PUNCHING AND INDEXING APPARATUS FOR SHEETS, CARDS, AND THE LIKE

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This invention relates to machines or apparatus having for their object the punching or perforating of paper sheets, cards, documents, or the like with holes and/or slots, with a view to facilitating the placing of the papers on a file and/or the sorting of papers into any desired order or sequence.

Wherever sheets are mentioned in this specification, it shall be taken to mean and include sheets, cards, tallies, documents made of paper or the like.

According to the invention the improved machine comprises a plurality of punches and dies arranged to give an alternative size or shape of hole or slot. The invention also includes the combination with such machine of printing or embossing mechanism, hereinafter referred to as index marking mechanism, and of auxiliary punching means for filing, which expression includes means for punching auxiliary holes and/or for cutting off the corner of the sheets.

The accompanying drawing illustrates one example of the invention, in which:

Fig. 1 is a sectional elevation, and
Fig. 2 is a plan.

Fig. 3 is an enlarged view of a part of the punch.

Figs. 4 and 5 are detail sectional elevations of the punches and their associated parts, Fig. 4 showing the parts in the punching position, and Fig. 5 in the notching position.

Fig. 6 is an elevation of the forward end of the lower castings, and Fig. 7 is a plan of a sheet after being punched.

In the preferred example of the invention, as illustrated, the machine is arranged to punch twenty seven holes or slots along each of two adjacent edges of a sheet. Smaller or larger machines, however, may be constructed as required having fewer or more punches.

The machine comprises a main rectangular casting a, the upper face of which forms a table b for supporting the sheet. The casting is hollow underneath, allowing for sufficient strength but at the same time avoiding unnecessary weight, two adjacent sides being closed in, while the other two sides, at which the punching mechanism is to be arranged, consist of two bars, one at the top b' formed by the edge of the table b and the other c near the base. The faces of these two bars are machined and in them at intervals of quarter of an inch are milled slots d of rectangular section, about \( \frac{1}{4} \) inch wide, and about \( \frac{1}{4} \) inch deep and equally spaced. These slots or holes may be grouped in three series of nine, and a slightly larger space may be allowed between each group. In these slots d are arranged punches d', the upper and lower slotted bars b' and c forming an upper and lower guide for each punch. Secured to the sides of the casting a are punch operating units having faces e which lie against the bars b' and c and retain the punches in their slots, also a stop or reaction plate f is secured along the bottom of the base or casting a on which the punches may rest. The lower end of each punch d' is visible below the retaining faces e and is formed with a slot g and provided with a pin g' with which an operating lever h hereafter described, can engage to raise the punch. The top of the punch d', which is preferably slightly inclined, being higher at its inner edge to give a "lead" to the shearing action of the punch, is also drilled near its inner edge, such drill hole j opening out into a notch k formed lower down on the inner face of the punch to provide for clearance of "punching" as this punch constitutes a die or matrix for a second punch and is therein a compound punch.

Over the punches is a fixed die plate m which is secured at the corner and at each end to bosses n formed on the side of the base a and so as not to interfere with the insertion of a sheet of any width. Alternatively this plate may be of angular section and secured direct to the machined side faces of the base. The inner portion of the die plate m is raised slightly above the table to allow of the insertion of the sheet and to form a shoulder or stop m' therefor.

Above the die plate is a movable punch plate o carrying a series of "pin" punches p fixed therein to coact with the holes j in the sliding compound punches d'. This punch plate is provided with guide posts o' which pass through the bosses n on the side of the
base to which the die plate is secured. Operating compression springs \( o \) are provided on the guide posts below the bosses and are intended on release of the punch plate, to effect the initial punching operation, forming the round holes in the sheet. The punch plate \( o \) is controlled by three cams \( q \), two of which are directly connected by an operation bar \( r \) and the third is connected by a link \( r^* \) to one of the other cams.

Where printing or embossing means is combined with the apparatus this may be provided for as in the present example, by forming the moving punch plate \( o \) with an overhanging flange \( s \) on which is secured a row of type characters \( t \), the matrix \( t^* \) for which is let into the table.

The operating mechanism for the sliding punches is a detachable unit consisting of a casting \( u \) having the retaining faces \( e \) aforesaid, and in which is mounted a series of levers \( h \) with notched projecting ends to engage the slots \( g \) and pins \( g^* \) of the punches \( f^* \). The other ends of the levers are connected to plungers \( n^* \) passing up through the top of the unit and carrying at their upper end numbered finger keys \( r^* \). These keys are arranged staggered in four rows, similar to typewriter keys, to facilitate their operation.

The unit is secured to flats on the bosses \( n \) of the base by bolts and locating dowels. The keys will generally be numbered consecutively from 1 to 9 and the keys of the groups will be different colours.

In addition to the arrangement for punching the selecting holes or notches, the machine may be constructed to punch two larger holes on the left hand side of the sheet for the ordinary filing purposes, and further the punch may be arranged to cut off the top left hand corner of the sheet which serves to provide a ready indication that the sheets are in a correct position for filing or sorting.

In order to clear the punchings from the pin punches \( p \) on which they will collect, means are provided in the form of a blade \( p^* \) to cut the back of the punching, such blade consisting of a wedge-shaped knife let into the base of each of the pin punches. Alternatively such blade may be formed by pressing up the surface of the punch at its base.

To further assist of the clearing of the punchings the back of the punch plate will be bevelled off at \( o^* \) so that the pressure of the accumulated punchings will force the upper punchings backwards. The operating unit is formed with a channel \( v \) into which such punchings fall thus preventing them from entering and interfering with the mechanism.

In use, the sheet of paper or card to be punched is placed on the table \( b \) and is slid under the punches up against stops \( m^* \) by which it is located. The operating bar \( r \) which is in the normal and raised position, is now pushed back allowing the springs \( o^* \) to operate the punch plate \( o \) and punch the initial or round holes, and, where provided, print or emboss the sheet with the required numbers. The keys may now be selected and pressed to form the slots in the positions required, the sheet being held meanwhile by the initial punching operation. When this has been completed the operating bar \( r \) is raised again to its normal position and the sheet is released.

The punching machine may be used for any system of filing and either directly on sheets, such as letters, bills, invoices, etc., or on cards, in which latter case, or where all the sheets are of the same size, all four edges may be punched, either by the single machine and placing the card or sheet into it twice or four times, or by means of a larger machine designed to do them in one operation.

What I claim is:

1. A punching and indexing machine for sheets, cards, and the like, comprising a base, a punch member above the base carrying a plurality of primary punches and having die formations around each primary punch, and a series of secondary punches slidably mounted in the base to coact with the die formations in the punch member and having die formations to coact with the primary punches, means for operating the punch member to effect the primary punching operation by simultaneously bringing into operation all the primary punches, and separate operating mechanism for operating each of the secondary punches to effect the secondary punching operation which takes in or includes the hole formed by the primary punches, as set forth.

2. In a punching and indexing machine for sheets, cards and the like, according to claim 1, a clearing device for severing the punched pieces from the primary punches, as set forth.

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

WILLIAM HENRY HILDRETH.