July 16, 1968 H. L. NEILSEN 3,392,913

PAPER PUNCH WITH SLIDABLE PUNCH ACTUATING PLATE

Filed July 28, 1966 2 Sheets-Sheet 1

Fig. 1.

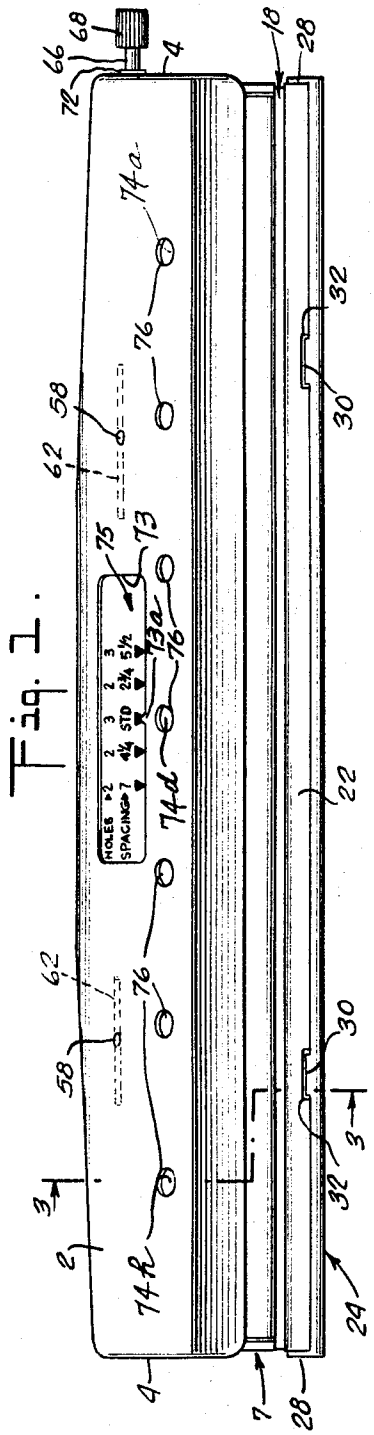


Fig. 3.

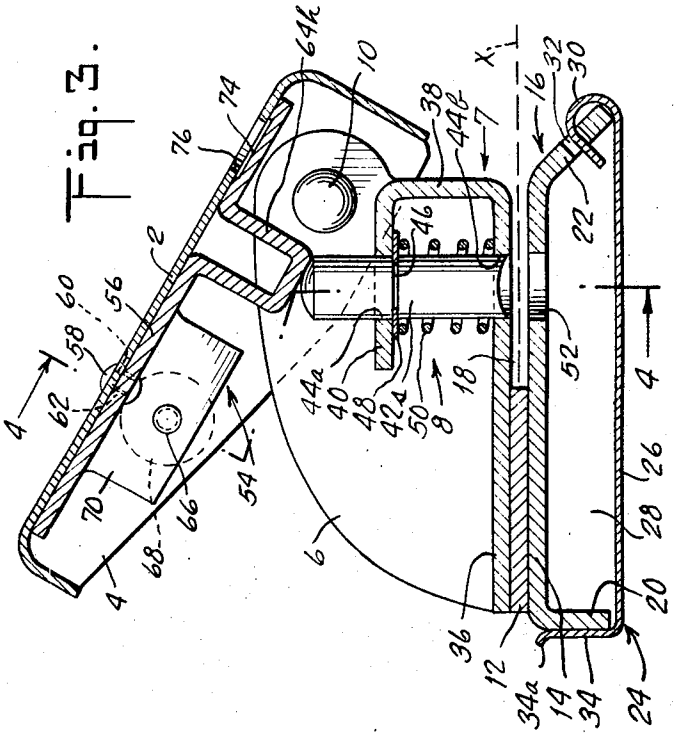
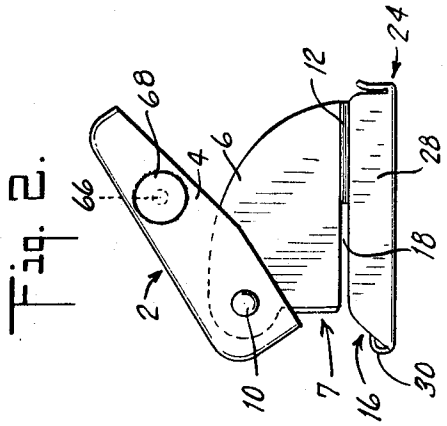


Fig. 2.



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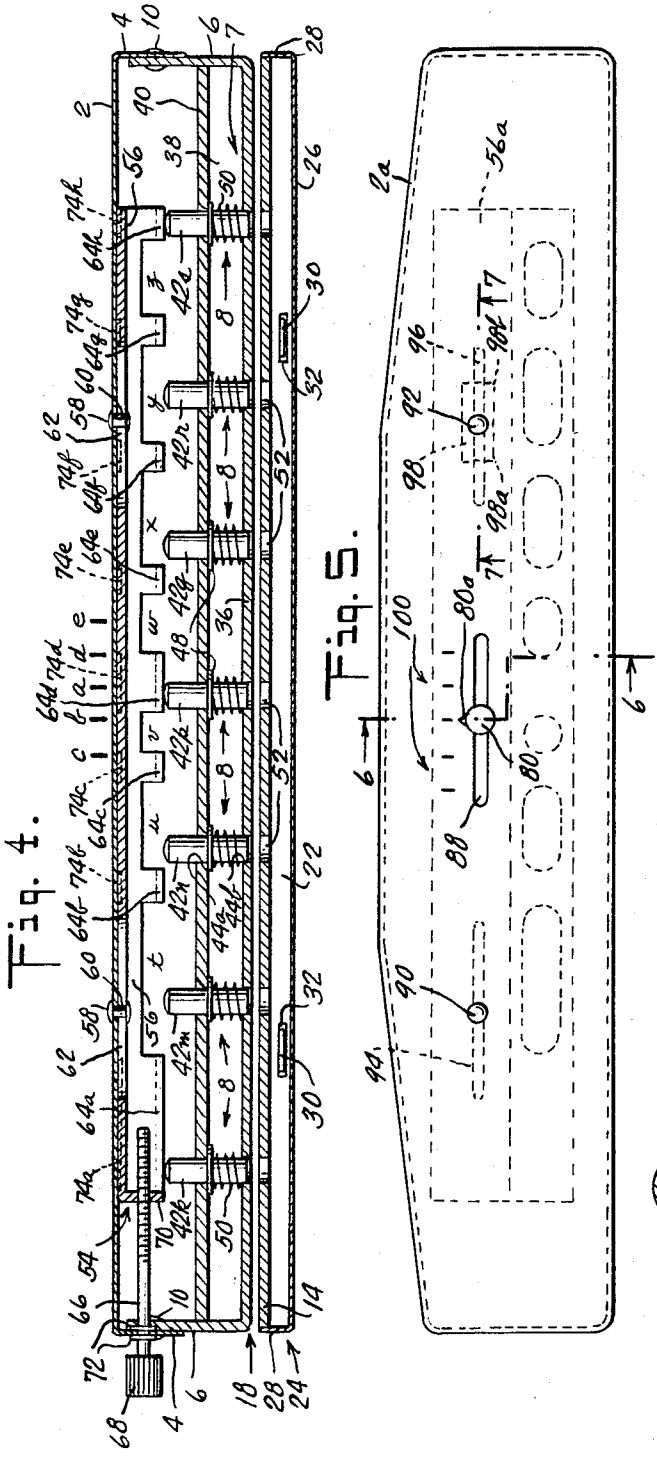


Fig. 4.

Fig. 5.

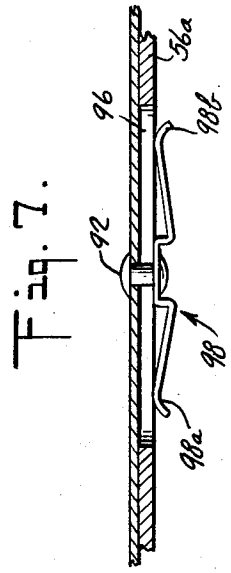


Fig. 7.

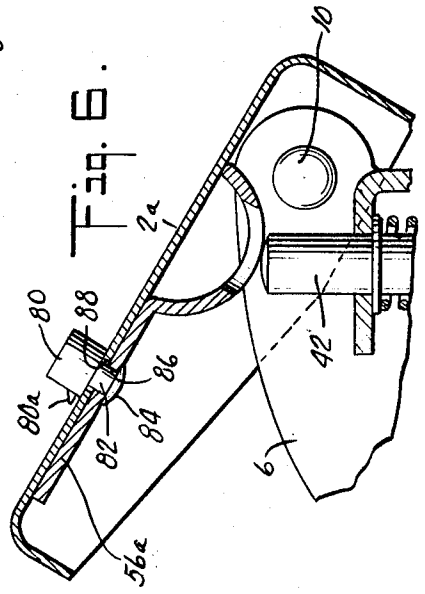


Fig. 6.

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PAPER PUNCH WITH SLIDABLE PUNCH ACTUATING PLATE

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8 Claims. (Cl. 234—98)

ABSTRACT OF THE DISCLOSURE

A paper punch is provided with a punch actuating plate which is slidable to be operatively effective, in different positions, with respect to different combinations of plural, fixedly located punches, and the paper punch, also is provided with screw means for effecting such sliding. Indicia and/or contrasting areas of said plate assume positions relative to openings in an operating handle of the device to indicate the spacing of holes to be punched at any given position of said plate.

This invention relates to devices for punching holes in paper and, more particularly, is directed to such a device which is readily adjustable for enabling it to be employed in simultaneously punching holes in various spaced relationships.

As such devices may be utilized for punching holes in sheet material other than paper, all references herein to "paper" should be understood to comprehend not only paper but all other sheet material capable of having holes punched therein by a device such as that which is disclosed herein.

An important object of this invention is the provision of such a paper punching device which may easily and quickly be adjusted or readjusted for punching holes in various spaced relationships.

Another important object is the provision of such a device having punch actuating means capable of selectively actuating various combinations of punches provided in the device.

Another important object is the provision of such a device having relatively few parts which may be assembled easily so that the device may be very economically manufactured.

Another important object is the provision of such a device having visible means indicating to the user the particular punches which the device is adjusted to operate.

Another important object is the provision of such a device which includes a waste tray for the reception of punched-out paper which tray may very easily and quickly be emptied and readjusted to its waste receiving position.

The foregoing and other more or less obvious objects are achieved by the present invention of which several illustrative embodiments are disclosed herein without, however, limiting the invention to those particular embodiments.

In the accompanying drawing,

FIG. 1 is a front elevational view of a paper punching device according to a preferred embodiment of this invention.

FIG. 2 is an elevational view of the device as viewed from the right end of FIG. 1.

FIG. 3 is a front to rear vertical sectional view substantially on the irregular line 3—3 of FIG. 1.

FIG. 4 is a longitudinal, generally vertical sectional view of the device substantially on the irregular line 4—4 of FIG. 3.

FIG. 5 is a top plan view of an operating lever employed in a device according to a second embodiment of this invention.

FIG. 6 is a front to rear vertical sectional view substantially on the irregular line 6—6 of FIG. 5, including a fragmentary showing of paper punching means with which the operating lever cooperates.

FIG. 7 is a fragmentary, vertical sectional view substantially on the line 7—7 of FIG. 5.

All parts of the disclosed devices are formed of suitable, relatively rigid material preferably steel or other suitable metal.

The first embodiment of this invention, illustrated in FIGS. 1–4, comprises an operating lever **2** hingedly connected by hinge studs **10** toward forward ends of end walls **4** of said lever to upright end ears **6** of a frame **7** carrying seven similar punch assemblies **8**.

The punch-carrying frame **7** includes on its underside and toward the rear thereof an elongate spacing plate **12** which is rigidly integral with said frame as, for example, by being welded thereto. Said spacing plate is also rigidly fixed as, for example, by welding, upon a top plate **14** of a base **16**.

The front edge of the spacing plate **12** is located approximately centrally in the device thereby providing, forwardly thereof, an elongate slot **18** into which one or more sheets *x* of paper may be inserted for the purpose of having holes punched therein. The forward edge of the spacing plate **12** serves as a stop to limit the extent of insertion of paper into the mentioned slot.

The base **16** is formed with a downwardly extending rear flange **20** and a downwardly and outwardly sloping front flange **22** so that the base is substantially hollow. A waste receptacle **24** is provided in the form of a bottom plate **26** formed with upwardly extending end flanges **28** which close the ends of the base **16**, and curled front tongues **30** which extend freely within rectangular apertures **32** in the sloping front flange **22** whereby the waste receptacle **24** is hingedly connected to the base.

The bottom plate **26** is formed, also, with an upwardly extending rear flange **34** which frictionally and quite tightly engages the outer surface of the rear flange **20** of the base. The upper edge of the flange **34** is preferably flared outwardly at **34***a* to facilitate manual pivotal opening and closing of the waste receptacle **24**.

The punch carrier **7** includes a flat bottom plate **36** to the underside of which the spacing plate **12** is fixed, an upwardly extending web **38** integral with the forward edge of the plate **36**, and a flat flange **40**, integral with and extending rearwardly of the upper edge of the web **38**.

The device, as may best be understood from FIG. 4, is provided with seven paper cutting plungers or punches **42***k*, *m*, *n*, *p*, *q*, *r*, *s*, arranged in spaced relationship and in alignment longitudinally of the device. All these punches are alike, and they all are similarly mounted.

As may best be understood from FIG. 3, punch **42***s*, for example, is slidably disposed within vertically aligned

holes 44*a* and 44*b* formed respectively in the flange 40 and in the flat bottom plate 36 of the punch assembly 8. The punch is formed with an annular recess or neck 46 in which is disposed a snap ring 48. A coil spring 50, encircling the punch, is compressed between the snap ring 48 and the plate 36 to hold the punch yieldably in its uppermost position, the movement of the punch to said position being limited by engagement of the snap ring 48 with the flange 40. The lower end of the punch may be dished to accentuate its paper cutting effect.

When the punch is in its uppermost position, as shown in FIG. 3, the slot 18 is clear or free to receive the paper *x*. When the punch is pressed downwardly in the manner hereinafter explained, it cuts through the paper *x* and continues downwardly into a hole 52 formed in the plate 14 in alignment with the holes 44*a* and *b*, thereby completing the punching of the hole in the paper.

The principal feature of this invention resides in means carried by the operating lever 2, at its underside, for actuating selected ones of the punches 42*k, m, n, p, q, r, s,* to effect punching of the paper with holes spaced apart as desired.

The punch actuating means, designated generally at 54, comprise a relatively rigid plate 56 slidably held upon the underside of the operating lever 2 by a pair of studs 58, which, as shown, may be of the nature of double-headed rivets tightly seated within longitudinally aligned and spaced holes 60 in the operating lever and arranged with their necks extending slidably within spaced, aligned slots 62 formed in the plate 56. Thus, the plate 56 may be slid longitudinally within the operating lever to the extent permitted by the length of the slots 62.

The plate 56 is bent to provide a plurality of longitudinally aligned, plunger actuating projections 64*a, b, c, d, e, f, g, h* (FIG. 4) which are generally U-shaped as shown, for example, at 64*h* in FIG. 3. These projections are of such various widths and so spaced that when the plate 56 is slid longitudinally between five different positions, different couples or groups of the mentioned projections will operate, when the operating lever 2 is manually pressed downwardly, to engage the upper ends of and operate different combinations of the seven punches 42*k, m, n, p, q, r, s.*

The sliding of the punch actuated plate 56 is accomplished by turning of a thumb screw 66. This thumb screw (see FIG. 4) has a manipulating knob 68 fixed to its outer end and, adjacent to said knob, the screw is supported for free rotation within a suitable hole formed in one of the end walls 4 of the operating lever. The threaded end 66*b* of said screw is threaded through a depending flange 70 provided at the corresponding end of the plate 56. Where the thumb screw 66 extends through the end wall 4 of the operating lever, it is suitably held against longitudinal movement as, for example, by means of snap rings 72 snapped into suitable annular recesses (not shown) formed in the thumb screw at opposite sides of the wall 4. Thus, manual rotation of the thumb screw 66 serves to slide the plate 56 in opposite directions to the extent permitted by the slot 62.

Colored spots 74*a, b, c, d, e, f, g,* and *h* are provided upon the upper surface of the plate 56; these spots being longitudinally coextensive, respectively, with the projections 64*a, b, c, d, e, f, g* and *h* as shown in broken lines in FIG. 4. The mentioned spots are in underlying alignment with indicator holes 76 formed in the operating lever 2 in longitudinal positions corresponding to the positions of the plural punches 42*k, m, n, p, q, r, s.* The arrangement is such that, in any adjusted position of the plate 56, colored spots will be visible through only those holes 76 which correspond to the punches then in operating relationship to their said actuating projections.

It may be seen from FIG. 4 that the punch actuating projections 64*a, b, c, d, e, f, g, h,* define spaces *t, u, v, w, x, y, z,* therebetween as well as clear spaces beyond opposite ends of the plate 56. When the operating lever 2 is pressed downwardly, the effect will be to depress and operate only those punches which are in vertical alignment with and underlie pairs or groups of the mentioned projections. Thus, with the plate 56 in its relationship to the punches illustrated in FIG. 4, manual operation of the operating lever 2 serves to actuate only punches 42*k,* 42*p* and 42*s* which, in said relationship, are operatively aligned with projections 64*a,* 64*d* and 64*h*. In said relationship, the other punches are aligned with spaces between projections on the plate 56, hence, they are not actuated.

The position of plate 56 as illustrated in FIG. 4 may be considered as a central position *a* on a scale which is applied to the drawing, above that figure, only for the present descriptive purposes. As viewed in that figure, the plate 56 may be moved longitudinally to the approximate extent shown in said scale either toward the left to bring the punch 42*p* into alignment with positions marked *b* and *c* on said scale or toward the right to bring the punch 42*p* into alignment with positions marked *d* and *e* on said scale.

It will thus be understood that the plate 56 may be shifted, by operation of the thumb screw 66, to five different operating positions with the punch 42*p* in alignment with the scale markings *a, b, c, d,* and *e* with the following results:

In *a* position, punches 42*k,* 42*p* and 42*s* will operate;
In *b* position, punches 42*k* and 42*p* will operate;
In *c* position, punches 42*k* and 42*r* will operate;
In *d* position, punches 42*n* and 42*q* will operate;
In *e* position, punches 42*m,* 42*p* and 42*r* will operate.

In a paper punching device as manufactured (not to the same scale as the drawing) the several punches may be so spaced that the device may be readily adjusted to provide any one of the five most used spacings between holes punched in paper; thus,

a position would provide three holes equally spaced 4¼ inches apart, i.e., 8½ inches between the end holes, this being the most used position;

b position would provide two holes spaced 4¼ inches apart;

c position would provide two holes spaced 7 inches apart;

d position would provide two holes spaced 2¾ inches apart;

e position would provide three holes equally space 2¾ inches apart, i.e., 5½ inches between the end holes.

The operating lever may be cut out as at 73 (FIG. 1) to expose indicia 75 on the sliding plate 56, said indicia, in conjunction with a pointer 73*a* formed on said plate at said cut out, indicating the number of punches which will operate in each of the five adjusted positions of said plate, and the spacing between the punches which are operative in each of those adjusted positions. This indicia arrangement enables a user to tell, at a glance, the direction and extent to which the plate 56 should be moved to change from one adjusted positioned to another.

It will thus be seen that a paper punching device according to this invention is readily adjustable to fulfill a substantial variety of paper punching requirements.

The second embodiment illustrated in FIGS. 5–7 differs from the first embodiment chiefly in the means by which the punch actuating plate may be shifted to adjust the device for punching differently spaced holes.

The second embodiment employs no thumb screw but instead, a punch actuating plate 56*a* is provided with a knob or handle 80 having a shank 82 and a rivet head 84. The main part of the knob is disposed above and at least slightly spaced from the upper surface of the operating lever 2*a* and one portion of the shank 82 is very tightly held within an accommodating aperture 86 in the plate 56*a* so that the knob is mounted rigidly with respect to said plate. An upper portion of the shank 82 extends freely and slidably within a slot 88 formed in the operat-

ing lever in parallelism with an underlying line of punches.

The operating lever **2***a* is also provided with two guiding rivets **90** and **92** rigidly fixed thereto and extending slidably within aligned, longitudinal guide slots **94** and **96** formed in the plate **56***a*. The rivet **92** has a leaf spring **98** fixed to its bottom end and arranged so that opposite ends **98***a* and **98***b* frictionally engage the underside of the plate **56***a* to hold the latter frictionally in any adjusted position to which it may be moved.

The plate **56***a*, like plate **56** of the first embodiment, may be moved to five different punching-effective operating positions; and those positions may be indicated by five scale markings **100** on the top of the operating lever **2***a*, In that arrangement, the knob **80** may be formed with a pointer **80***a* to indicate, on the scale markings, the particular existing adjustment of the punch actuating plate **56***a*.

It should be understood that the concepts disclosed herein may be utilized in various other ways without departing from the invention as set forth in the following claims.

I claim:

1. A paper punching device comprising a base, a punch assembly frame fixed upon said base with a portion of the frame spaced from the base to provide a slot for the reception therein of paper to be punched, a series of spaced punches vertically slidably carried in said frame in vertical alignment with said slot and with cutting holes formed in said base, and an operating member movably supported above the series of punches for movement downwardly to press punches of said series downwardly to cause the thus pressed punches to coact with portions of the base defining said cutting holes to punch holes in paper disposed in said slot; the device further comprising a punch actuating plate which is carried on the undesirable of said operating member and constrained to move downwardly with the latter and has spaced punch actuating projections which extend downwardly and define open punch receptive spaces therebetween, said plate being manually slidable selectively to various positions in each of which a different combination of said projections overlies and is vertically aligned with a corresponding combination of the punches in position to press the latter downwardly, upon downward pressing of the operating member, to punch holes in the paper, while punches other than those in said corresponding combination are inactively received within said punch receptive spaces; the device still further comprising plate shifting means connected to said plate and including a manipulatable portion extending horizontally to a position exteriorly of said operating member for manipulation to slide the plate between its said various positions; said plate shifting means comprising a screw borne horizontally in said operating member toward one end thereof and held against material axial movement, a threaded end of the screw being in threaded relation to said punch actuating plate, and the opposite end of the screw constituting said manipulatable portion and enabling manual turning of the screw to shift the punch actuating plate relatively to the operating member.

2. A paper punching device comprising a base, a punch assembly frame fixed upon said base with a portion of the frame spaced from the base to provide a slot for the reception therein of paper to be punched, a series of spaced punches vertically slidably carried in said frame in vertical alignment with said slot and with cutting holes formed in said base, and an operating member movably supported above the series of punches for movement downwardly to press punches of said series downwardly to cause the thus pressed punches to coact with portions of the base defining said cutting holes to punch holes in paper disposed in said slot; the device further comprising a punch actuating plate which is carried on the underside of said operating member and constrained to move downwardly with the latter and has spaced punch actuating projections which extend downwardly and define open punch receptive spaces therebetween, said plate being manually slidable selectively to various positions in each of which a different combination of said projections overlies and is vertically aligned with a corresponding combination of the punches in position to press the latter downwardly, upon downward pressing of the operating member, to punch holes in the paper, while punches other than those in said corresponding combination are inactively received within said punch receptive spaces; said operating member being formed with indicator holes therein in positions corresponding to the positions of the punches, and the upper surface of the punch actuating plate having contrasting areas located in positions corresponding substantially with the positions of said punch actuating projections; said contrasting areas being visible through said indicator holes to indicate which punches are operable in any given one of the said various positions to which the punch actuating plate may be moved.

3. A paper punching device according to claim **2**, said constrasting areas being of a color of substantial contrast relatively to the color of the top surface of said operating member.

4. A paper punching device according to claim **2**, said plate having an indicia portion, visible through an opening in said operating member, and said indicia portion and said operating member having inter-indicating means arranged to become aligned, upon movement of said plate, to indicate the different punch actuating settings of said plate.

5. A paper punching device according to claim **2**, said plate having an indicia portion, visible, through an opening in said operating member, in relation to a pointer provided on the latter member, said indicia portion including spaced characters indicative of different usable punch combinations and so positioned as to be aligned with said pointer when their respective punch combinations are operative.

6. A paper punching device comprising a base, a punch assembly frame fixed upon said base with a portion of the frame spaced from the base to provide a slot for the reception therein of paper to be punched, a series of spaced punches vertically slidably carried in said frame in vertical alignment with said slot and with cutting holes formed in said base and an operating member movably supported above the series of punches for movement downwardly to press punches of said series downwardly to cause the thus pressed punches to coact with portions of the base defining said cutting holes to punch holes in paper disposed in said slot; the device further comprising a punch actuating plate which is carried on the underside of said operating member and constrained to move downwardly with the latter and has spaced punch actuating projections which extend downwardly and define open punch receptive spaces therebetween, said plate being manually slidable selectively to various positions in each of which a different combination of said projections overlies and is vertically aligned with a corresponding combination of the punches in position to press the latter downwardly, upon downward pressing of the operating member, to punch holes in the paper, while punches other than those in said corresponding combination are inactively received within said punch receptive spaces; said operating member being formed with an aperture, affording exposure of a viewable top surface area of said plate, and said top surface area of the plate and a top surface of said operating member, adjacent to said aperture, having inter-indicating means of which various relative positions are indicative of various punch actuating settings of said plate.

7. A paper punching device according to claim **1**, said plate having an indicia portion, visible through an opening in said operating member, and said indicia portion and said operating member having inter-indicating means

arranged to become aligned, upon movement of said plate, to indicate the different punch actuating settings of said plate.

8. A paper punching device according to claim 1, said plate having an indicia portion, visible, through an opening in said operating member, in relation to a pointer provided on the latter member, said indicia portion including spaced characters indicative of different usable punch combinations and so positioned as to be aligned with said pointer when their respective punch combinations are operative.

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WILLIAM S. LAWSON, *Primary Examiner.*

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,392,913 July 16, 1968

Hildaur L. Neilsen

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 5, lines 35 and 36, "undesirable" should read -- underside --.

Signed and sealed this 9th day of December 1969.

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents