A. WILKINSON.

APPARATUS FOR FORMING CHARACTERS OUT OF SHEET MATERIAL.

APPLICATION FILED MAY 1, 1911.

1,048,775.

Patented Dec. 31, 1912.

2 SHEETS—SHEET 1.

Fig. 3

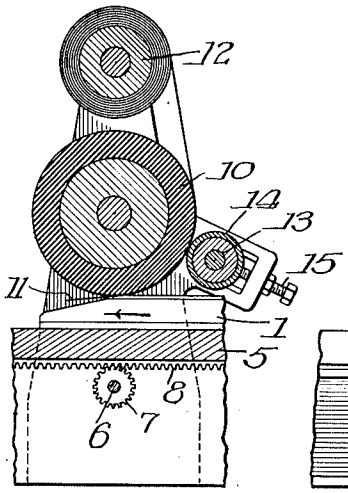


Fig. 1

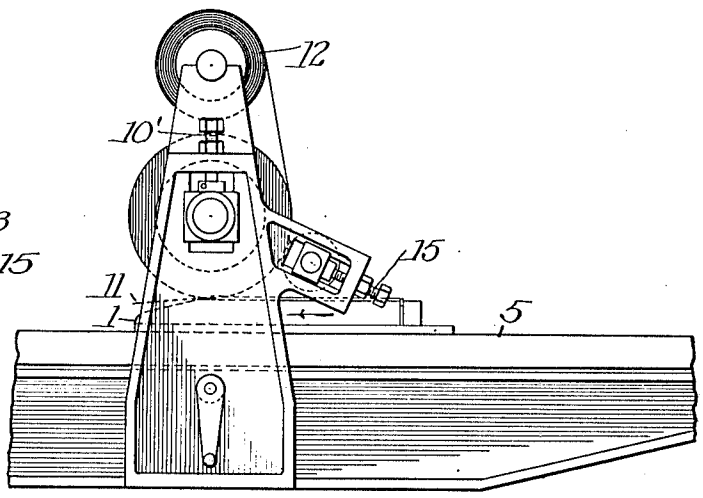
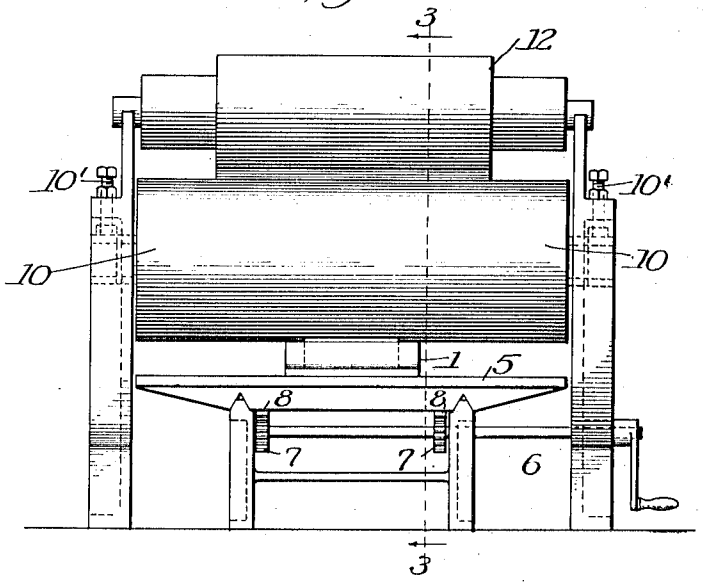


Fig. 2



Witnesses:

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2 SHEETS—SHEET 2.

Fig 4

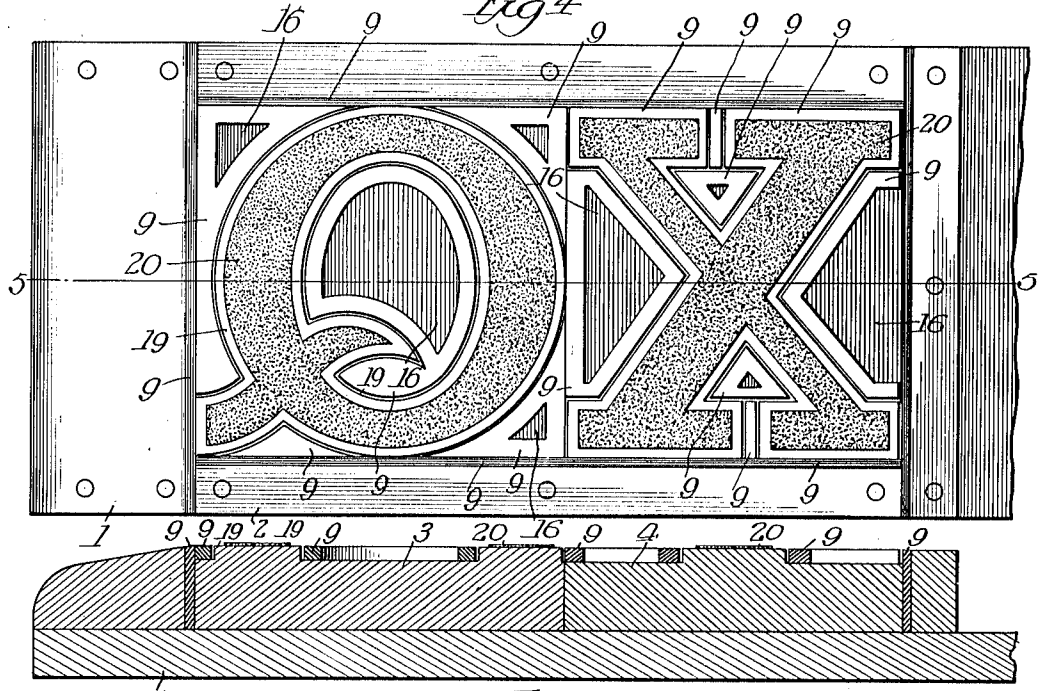


Fig 5.

Fig 6.

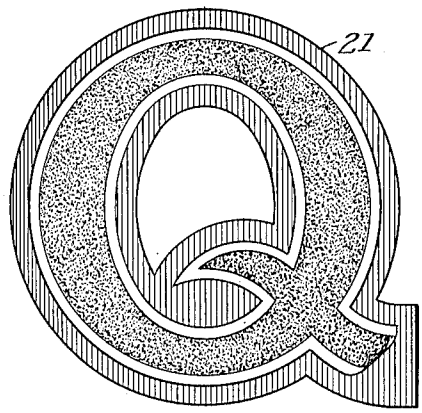
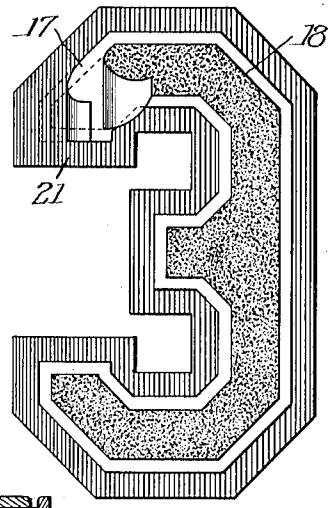


Fig 7.



Witnesses:

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Fig 8

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR FORMING CHARACTERS OUT OF SHEET MATERIAL.

1,048,775. Specification of Letters Patent. Patented Dec. 31, 1912.

Application filed May 1, 1911. Serial No. 624,436.

To all whom it may concern:

Be it known that I, ALBERT WILKINSON, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Apparatus for Forming Characters Out of Sheet Material, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to apparatus for forming characters out of sheet material, the characters produced by the apparatus of my invention being of service, for example, in the formation of signs or in the formation of stencils with the aid of which signs may be painted.

My invention has among its objects the provision of means whereby a single sheet cut to produce a character may present the appearance that was hitherto presented by two sheets of different appearance, one superposed upon the other and unequal in area. By means of this feature of my invention I am enabled to produce a character out of a single sheet of tin foil in which the marginal portions of the character are smooth and the balance is mottled.

A machine which is constructed to carry out the first object of my invention, and which is also desirably employed to carry out the second object of my invention, may generally be described as residing in a punch member capable of penetrating the sheet material such as tin or other metal foil, a die member made of resilient material such as rubber into which the punch member may be embedded so as to cut the sheet material that is interposed between the punch and die members and auxiliary sheet supporting means margining the edge portions of the punch element so as to prevent such a movement of the yielding die member beyond the cutting plane or surface of the punch member presented to the die member as would interfere with the proper operation of the punch upon the sheet material, whereby the sheet material is smoothly cut by and along the cutting edges of the punch. In the preferred embodiment of my invention the auxiliary sheet supporting means is itself also yielding so that it may very closely approach the cutting edge portions of the punch and may sufficiently yield to permit the cutting edge portions of the punch properly to depress the yielding body of the die to enable the punch to perform its cutting function. In one embodiment of the invention, however, the auxiliary supporting means that margins the cutting edges of the punch is unyielding, in which event the clearance between the same and the punch is sufficient to permit of the entry of the yielding material of the die into said clearance to an extent that will permit the punch to do its work.

In accomplishing the second object of my invention, the face of the punch is smooth along its cutting edges so as to produce a smooth shiny surface margining the edges of the character that is produced, the balance of the punch surface being mottled or roughened, as by means of emery so as to produce the desired mottled appearance in the formed characters whereby a single sheet may serve to present an appearance that was hitherto produced by distinct sheets, one superposed upon another.

I will explain my invention more fully by reference to the accompanying drawings showing the preferred embodiment thereof and in which—

Figure 1 is a side elevation of a part of a machine constructed in accordance with the preferred embodiment of my invention; Fig. 2 is an end view of the machine shown in Fig. 1; Fig. 3 is a sectional view on line 3—3 of Fig. 2; Fig. 4 illustrates one form of a punch that may be employed; Fig. 5 is a sectional view on line 5—5 of Fig. 4; Fig. 6 is a view of one of the characters produced by the machine of my invention, a backing for this character being also shown in this figure; Fig. 7 is a view showing a character as produced in accordance with the hand method of the prior art; and Fig. 8 is a sectional view showing a part of a modified punch element.

Like parts are indicated by similar characters of reference throughout the different figures.

The punch member 1 of the machine is made up in a shape to conform with the character or characters to be produced. This punch member desirably includes a chase 2 in which the character forming elements 3 and 4 of the punch are removably secured, though it is to be understood that I do not limit myself to a punch element in which the

character forming parts are separable from the chase or other support therefor. The character forming parts 3 and 4 of the punch are, in the example chosen for illustration, adapted to form the characters Q and X respectively. The punch member, in the embodiment of the invention illustrated, is shown as being flat and as occupying a position upon the flat bed 5 to which the punch member is clamped. The bed 5 is adapted to be reciprocated as a consequence of the rotation of a hand crank shaft 6 carrying pinions 7 in engagement with rack bars 8, the bed 5 and the punch member traveling therewith being somewhat analogous to the bed of a flat bed cylinder press.

While I prefer to locate the punch member of the machine of my invention upon a flat reciprocating bed, I do not wish to be limited to this characteristic.

Referring now more particularly to Figs. 4 and 5, the cutting edges of the character forming elements 3 and 4 are margined by auxiliary sheet supporting means 9 whose upper faces are desirably flush with the cutting face of the punch element and which auxiliary sheet supporting means are made of yielding material so that the yielding die may slightly depress the auxiliary sheet supporting means and thereby permit the punch to enter the die to an extent that will enable the punch to cut the sheet material that is interposed between the die and the punch. To insure the best results, the supporting means 9 are desirably slightly separated from the contiguous punch cutting edges.

Referring now more particularly to Fig. 8, the auxiliary sheet supporting means 9 are shown as being made of unyielding material such as wood, in which event the clearance that intervenes between the cutting edges of the punch element and the supporting means 9 is sufficiently great to permit of the admission therein of the yielding die to an extent that will enable the punch to perform its function. The edge portions of the auxiliary sheet supporting means 9, shown in Fig. 8, that are presented to the cutting edges are desirably rounded to prevent the supporting means 9 from themselves cutting the sheet material. With the aid of the rigid or yielding auxiliary sheet supporting means 9, the sheet from which the characters are to be cut is gripped (by the engagement of the yielding die and the supporting means 9) so that the punch is able to cut its way through the sheet material without having the parts of the sheet material surrounding the punch and surrounded by the punch move with the punch and the die to an extent to prevent the punch from having proper shearing or cutting action upon the sheet material interposed between the punch and die.

Inasmuch as the punch is, in the embodiment of the invention illustrated, located flat upon the base of a traveling flat bed, the die is in the form of a cylinder inclosed by a heavy coating 10 of a yielding resilient, compressible and self-expansible material such as rubber employed in printing ink rollers. This cylinder presses upon the punch element as the punch element is moved beneath the same and the yielding material 10 upon the circumference of the cylinder operates upon the punch element to cut the sheet material 11 that is between the punch and cylinder. The cylinder thus constitutes a rotating die but I do not wish to be limited to a rotating die. The sheet material that is to be cut, such as metal foil, is passed between the die and punch from a supply roller 12, a presser roller 13, having a yielding rubber coating 14, being held against the foil by means of presser bolts 15. The die 10 is rotated by the punch element that is forced to travel beneath the die and the sheet material 11 is fed from the roller 12 owing to the pull exerted thereupon by the opposed surface of the punch and die applied thereto. As the punch is moved in the direction indicated by the arrows in Figs. 1 and 3, the die 10 is turned in a clockwise direction, the periphery of the die being indicated upon the cutting faces of the punch member by initially riding upon the front inclined portion of the punch structure. When the die has reached the top surface of the punch structure it is under such a degree of compression, owing to the adjustment effected by the bolts 10^1 where it contacts with the punch structure, as to enable it to expand where it encounters the auxiliary sheet supporting means 9 to depress said devices when they are themselves made of yielding material or to enter the enlarged clearance between said supporting means 9 and the adjacent cutting edges of the punch when such auxiliary sheet supporting means are unyielding whereby the sheet material 11 is depressed with the portions of the yielding die that sink upon the supporting means 9 or into the spaces between said supporting means and the punch with the results which have been specified. Where the auxiliary supporting means are made of rubber or other suitable yielding material, they are made hollow when covering any appreciable area, hollow spaces being illustrated at 16 in Figs. 4 and 5. These hollow spaces prevent the cylindrical die from causing the yielding elements 9 to bulge and pile up adjacent to the cutting edges, it being apparent that if the elements 9 were permitted to pile up near the cutting edges that such piling action might be of sufficient extent to prevent the cylindrical die from depressing the elements 9 below the cutting face of the punch element and thereby prevent the punch element from cutting the sheet material.

By means of my invention I am enabled to cut the characters in any shapes that may be desired irrespective of the nature of the sheet material that is suitable to the operation of the machine. Hitherto it has been the practice to form characters out of sheets of tin or other metal foil by the careful manipulation of hand operated tools. It was impossible commercially with the method of the prior art to cut characters in all sorts of shapes and with all sorts of curves out of tin foil. In the prior art it was also customary, when it was desired to have a character present a smooth edge and a mottled surface surrounded thereby, to employ two sheets for each character as illustrated for example in Fig. 7, the nether sheet 17 being smooth throughout the upper sheet 18 being mottled throughout, the latter sheet being of lesser extent than the first so that when the two sheets were glued together a smooth border afforded by the nether sheet 17 would surround the upper sheet 18. By means of another feature of my invention I am enabled to produce the smooth and mottled appearance as indicated in Fig. 7 by a single sheet. To this end the character forming elements are provided with smooth borders 19 margining their cutting edges and surrounding a roughened space which may be produced by gluing emery upon the cutting face of the character forming element as indicated at 20.

After the character has been produced it is usually provided with a backing as indicated at 21 in Fig. 6 (this backing itself constituting a character) when these characters are to be fastened upon glass. The backing 21 may also be made of tin foil with the aid of a machine of my invention.

While I have herein shown and particularly described a machine for producing characters that are to form parts of signs, I do not wish to be limited to the precise nature and purpose of the product of the machine.

Changes may readily be made in the machine forming the preferred embodiment of my invention without departing from the spirit of my invention and I do not therefore wish to be limited to the precise details of construction, but

Having thus described my invention, I claim as new and desire to secure by Letters Patent the following:—

1. A machine for producing characters including a punch element having cutting edges conforming to the character to be produced; a yielding die element into which the punch may be impressed and between which punch and die elements sheet material may be fed from which the characters are to be cut; and auxiliary yielding compressible and self-expansible sheet supporting means adjacent to the cutting edges of the punch and operating to support the sheet in contact with the die to enable the punch to have proper cutting action upon the sheet.

2. A machine for producing characters including a punch element having cutting edges conforming to the character to be produced; a yielding rotating die element into which the punch may be impressed and between which punch and die elements sheet material may be fed from which the characters are to be cut; and auxiliary yielding compressible and self-expansible sheet supporting means adjacent to the cutting edges of the punch and operating to support the sheet in contact with the die to enable the punch to have proper cutting action upon the sheet.

3. A machine for producing characters including a punch element having cutting edges conforming to the character to be produced; a yielding die element into which the punch may be impressed and between which punch and die elements sheet material may be fed from which the characters are to be cut; and auxiliary yielding sheet supporting means adjacent to the cutting edges of the punch and operating to support the sheet in contact with the die to enable the punch to have proper cutting action upon the sheet, the auxiliary supporting means being hollow to prevent the die from piling it up to an objectionable extent.

4. A machine for producing characters including a punch element having cutting edges conforming to the character to be produced; a yielding rotating die element into which the punch may be impressed and between which punch and die elements sheet material may be fed from which the characters are to be cut; and auxiliary yielding sheet supporting means adjacent to the cutting edges of the punch and operating to support the sheet in contact with the die to enable the punch to have proper cutting action upon the sheet, the auxiliary supporting means being hollow to prevent the die from piling it up to an objectionable extent.

5. A machine for producing characters including a punch element having cutting edges conforming to the character to be produced; a yielding die element into which the punch may be impressed and between which punch and die elements sheet material may be fed from which the characters are to be cut; and auxiliary yielding, compressible and self-expansible sheet supporting means adjacent to the cutting edges of the punch and operating to support the sheet in contact with the die to enable the punch to have proper cutting action upon the sheet, the auxiliary supporting means being hollow to prevent the die from piling it up to an objectionable extent.

6. A machine for producing characters

including a punch element having cutting edges conforming to the character to be produced; a yielding rotating die element into which the punch may be impressed and between which punch and die elements sheet material may be fed from which the characters are to be cut; and auxiliary yielding, compressible and self-expansible sheet supporting means adjacent to the cutting edges of the punch and operating to support the sheet in contact with the die to enable the punch to have proper cutting action upon the sheet, the auxiliary supporting means being hollow to prevent the die from piling it up to an objectionable extent.

In witness whereof, I hereunto subscribe my name this 29th day of April A. D., 1911.

ALBERT WILKINSON.

Witnesses:
G. L. CRAGG,
ETTA L. WHITE.