

E. POCKOCK.
CUTTING DIE.

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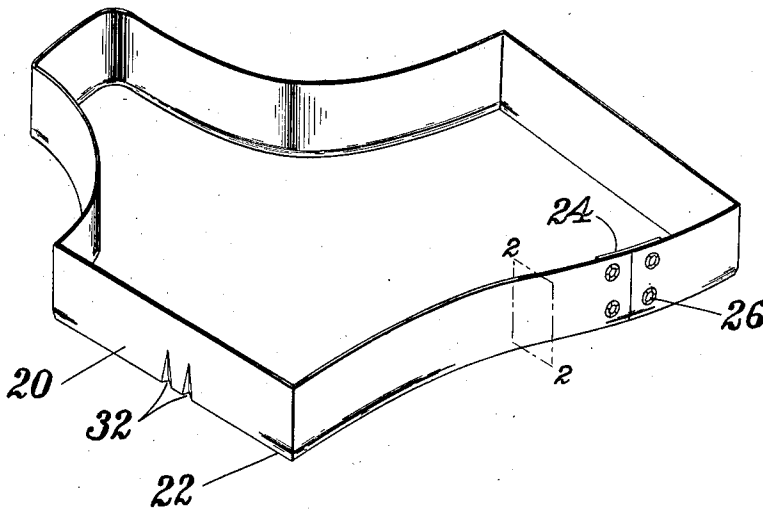


Fig. 1.

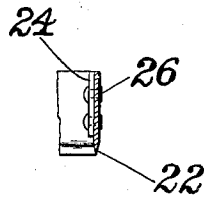


Fig. 2.

WITNESSES.

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CUTTING-DIE.

1,056,448.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, EBENEZER POCOCK, a subject of the King of England, residing at Paris, France, have invented certain Improvements in Cutting-Dies, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to dies of the class used with clicking presses for cutting blanks from thin sheet material, and is particularly intended for use in dying out upper leather for boots and shoes.

In order that a die may be used satisfactorily for dying out uppers, it must be so constructed as to maintain the predetermined contour of its cutting edge throughout its use so that all upper blanks cut by it shall be of the same size and shape.

Dies heretofore used for cutting uppers have been rigidly constructed from heavy and substantially inflexible stock. It has also been proposed to employ flexible stock for a cutting blade but to support and constrain such flexible cutting blade by a rigid, inflexible frame. In both of these constructions the strength and rigidity of the die have been depended upon to maintain the desired contour, but it has been found that such dies have occasionally, during their use or while they were being transported or handled, been materially distorted and that such distortions resulted in material deformation of the dies and rendered them unfit for further use.

I have discovered that a satisfactory die for use in cutting upper leather may be formed of thin, flexible, ribbon steel and that such a die will maintain its contour by virtue of its elasticity or resiliency, so that, while it may be easily distorted, it will, when the distorting influence is removed, immediately return to its predetermined contour.

I have found that in making my novel die I can use cold drawn or cold rolled untempered steel which is not in itself of a very resilient nature and that when material of this kind is made into a die of closed contour, the resulting die exhibits marked re-

siliency as a whole and will reassume its original outline with a surprising degree of accuracy after having been distorted.

The cost of manufacture of my novel die is very much less than that of dies heretofore used, chiefly because it can be made from thin steel, preferably untempered, which can be bent cold to the desired outline. Heretofore it has been necessary to heat the die stock before bending it and frequently in the case of sharp bends it has been necessary to heat the same portion of stock several times before the bend has been correctly made. The necessity for so heating, and occasionally reheating, each portion of the die stock which was to be bent, and the necessity for further heating the die stock after the bends have been completed in order to remove the initial strain, or bending strain, have by this invention been entirely obviated, together with numerous other operations heretofore necessary in the manufacture of dies. Thus the process of manufacture has been greatly simplified and the operation of conforming the cutting edge of my novel die to the desired contour may be performed easily and accurately and requires little skill.

A further important advantage of my novel die is its extreme lightness. The die shown and described weighs less than one third as much as a die of the same size and contour heretofore in commercial use for cutting upper blanks. This lightness greatly facilitates the handling of the die by the workman and obviates any danger of scratching or marring the upper leather as the die is moved about over it, and furthermore the die compares favorably in weight with the patterns heretofore used by hand cutters and may be handled as conveniently as such patterns, characteristics which make it much easier for the experienced hand cutter to change from hand cutting to machine cutting.

Other advantages resulting from the use of dies of my invention in connection with a clicking press, such for example as that disclosed in United States Letters Patent No. 921,503, granted February 16, 1909 may be enumerated as follows: The improved dies require the application of compara-

tively little power to cause them to die out a blank cleanly and consequently they are not driven deeply into the cutting block. The cutting block therefore suffers noticeably little wear. The dies of my invention moreover can be used with superior results upon a cutting block having an uneven surface. This is important because in practice it is found that cutting blocks, even if frequently planed, are more or less uneven. The planing not only takes time, but is expensive and the more frequently a block is planed the sooner it must be replaced. On this account it often happens that cutting blocks are used with more or less uneven surfaces. A substantially rigid die will sink deeply into the higher parts of an uneven block and will have a tendency to bridge the lower parts and produce incomplete cutting at such points. The improved die of this invention, however, by reason of its flexibility, adapts itself to the uneven surface of the block and so offers decided advantages both in its effect upon the condition of the cutting block and in the character of the cutting. Another advantage of practical value is apparent in case a die is inadvertently placed upon the leather with its cutting edge uppermost. This occasionally happens under the present conditions and when a substantially rigid die is so misplaced the press arm is almost invariably broken. Such a catastrophe is obviated by the use of the die of this invention as this die will merely bend and so permit the arm of the press to make its full stroke. It sometimes happens that the arm of the press is set too low with respect to the cutting block or that it slips downwardly upon the post to which it is secured. When this occurs, while a substantially rigid die is in use, the eccentric which operates the press arm is likely to be broken and even if no actual break occurs the driving belt will be thrown off and the machine comes to a standstill with the knife so deeply embedded in the block that neither the arm nor the die can be moved without taking the machine apart, an operation which requires the better part of a day. This exasperating occurrence is also obviated by the use of the die of the present invention for reasons above intimated. It has been found in practice that another advantage incident to the flexibility of the improved die of this invention is that such a die will receive a blow from the press arm upon one of its corners without detrimental effect, whereas other dies, if mistreated in this manner, are invariably injured or rendered useless by breaking out at the corner. Another advantage incident to the improved die is that it lends itself particularly well to certain shapes which it has been difficult to produce in the dies heretofore known. For

example, it is often desired to shape a die for cutting a Blucher vamp so as to cut out a portion of very small radius of curvature at either side of the tongue and the thickness of the die stock formerly used interferes with bringing the cutting edges of the die into conformity with such a curve. The thin die stock used in the construction of the flexible die of this invention, however, presents no such difficulty. Still another advantage incident to the improved dies of this invention is apparent in those cases where a cutter desires to measure a skin before cutting by placing different dies upon it in order to determine how the skin can be cut to the best advantage. The improved dies can be placed so close together upon a skin that there is almost no waste between them and a very accurate determination of the best method of arranging the blanks is thus secured.

Other features and advantages of the invention will be set forth in the following description of a preferred embodiment thereof in connection with the drawing in which:

Figure 1 is a view in perspective of a die embodying my invention for cutting Blucher quarters; Fig. 2 is an enlarged sectional view on the line 2-2 of Fig. 1.

The die shown in the drawing comprises a continuous frame 20 of ribbon steel which conforms in contour with the outline desired in the blanks to be cut. The ends of the strip are shown as connected and maintained in alinement by a mechanical joint which, in this case, comprises a short piece 24 of material similar to the die stock and tubular rivets 26 extending through the ends of the strip 20 and the piece 24. It may, however, be preferred to weld together the ends of the strip in accordance with the method described in Letters Patent No. 922,926 granted May 25, 1909, on an application of John M. Lynch. Neither method of connecting the ends of the strip renders any portion of the die materially different in flexibility from the remainder, the closed frame offering to distorting pressure a resistance which is nearly uniform throughout the circuit of the die. The upper edge of the die is adapted to receive the cutting pressure from the arm of a clicking press and the lower edge 22 is sharpened to form a cutting edge. Preferably the cutting edge is formed with a bevel on both sides of the die stock as the edge of a die sharpened in this way will cut through the material operated upon in a direction normal to the surface of the material without tendency to cut under and bevel the edge of the blank as might be the case if the bevel of the cutting edge were formed entirely on the outside of a resilient die, particularly in using the dies on comparatively thick stock. Indentations

32 are shown in the cutting edge 22 of the die for the purpose of indicating the size of the blank by forming notches in the outline thereof which notches constitute symbols of an arbitrary code of sizes.

The die illustrated in the accompanying drawing was made of untempered flexible ribbon steel 0.053 of an inch in thickness. Cold rolled or cold drawn ribbon steel of from 0.05 to 0.12 of an inch in thickness, having a proper proportion of carbon has been found to be suitable material from which to make dies of this character, it being preferable to employ material which is capable of being bent cold to follow a comparatively sharp curve or angle. It is contemplated that the thicker ribbon steel would only be used in constructing dies of the larger sizes. If steel as thick as 0.12 of an inch be used it is believed that it should contain only a low percentage of carbon in order that it may be bent at a sharp angle without breaking. It has been found that by selecting cold drawn or cold rolled steel having the proper proportion of carbon, the necessity for tempering or heat treating the die is avoided, a sufficient degree of hardness having been imparted to the steel by the dies or rolls during its manufacture. If desired, however, the cutting edge of the die may be tempered or case hardened after the die has been shaped and such treatment improves the wearing quality of the cutting edge, and also somewhat increases the characteristic resilient properties of the die. While a die constructed of such material does not of course rigidly resist a distorting force and yields under such influence, I have found that the die is elastic and resilient and will immediately reassume its normal contour on the removal of such distorting force as it is likely to be subjected to in the use for which it is intended, and that it is well adapted for use in dying out upper leather. The extent of distortion occasioned in the use of dies of this type is, in the case of small or medium size dies, well within the elastic limit of the material and no permanent bending or distortion of the die results. However, it may be found desirable in the case of large size dies to limit the extent to which their longer portions may be deflected, and this result may be obtained, preferably, by means of one or more braces extending across the interior of the die. Such an arrangement would not be outside the scope of this invention as the contour of the die as a whole would be preserved by means of its resiliency as above explained.

A die constructed in accordance with the present invention may be corrected in contour if it should become permanently distorted by accident or otherwise. Such op-

eration may be accomplished readily by hand or by the aid of simple bending tools, the contour of the cutting edge being compared with a pattern or templet giving the original outline of the die and the die being bent again into conformity therewith. Another advantage incident to this die is that it may be reshaped within certain limits and thus adapted for dying out blanks of different styles from those originally produced.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. A die for use with clicking presses or the like, comprising a closed, flexibly resilient frame normally conforming in contour with the outline desired in the blanks to be cut and having parallel pressure-receiving and cutting edges, said frame tending, by its structure and by the resiliency of its material, to maintain its normal contour and to reassume it on withdrawal of the distorting force.

2. A die for use with clicking presses or the like, comprising a continuous strip of flexible resilient steel, bent into curves and angles of the desired contour, and conformed by the rigid union of its ends into a closed frame, tending, by its structure and the resiliency of its material, to resist distortion and to return to contour on removal of the distorting force.

3. A die for use with clicking presses or the like, comprising a continuous strip of thin flexible ribbon steel permanently bent to the desired contour and having its ends connected and presenting a resilient closed frame capable of promptly returning to normal contour automatically after distortions incident to its use.

4. A die for use with clicking presses or the like, comprising a continuous strip of flexible ribbon steel normally conforming in contour with the outline desired in the blanks to be cut, said die being resilient, yielding to a distorting force and reassuming its normal contour after being sprung out of form, one edge of said strip being beveled on both sides to form a cutting edge which will be forced through the material without being appreciably deflected from a normal path.

5. A die for use with clicking presses or the like, comprising a continuous unconstrained frame of thin flexible untempered ribbon steel, said frame normally conforming in contour with the outline desired in the blanks to be cut and being highly resilient, whereby it is enabled to resist distortion yieldingly and by reason of the flexible nature of its material is capable of being corrected readily in contour after being permanently distorted.

6. A die comprising a closed unconstrained
frame having a pressure receiving edge and
a cutting edge and being constructed of
flexible ribbon steel of medium resiliency
5 formed, by the rigid union of its ends, into
a closed frame of higher resiliency.
In testimony whereof I have signed my

name to this specification in the presence of
two subscribing witnesses.

EBENEZER POCOCK.

Witnesses:

JOHN BAKER,
DEAN B. MASON.