 3 and 4 may be adjusted with relation to each other as indicated by comparison of Figures 4 and 5. It will be obvious that this will vary the contour of the letter, symbol or design formed, particularly the cross sectional contour. It will likewise be apparent that the adjustment provided by the eccentric sleeve 35 will permit of the embossing of sheets of metal of varying thicknesses without further adjustment of the device. To vary the depth of the letter depends largely upon the shape of the rollers 3 and 4, it being obvious that the rolls may be removed and replaced by differently designed rolls for the purpose of making letters of different contour or for any other desired purpose.

With the form of rolls shown in Figure 6 and with the depth of casting throat shown, it is possible to form a scroll of the cross section indicated but of any desired design in the center of a sheet of metal of considerable area. Obviously the depth of throat shown permits forming the scroll on a sheet of comparatively large area.

Having thus described my invention, what I claim is:

1. The method of producing letters, designs, or symbols in metal which comprises placing a sheet of metal between rollers so that said sheet contacts with the rollers at a portion away from the edges of the sheet, and causing the rollers to raise the metal in one direction and then in another direction along and above the surface of the metal sheet around the letter, design, or symbol to be formed, said sheet of metal being in continuous rolling contact with said rollers throughout the entire operation.

2. Apparatus for producing letters, designs, or symbols in sheet metal comprising a support provided with a horizontal opening, cooperating rolls adjacent to said opening and disposed at an angle thereto for forming a raised portion in such sheet of metal, means for moving said rolls axially relative to each other, and means for rotating said rolls to thereby produce a raised portion corresponding to the shape of the letter, design, or symbol in any direction in the metal.

3. Apparatus for producing letters, designs, or symbols in sheet metal comprising a support provided with a horizontal opening, cooperating rolls adjacent to said opening and disposed at an angle thereto for forming a raised portion in such sheet of metal, means for moving said rolls axially relative to each other, means for moving said rolls transversely relative to each other to vary the height of the raised portion to be formed, and means for rotating said rolls to thereby produce a raised portion corresponding to the shape of the letter, design, or symbol in any direction in the metal.

In testimony whereof I hereby affix my signature.

WILLIAM T. NEWTON.