June 9, 1931. J. HUSLER 1,809,040

CUTTING OR PUNCHING MACHINE

Filed May 31, 1929 3 Sheets-Sheet 1

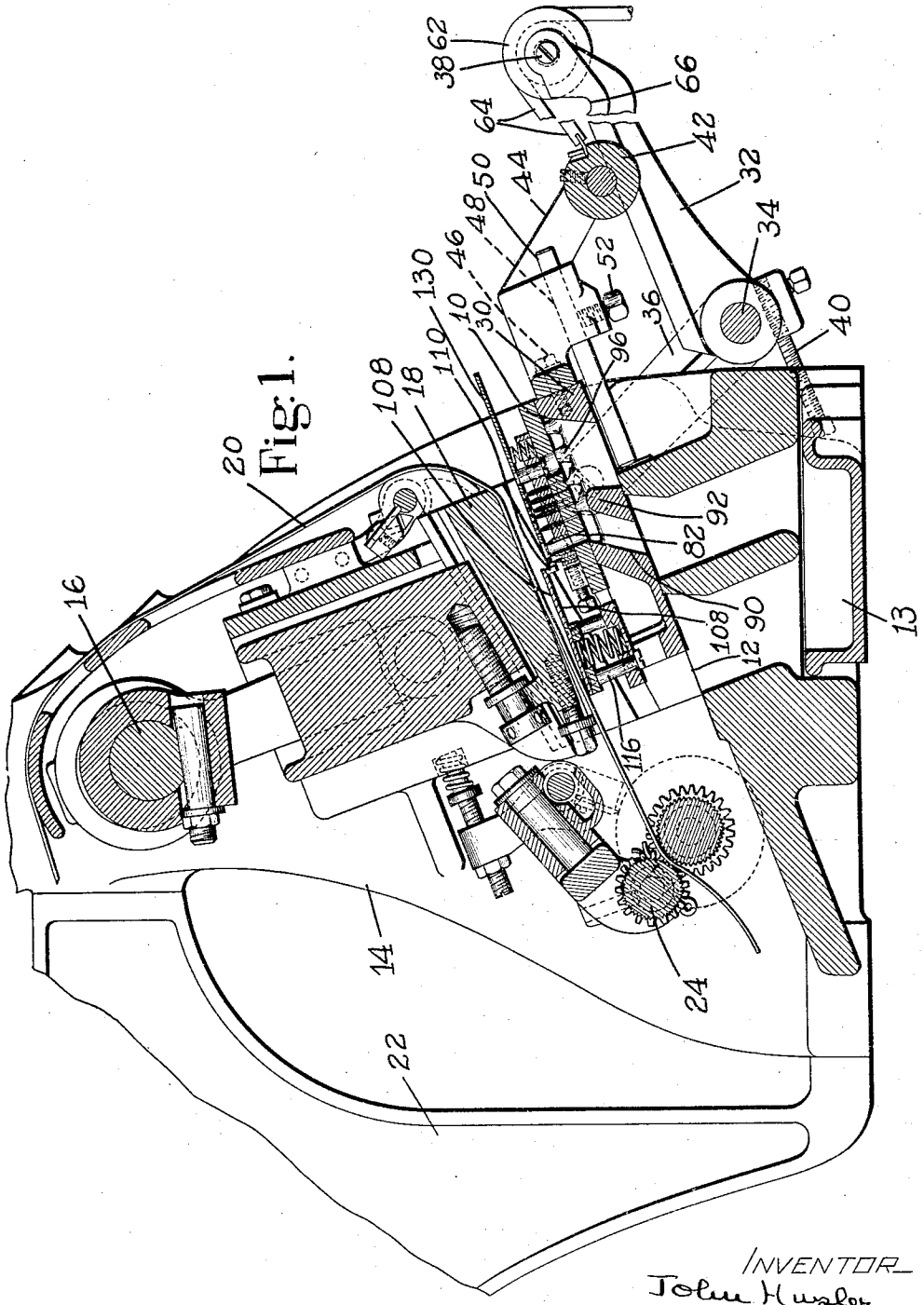


Fig. 1.

INVENTOR
John Husler
By his Attorney,
Harlow M. Davis

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Fig. 2.

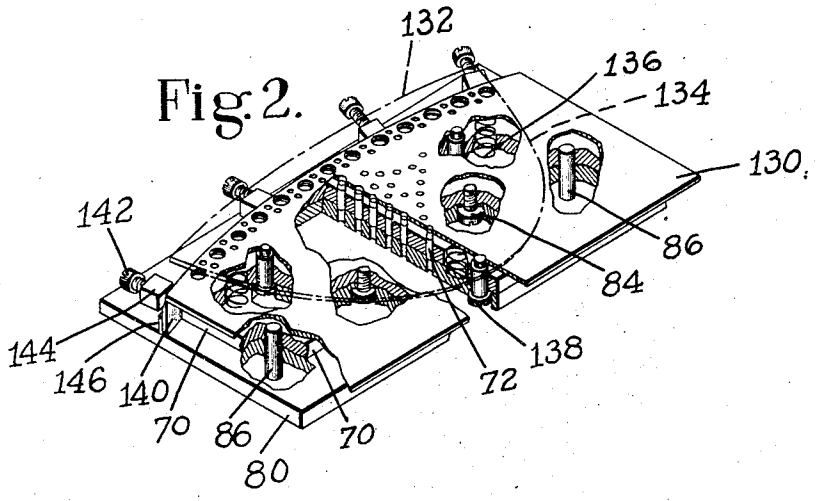
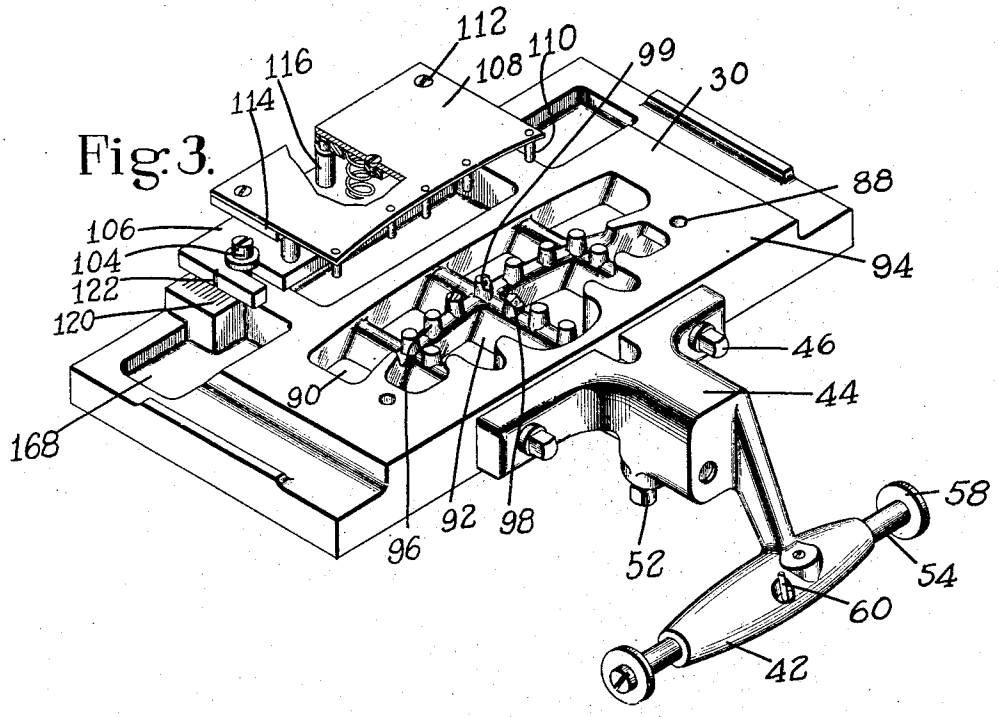


Fig. 3.



INVENTOR

John Husler

By his Attorney

Harlow M. Davis

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Fig.4.

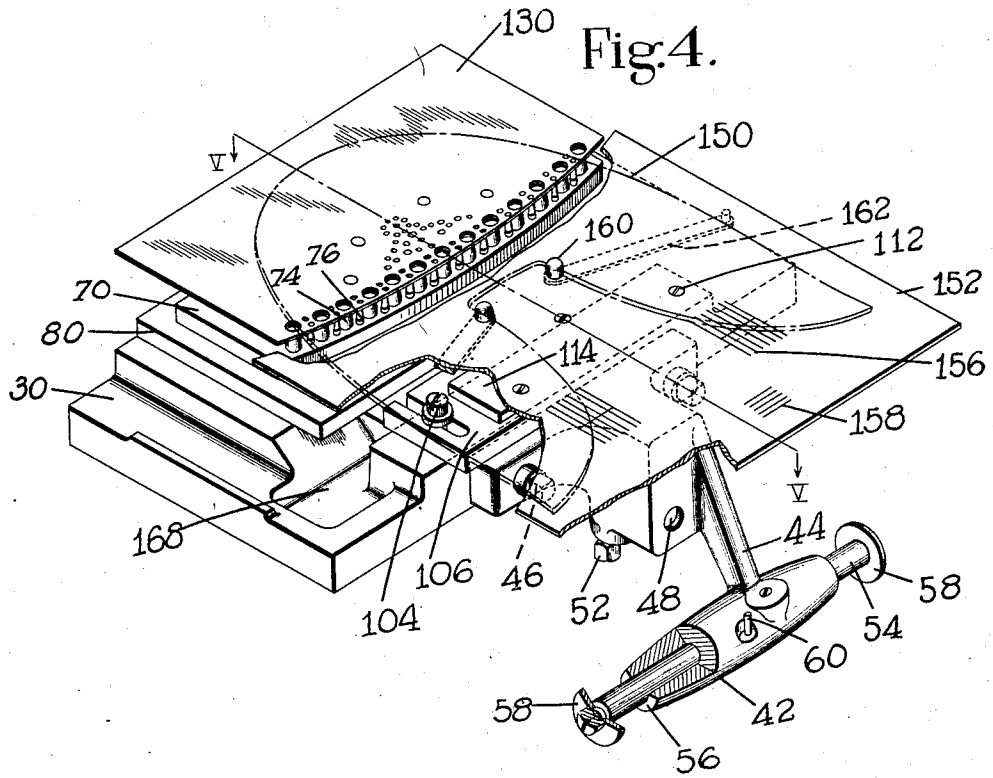
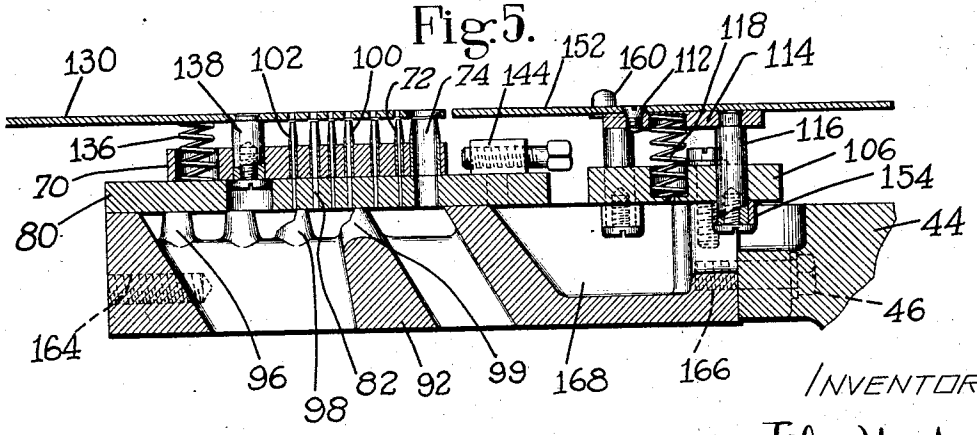


Fig.5.



INVENTOR

John Husler

By his Attorney

Harlow M. Davis

Patented June 9, 1931 1,809,040

UNITED STATES PATENT OFFICE

JOHN HUSLER, OF SAUGUS, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY

CUTTING OR PUNCHING MACHINE

Application filed May 31, 1929. Serial No. 367,587.

This invention relates to cutting or punching machines and is herein illustrated as embodied in a machine of the gang type such as is shown in Letters Patent of the United States No. 1,667,184, granted April 24, 1928 on the application of M. H. Ballard.

Machines of the type illustrated in the above-mentioned patent are used to a considerable extent in the manufacture of shoes where it is desired to create a design of predetermined conformation by cutting or punching out portions of the leather of the upper of the shoe so as to produce an ornamental effect by reason of the removal of these small portions of the leather. In such machines, the die is rigidly supported with its cutting edges uppermost and the work is pressed against the cutting edges of the die by means of a presser member, the arrangement being such that the die is slidably mounted in the machine to provide for movement forwardly to facilitate the accurate positioning of work on the die and backwardly beneath the presser member for the operation of the machine. Most of such dies are apertured for the passage of the chips of material which have been cut out, and an important problem is to provide for the disposal of these chips so that they will not interfere with the proper operation of the die. In case adequate provision for the disposal of the chips is not made, then there is serious danger that the accumulation of chips will break the die or at the very least will get between the work and the die and spoil the work.

Dies of the gang type commonly employed in machines, such as that illustrated in Letters Patent No. 1,667,184, to which reference has been made above, are commonly built up out of a relatively light steel plate which is so constructed as to provide upstanding cutting edges surrounding apertures for the passage of the chips of the material, and of a more massive supporting plate of less expensive material by means of which the rigidity of the die is insured and which must also be apertured to permit the escape of the chips of material. The pressure applied to the die may be several thousand pounds. With such pressures, deflections of portions of a die below other portions thereof are apt to occur and such deflections even if they are only a few thousandths of an inch in magnitude, will usually cause imperfect cutting of the leather. A proper support for a die is, therefore, very necessary for perfect operation of the machine. Because of the large variety of designs embodied in such dies it has not been found feasible to provide supporting plates having apertures which would be common to any considerable number of dies but the supporting plate has been individually fashioned for the die of which it forms a part because the supporting plate must be carefully constructed and arranged to provide adequate support adjacent to and between the cutters. As a result, a considerable amount of machine work and consequent expense has been embodied in the supporting plates employed for individual dies.

In view of the above conditions, the invention provides a die comprising a supporting plate of standard form apertured for the passage of chips of material and provided with a plurality of frangible projections having surfaces supporting the die between apertures therein. At the same time, one or more of these frangible projections may be readily chipped or removed as the die is assembled in case the top of the projection closes an aperture within the said cutting edges and would hinder the escape of chips of material. Thus, to adapt a supporting plate for embodiment in any particular die it is only necessary to remove one or more small pieces of metal which may readily be done by means of a cold chisel. In addition, the support provided for the die is not adversely affected because there remains a large number of projections, the tops of which are so disposed in the plane of the upper surface of the supporting plate and arranged adjacent to the apertures of the die that, individually and collectively, they provide for the support of the cutters.

The dies employed in machines of this type are frequently of substantial size and have a very considerable weight. At the

same time, a piece of work cannot be positioned on the die with any facility while the die is directly beneath the presser member in its operative position in the machine. Projecting tracks mounted on the front of the machine have been provided, therefore, to assist in supporting the die as it is moved forward to permit the positioning of a piece of work, but such tracks are necessarily somewhat in the way and are not always favored by the machine operatives who depend, for adequate wages, upon producing a maximum quantity of work.

In the machine herein illustrated, in accordance with another feature of the invention, the supporting tracks are mounted on the front of the machine at a level beneath the plane of movement of the die as it is drawn forward, so as to be less in the way, and a handle is provided which is detachably secured to the die, which handle cooperates with these tracks to support the die in its forward inoperative position, and which also assists in guiding the die as it is drawn out. A cord attached to a treadle is sometimes provided for pulling the die out but many operatives do not like this arrangement and, accordingly, the illustrated handle has a central portion shaped so that it may readily be grasped by the hand of the operative when he desires to pull the die out manually instead of with the aid of a foot treadle. Further, as illustrated, the handle is drilled for the reception of a stop rod which may be adjustably clamped in position in the handle to determine the inner position of the die, and the ends of the handle have flanges engaging the edges of the tracks still further to assist in guiding the die to forward position so that it will slide easily and not bind the machine.

These and other features of the invention are more fully described in the following specification taken in connection with the accompanying drawings, in which

Fig. 1 is a vertical, longitudinal section through the machine from front to back;

Fig. 2 is an angular view of a tip die;

Fig. 3 is a corresponding view of a supporting plate for such a die having a tip gage and a handle detachably secured thereon;

Fig. 4 shows another form of gage combined with the same die and assembled upon the same plate, the position of the handle having been changed from one to the other of the opposing edges of said plate;

Fig. 5 is a longitudinal upright section through the die shown in Fig. 4, taken on the line V—V.

In the machine herein illustrated, the die 10 is slidably mounted for in-and-out movement on an inclined bed 12 which is apertured to provide for the passage of chips of material or "pills". A drawer 13 facilitates the disposal of the chips. This bed 12 forms part of a frame having side pieces 14 which provide bearings for a power operated shaft 16 by means of which a presser member 18 is vertically reciprocated to carry pieces of work against the die. Commonly, a strip of backing material 20 is interposed between the presser member and the work and coming from a source of supply, not shown, mounted on a bracket 22 passses down over the front of the machine under the presser member and between the rolls of a feeding mechanism 24 whereby it is drawn along step by step as it is used.

A die 10 including its supporting plate 30, to be later and more fully described, fills the space between the side frames 14 and is guided thereby for forward movement as the die is drawn into position for the convenient placement of work thereon. Obviously, however, when the die is in forward position, it is nearly withdrawn from the machine so that it is less subject to the guiding effect of the sides of the machine and is in danger of tilting forward unless adequate support is provided. Accordingly, forwardly projecting tracks 32 are adjustably secured in position upon a cross bar 34 which is supported by duplicate hangers 36 attached to the outer sides of the frame of the machine. A cross bar 38 extends between the forward ends of the tracks to increase their rigidity and an adjusting screw 40 is provided to assist in assembling the machine so that the upper surfaces of the tracks may be brought into a plane parallel to the plane of the bed 12 of the machine but at a substantially lower level so as to be less in the way of the operator.

Since the plane of the tracks is considerably below that of the plane of the bed 12, depending means are provided in the form of a bracket 44 which is spread out at its rear end to facilitate its attachment to the forward end of the supporting plate 30 by means of stud screws 46 and the forward end of which is provided with a handle 42 having its central portion rounded so that it may be grasped conveniently by the hand of the operator. The bracket 44 is apertured at 48 to provide for a stop rod 50 (Fig. 1) which is held in adjusted position by a set screw 52 so that it will abut the frame of the machine and stop the die in such an inner position that the die and the portion of the work to be punched come directly under the presser member 18. It will be noted from Fig. 4 that a cross rod 54 is mounted in the handle to provide reduced portions which ride upon the upper edges of the tracks 32. The die is guided by the cooperation of shoulders 56 formed on the ends of the handle 42 with the inner edges of the tracks and the added cooperation between the outer edges of the tracks and

flanges 58 secured to the outer ends of the rod 54. When it is desired to move the die by means of a foot treadle, then a cord 64 (Fig. 1) may be attached to a pin 60 in the handle and guided forwardly over a pulley 62 rotatably mounted on the cross rod 38 at the forward ends of the tracks.

It will be noted that the forward ends of the tracks 32 are notched at 66 so that when the die is in its forward position it may be retained there during the positioning of the piece of work on the top of the die by dropping the rod 54 of the handle 42 into these notches 66. After the work has been positioned the die may be readily slid back to the operative position shown in Fig. 1 as determined by the stop rod 50.

One of the many forms of dies to which my invention is applicable is illustrated in Figs. 2 to 5 and comprises a thin die plate 70 embodying a plurality of tubular punches or cutting members 72 which are assembled in said plate in accordance with any desired design. The design herein illustrated is especially suited for the tips of shoes and comprises a row of larger punches 74 alternated with pairs of smaller punches 76, which row of punches is adapted to make a line of perforations extending transversely of the tip where it is joined to the vamp. The die also includes a group of the punches 72 arranged to form a center design or medallion within the tip for the decoration thereof. Positioned back of or underneath the die plate 70 is an intermediate plate 80 (Fig. 5) having apertures 82 arranged to register with the apertures of the punches 72, 74 and 76, which apertures are of exactly the same size as those of the interiors of the punches so as not to interfere with the passage of chips of material cut out by the punches while the surrounding material of the plate 80 supports the punches 72, 74 and 76. These two plates are secured together by screws 84 (Fig. 2) and as a unit are provided with depending dowel pins 86 adapted to be inserted in holes 88 of the supporting plate 30.

This supporting plate 30 is cut away, adjacent to its central portion, to form an opening 90 corresponding in general to the shape of the designs commonly employed in dies of this class, and provided with a grating 92 in which the upper edges of the bars of the grating are below the level of the upper surface 94 of said supporting block. Said upper edges are, however, provided with a plurality of cylindrical or frusto-conical projections 96 extending upwardly to the level of the surface 94 and ground so that the smooth tops of said projections 96 are exactly in the plane of the surface 94. These projections thus serve individually and collectively to support the die plate between and adjacent to the apertures thereof so as to insure a complete rigidity of the die and prevent as far as practicable in a commercial machine deformation of the die plate under the pressure of the machine.

The supporting plate 30, as has been previously intimated, is of such a design that it is common to any one of a large number of dies with which it may be assembled and provides a minimum of interference for the free passage of chips of material cut out by the punches 72, 74 and 76. In case, however, one or two of the projections 96 happen to come directly underneath some of the punch tubes, it is possible to remove the offending projections without adversely affecting the support provided by the plate 30, as a whole. As shown, for example, in Figs. 3 and 5, the projections 98 and 99, of those designated generally as the projections 96, have been chipped away at their corners to prevent interference with the passage of chips through particular punch tubes 100 and 102. The supporting plate with its projections is of frangible material, such as cast iron, and corners of, or the whole of, any particular projection may be very readily removed by means of a cold chisel and hammer. Although the particular supporting plate 30 which is illustrated in Figs. 3 and 5 is especially adapted for use with a tip die of the kind illustrated, still it will be understood that when larger dies, such as are used for winged tips or other purposes, are to be employed the supporting plate may be provided with differently shaped apertures and with an entirely different arrangement of its grating bars and projections without, however, departing from the principle of the invention embodied.

The supporting block 30 is also provided with screws 104 (Fig. 3) for supporting a gage 108 having depending gage pins 110. This gage plate 108 is secured by screws 112 to a plate 114 which is guided for up-and-down movement in a notched plate 106 by means of studs 116 having headed bottom ends and normally held in elevated position by means of springs 118. Marks 120 (Fig. 3) are inscribed upon the upper surface of the supporting plate 30, and the edge of the notched plate 106 is engraved at 122 to assist the operator in moving the gage 108 toward or away from the die in accordance with the size of the tip to be punched. The depressible arrangement of the gage plate 108 allows it to stick up above the level of the stripper plate 130 (Fig. 2) such as is commonly employed in dies of this type and thereby to enable the operator to position the rear edge 132 of a tip 134 against the gage pins 110 when said gage pins are in the relative position indicated in Fig. 1 above the level of the stripper plate 130. The stripper plate is held up by springs 136 and limited in its movement by headed studs 138.

If desired, a pinking blade 140 (Fig. 2) may be clamped in position adjacent to the line of punch tubes 74 and 76 so as to trim the edge of the tip at the same time that it is perforated. For convenience in securing this pinking blade 140, the rear edge of the die plate 70 is formed in a curve parallel to the curve of the punch tubes 74 and 76 and set screws 142 passing through detachable blocks 144 are utilized for clamping the pinking blade 140 against the edge of the die plate 70. Filler strips 146 may be associated with the pinking blade 140 to vary its distance from the row of perforations. The studs 144 have depending screws by means of which they are secured in the intermediate plate 80.

It will be understood by those familiar with shoe factory practice that the die illustrated in Fig. 2 may readily be used for perforating shield tips such as that shown at 150 in Fig. 4 by removing the gage 108 and substituting therefor a larger supporting plate 152. This plate is substituted for the plate 108 by removing the screws 112 from the gage plate 108 and mounting the plate 152 on the cross plate 114. At the same time, collars 154 are threaded over the lower ends of the studs 116 to draw the plate 152 down to the level of the stripper plate 130 so that the vamp 150 will lie flat upon the surface provided by the plates 130 and 152. A series of gage marks 156 and 158 is provided on the upper surface of the plate 152 to assist the operator in positioning the vamp, and in addition a pair of throat engaging pins 160 are provided which are mounted on the inner ends of flat springs 162 secured to the under surface of the plate 152. This arrangement requires that the handle 42 be detached and secured again to the opposite edge of the supporting plate 30.

Suitable threaded holes 164 and 166 (Fig. 5) which, with the stud screws 46, constitute securing means, are provided for this purpose. A recess 168 in the supporting plate 30 is simply for the purpose of lightening that plate without affecting its operation or utility.

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

1. A die for use in a cutting or punching machine comprising a member provided with cutting edges and having apertures for the passage of chips of material, and a supporting plate for said member also having apertures for the passage of the chips of material and provided with a plurality of frangible projections having surfaces supporting said member between the aperatures therein.

2. A die for use in a cutting or punching machine comprising a member provided with cutting edges and having apertures for the passage of chips of material, and an apertured supporting plate for said member having a plane surface on which the member rests and also provided with a plurality of frangible projections, the tops of which are disposed in the plane of the upper surface of said plate.

3. A die for use in a cutting or punching machine comprising a member having apertures for the passage of chips of material and cutting edges to produce a design upon a piece of work, and an apertured supporting plate for said member, said plate being provided with a grating across its opening, a portion of said grating being provided with frangible projections which are constructed and arranged to support the member at points adjacent to the apertures therein.

4. A die for use in a cutting or punching machine comprising a member provided with cutting edges and for producing openings in a piece of work having apertures for the passage of chips of material cut from the work, and a supporting plate for said member provided with an aperture in which there is a grating having bars which are tapered at their upper portions, said grating being provided with a plurality of frangible projections the upper ends of which are in the plane of the upper surface of the supporting plate.

5. A standard supporting plate for dies adapted for use in cutting or punching machines, said plate being constructed and arranged for embodiment in any one of a plurality of dies in which pieces of the work pass through apertures in the cutting members of the die, said supporting plate being also apertured to permit the passage of cuttings from the work and constructed and arranged to provide a supporting surface for the cutting members of the dies readily adapted for any particular design of die by being provided with a large number of relatively small frangible projections the upper ends of which are in a plane so that together they provide a large supporting area sufficient to allow the destruction of one or more projections which may interfere with the passage of chips through any particular opening in the die without adversely affecting the support provided.

6. A die for use in a cutting or punching machine comprising a supporting plate for an apertured cutting member of a die, said supporting plate having apertures for the passage of chips of material and providing a relatively large and rigid support for the die, to prevent distortion thereof, by means of a large number of relatively small frangible projections arranged between the apertures in the supporting plate and having the surfaces of the upper ends

of the projections finished in a single plane so that the projections will uniformly support the cutting member, while at the same time an occasional projection may be broken out in case it interferes with the passage of chips with a minimum lessening of the support provided.

7. In a cutting or punching machine, a die slidably mounted for movement into and out of the machine, guide tracks secured to the machine and a handle for said die having flanges adapted to engage said tracks to guide the die.

8. In a cutting or punching machine adapted to be positioned upon a support such as a bench, a platen, a die supporting bed in line with the platen face and inclined upwardly toward the operator, a die slidably mounted on the bed for movement into and out of the machine, an inclined support extending outwardly from the machine having a supporting surface parallel to the die bed and with its inner end substantially midway between the die bed and the supporting bench, and means depending from the forward part of the die resting on said support.

9. In a cutting or punching machine, a platen, a die supporting bed in line with the face of the platen, a die slidably mounted on the bed for movement into and out of the machine, depending hangers on the machine, tracks carried by said hangers to extend outwardly from the machine and having supporting surfaces substantially below the die bed and parallel therewith whereby the outer ends of the tracks do not interfere with placing work on the die, and an arm depending from the forward part of the die resting on said tracks and in guiding engagement therewith.

10. In a cutting or punching machine, a die slidably mounted for movement into and out of the machine, supporting and guiding tracks rigidly mounted on the machine at a lower level than the die, a depending handle for said die having a central portion adapted to be readily grasped by the hand of the operator, and terminal flanges constructed and arranged to overlie said tracks thereby to assist in supporting and guiding the die.

11. In a cutting or punching machine, a die slidably mounted for movement into and out of the machine, tracks rigidly mounted on the machine to assist in supporting the die in its outward position, and means interposed between the die and the tracks comprising a cross member resting on the tracks to assist in supporting and guiding the die, said tracks being deformed near their forward ends to retain the die in the pulled-out position of the die by coaction with said cross member.

12. In a cutting or punching machine, supporting and guiding tracks on said machine, a die slidably mounted thereon for movement into and out of the machine, and a handle for said die comprising a centrally projecting bracket provided with a cross member shaped for convenient engagement by the hand of the operator and having its ends constructed and arranged for guiding engagement with said tracks.

13. In a cutting or punching machine, a die slidably mounted for movement into and out of the machine, tracks projecting outwardly from the machine, a handle interposed between said die and said tracks to assist in supporting and guiding the die, said handle having reduced portions for engagement with the tracks, and flanges both inside and outside the tracks.

14. In a cutting or punching machine, a die slidably mounted for movement into and out of the machine, tracks projecting outwardly from the machine, a handle interposed between said die and said tracks to assist in supporting and guiding the die, said handle having a substantially centrally disposed outwardly projecting bracket, and a cross member shaped for convenient engagement by the hand of the operator, the ends of said cross member being provided with flanges adapted to overhang the edges of said tracks to assist in guiding the die into and out of the machine.

15. In a cutting or punching machine, a die having apertures for the passage of chips of material, said machine providing a support for said die when in working position and guides to permit movement of the die into and out of the machine to facilitate positioning of the work on the die, the machine also having outwardly projecting guide tracks, a supporting plate for the die having apertures for the passage of chips of material and provided with a plurality of frangible projections which are constructed and arranged to support the die at points between the apertures therein, and a handle for said die having flanges adapted to engage said tracks to guide the die when it is moved forward to position the work thereon.

16. In a cutting or punching machine, a die having a supporting plate slidably mounted for movement into and out of the machine, said die and plate being capable of reversal and movement into the machine with either of two opposed edges forward according to the class of work to be cut, said supporting plate having its opposed edges provided with securing means, a handle for said die adapted to be attached with the aid of said securing means to either edge of said supporting plate, tracks projecting outwardly from the machine, said handle being constructed and arranged to rest on the tracks thereby to guide the die for movement from front to back and to assist in

supporting the die when in forward position.

17. In a cutting or punching machine, a die, a bed for supporting said die for sliding movement into and out of operative position, a handle attached to said die to facilitate withdrawing the die from the machine, and a rod adjustably mounted in said handle constructed and arranged to cooperate with the machine to determine the operative position of the die when it is moved back into the machine.

18. In a cutting or punching machine, a die, an inclined bed for supporting said die for sliding movement into and out of operative position in the machine, a handle attached to the die to facilitate withdrawal thereof from the machine, an aperture in said handle, a stop rod passing through said aperture constructed and arranged to abut a portion of the machine, and means for adjustably securing said rod in said handle thereby to assist the operator in determining the operative position of the die.

In testimony whereof I have signed my name to this specification.

JOHN HUSLER.