J. S. DUNCAN.

DIE.

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1,048,460.

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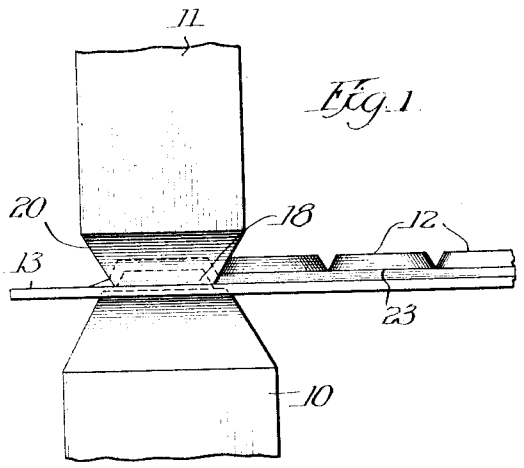

Fig. 1.

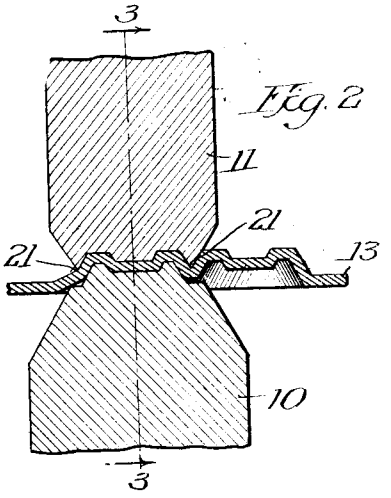

Fig. 2.

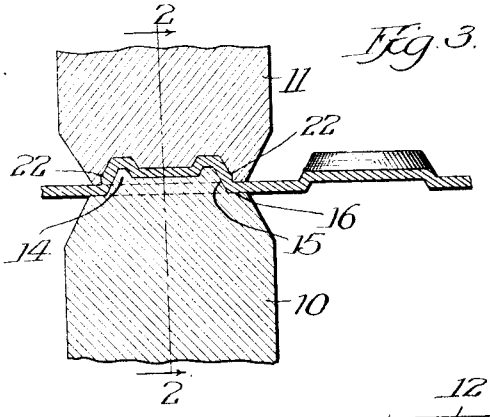

Fig. 3.

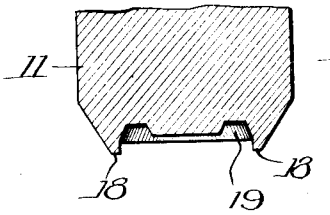

Fig. 4.

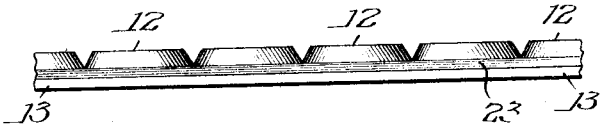

Fig. 5.

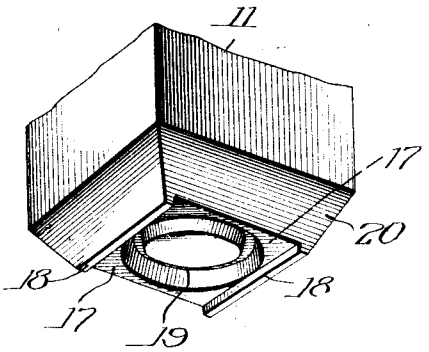

Fig. 6.

Witnesses

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To all whom it may concern:

Be it known that I, JOSEPH S. DUNCAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Dies, of which the following is a specification.

This invention relates particularly to dies which are employed in connection with suitable punches for stamping up the printing characters on sheet-metal blanks or plates.

One of the principal objects of the present invention is the provision of a die by means of which, when employed in connection with a companion punch, the printing characters on a sheet-metal printing device can be struck up much closer together than it has heretofore been possible to form them, thus permitting the printing characters to be arranged as closely together as the impressions made by an ordinary typewriter appear on the paper, so that the impressions made by the printing device will very closely represent typewritten matter.

The invention will be best understood by reference to the following description when considered in connection with the accompanying drawings illustrating a preferred embodiment of the die.

Referring to the drawings—Figure 1 is a fragmentary side elevation showing my improved die and its companion punch in coöperative relation, and a section of a sheet-metal printing device with a number of printing characters formed thereon; Fig. 2 is a transverse sectional view taken substantially on the line 2—2 of Fig. 3; Fig. 3 is a longitudinal sectional view taken substantially on the line 3—3 of Fig. 2; Fig. 4 is a detail sectional view of the die shown in Figs. 1, 2 and 3; Fig. 5 is an elevation of a sheet-metal printing device showing a line of type formed thereon; and Fig. 6 is a perspective view of the die employed in forming the characters shown in Fig. 5.

Prior to my present invention the printing characters on sheet-metal printing devices have been formed independently of each other by stamping them up directly to the required height on a metal blank by means of ordinary punches and dies, but because of the construction of the punches and dies the individual printing characters in each line have been spaced some little distance apart. It is, however, very desirable in some classes of printing that the individual printing characters in the lines be located closely together, particularly where the printing devices are to be employed for printing matter in imitation of typewriting and my present invention is designed to form the individual printing characters in each line more closely together than it has heretofore been possible to arrange them.

From the drawings it will be observed that I employ a punch 10 of suitable construction which coöperates with my improved die 11 to stamp up the printing characters 12 on one face of a sheet-metal blank 13. The punch 10 is provided at its operating end with a suitable elevated character-forming portion 14 the outer walls of which taper toward the body of the punch, as indicated at 15, and merge at their bases into a flat portion 16 which forms a flat shoulder or ledge surrounding the character-forming portion.

The die 11 which coöperates with the punch 10 is provided at its operating end with a channel or recess extending transversely across the face of the die forming at its bottom a flat face 17 bounded at opposite edges by the flanges or lips 18 which project longitudinally of the die beyond the face 17. The character-forming depression 19 similar in shape to the character-forming elevation 14 on the punch is formed on the face 17 between the flanges 18. It will be observed, therefore, that the face 17 at the sides of the character-forming depression merges directly into the inclined walls 20 of the die while at the top and bottom of the depression the walls extend some little distance beyond the face of the die in the form of flanges or lips 18.

When the punch and die are brought into coöperative relation the metal at the top and bottom of the die, or between the lines of printing characters, is maintained in its normal plane by the flanges or lips 18 the edges of which, when the punch and die are forced together, are spaced from the shoulder 16 of the punch a distance equal to the thickness of the sheet-metal blank being operated upon. The metal at the top and bottom of the character being formed, or, in other words, between the lines of characters, is, therefore, maintained in its original plane. The metal at the sides of the

character, however, is elevated or distorted from its original plane by the punch as far as is permitted by the side edges 21 of the face 17. This distortion of the metal between the adjacent characters is plainly evident from an inspection of Fig. 2 where it will be seen that the metal at the left of the character being formed is curved upwardly from its original plane and the metal at the right of the character being formed, or between the adjacent characters, is elevated or drawn upwardly some little distance above its original position.

By constructing the die in the manner above described so that the top and bottom walls of the die project downwardly beyond the side walls, I am enabled to form the printing characters very closely together without unduly stretching the metal between the characters or tearing or breaking it at that point. The square shoulders 22 formed between the ends of the character-forming depression 19 and the lips 18 permit the metal of the blank being worked to crowd into this space and relieve, to a certain extent, the wedging action which would tend to break off the lips 18 if the die were made with a continuous incline from the outer edges of the lips 18 to the bottom of the character-forming depression. The stretching or crowding of the metal into the shoulders 22 produces at the top and bottom of the printing characters a sort of panel 23 and the metal instead of being stretched from its original plane to the full depth of the character at one operation is, in reality, stretched twice so that the strain on the metal is somewhat relieved. One stretching takes place between the lower edges of the lips 18 and the face 17 and the other stretching takes place between the face 17 and the bottom of the character-forming depression.

From the foregoing it will be understood that by means of my improved die I am enabled to stamp up printing characters on a sheet-metal plate without fracturing or unduly stretching the metal at the tops and bottoms of the characters and am also enabled to form the characters much closer together than has heretofore been possible and without unduly stretching the metal between the characters since at this point the metal is raised or distorted above its original plane.

I have shown in the present instance, for purposes of illustration merely, a punch and die formed to produce the letter "O" but it will be obvious, however, that the punch and die can be constructed to produce any desired letter, figure or character. The proportions and the details of construction of my improved die are obviously capable of considerable variation without departure from the spirit of the invention or sacrificing any of the material advantages thereof.

I claim:

1. A die for forming printing characters in a metal plate, comprising a body having a die face provided therein with a channel open at each end, there being a printing character forming element within the channel, the walls of the channel being at the top and bottom respectively of the character-forming element and projecting beyond the same.

2. A die for forming printing characters in a metal plate, comprising a body having a die face provided therein with a channel open at each end, there being a printing character forming element within the channel, the walls of the channel being at the top and bottom respectively of the character forming element and projecting beyond the same, the edges of the die body at the open ends of the channel being cut away.

3. A die for forming printing characters in a metal plate, comprising a die body having a die face provided with a printing character forming element, and lips projecting from and beyond the plane of the die face at the top and bottom only of the character-forming element to retain the metal being operated upon in its original plane.

4. A die for forming printing characters in a metal plate, comprising a die body having a die face provided with a printing character forming element, and lips projecting from and beyond the plane of the die face at the top and bottom only of the character-forming element to retain the metal being operated upon in its original plane, the space between the corresponding lips and at the side of the character-forming element being open to permit displacement of the plate at the side of the printing character forming element into said space.

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