

April 8, 1924.

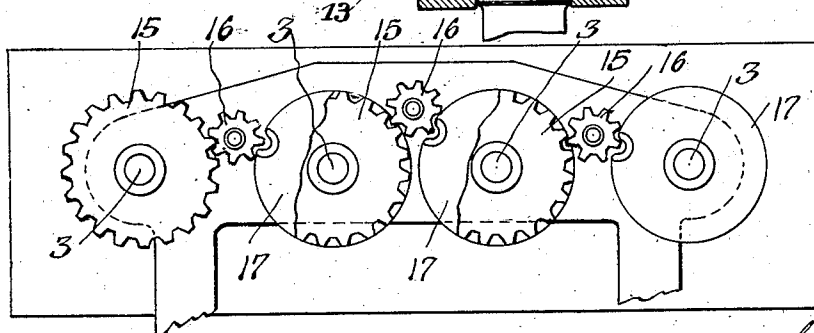
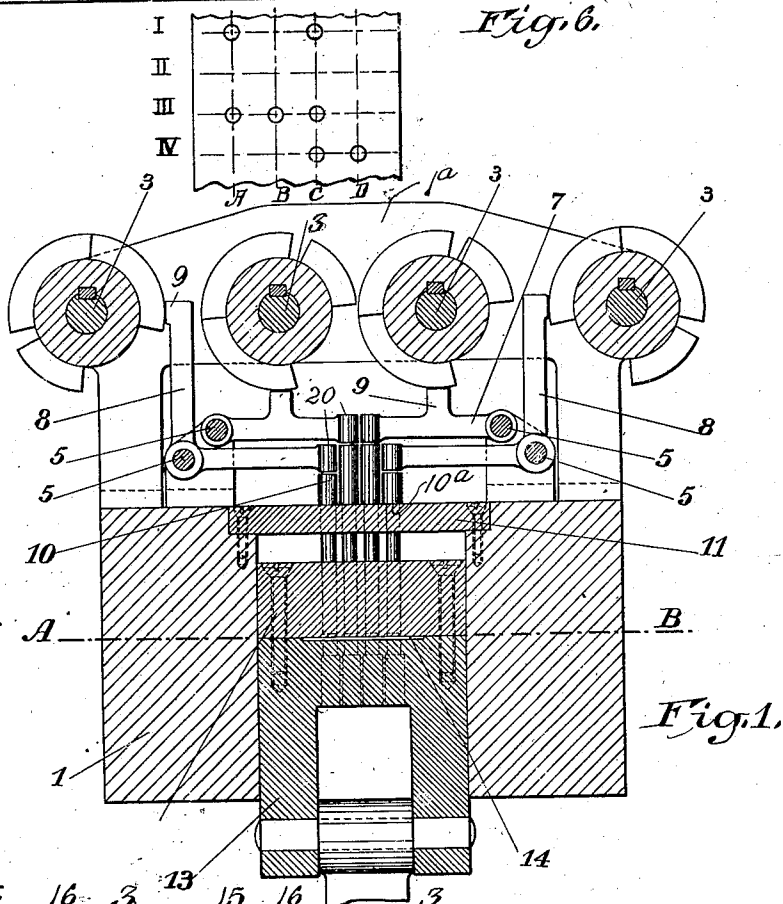
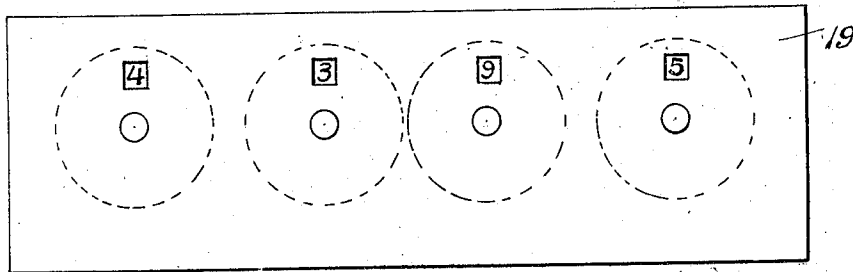
1,489,534

M. LEBEIS

PUNCHING MACHINE FOR STATISTICAL AND LIKE CARDS

Filed Dec. 30 . 1922

3 Sheets-Sheet 1



Inventor

Martin Leber

April 8, 1924.

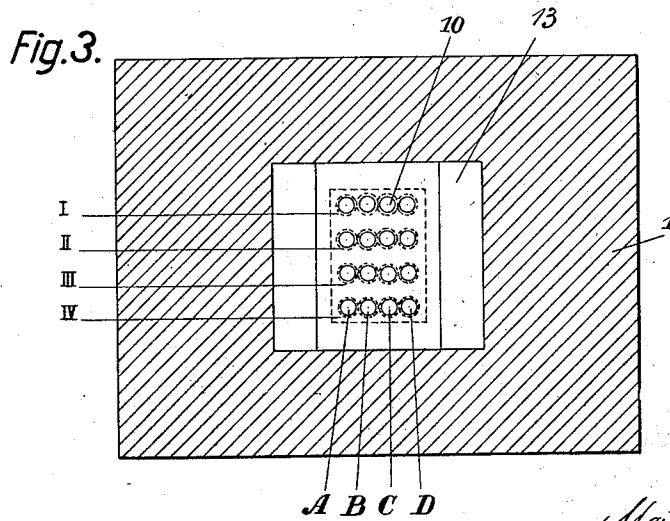
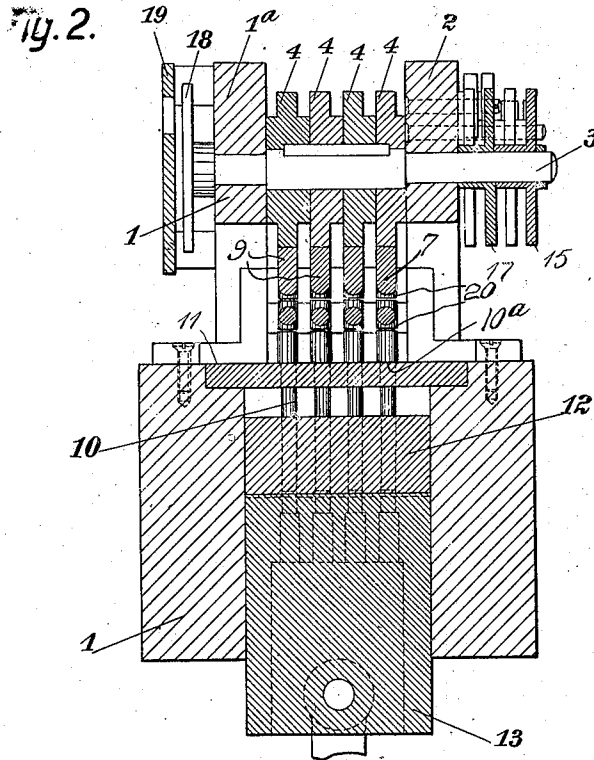
1,489,534

M. LEBEIS

PUNCHING MACHINE FOR STATISTICAL AND LIKE CARDS

Filed Dec. 30, 1922

3 Sheets-Sheet 2



Inventor

Martin Lebeis

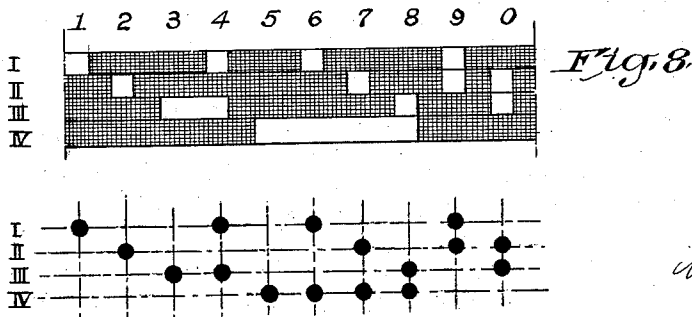
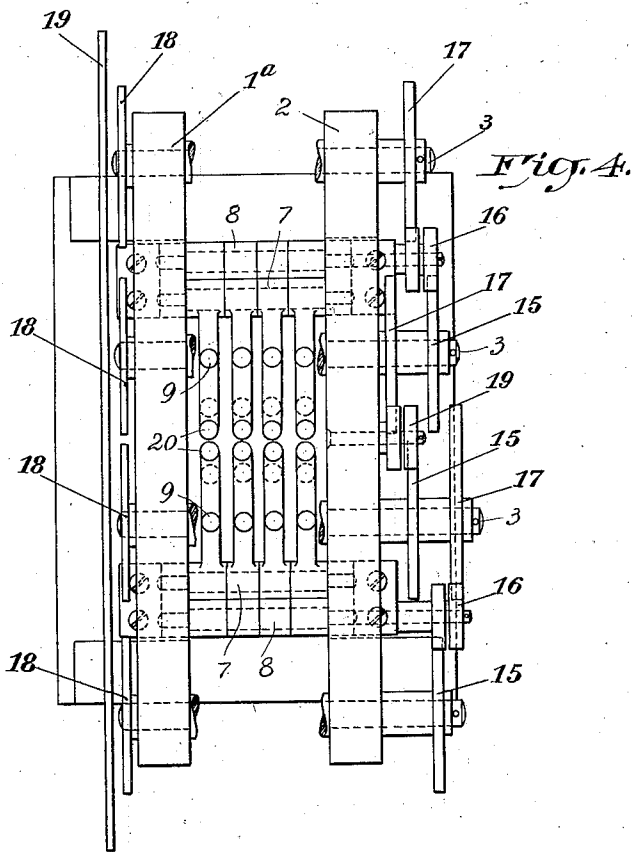
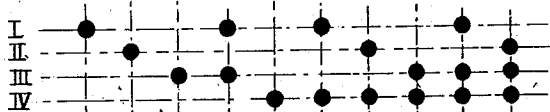
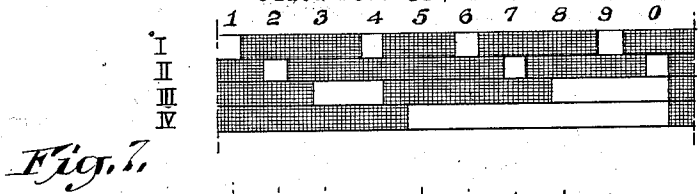
April 8, 1924.

1,489,534

M. LEBEIS

PUNCHING MACHINE FOR STATISTICAL AND LIKE CARDS

Filed Dec. 30, 1922 3 Sheets-Sheet 3



Inventor

Martin Lebeis

Patented Apr. 8, 1924.

1,489,534

UNITED STATES PATENT OFFICE.

MARTIN LEBEIS, OF BERLIN-FRIEDENAU, GERMANY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO NAAMLÖÖZE VENNOOTSCHAP MACHINA MAATSCHAPPIJ VOOR HANDEL EN INDUSTRIE, OF AMSTERDAM, NETHERLANDS.

PUNCHING MACHINE FOR STATISTICAL AND LIKE CARDS.

Application filed December 30, 1922. Serial No. 610,012.

To all whom it may concern:

Be it known that I, MARTIN LEBEIS, a citizen of the German Republic, residing at Berlin-Friedenau, Germany, have invented certain Improvements in Punching Machines for Statistical and like Cards, for which I filed applications in Germany on October 20th, 1919, and Great Britain on November 27th 1922, and of which the following is a specification.

This invention relates to a machine for punching statistical and like cards on which numerals and letters are expressed by the different distribution of apertures over a definite number of positions, and consists in the provision of selecting elements in the form of rollers serving as a support for card punches and having recesses into which unselected punching elements can recede, the rollers being, except at the punching moment, quite free so that they can be operated by clock-work or by the mechanism of a counting device.

Fig. 1 of the drawings represents a vertical section of the machine taken transversely of the selecting rollers,

Fig. 2, another vertical section of the same taken at right angles to Fig. 1,

Fig. 3, a horizontal section on the line A—B of Fig. 1, and

Fig. 4, a plan of the device with the rollers removed.

Fig. 5 is a rear view showing the gearing of the rollers, and

Fig. 6, a front view of the indicating arrangement together with an example of a card showing punch-holes to represent the indicated numerals.

Fig. 7 shows a development of one of the selecting rollers together with the punch marks it produces, and

Fig. 8, another development with a different arrangement of punch marks to suit the same purpose.

To enable the cards used for statistical and like purposes to be sorted automatically, they are sometimes punched with apertures which are distributed differently over a definite number of positions, so that by means of a few feelers admitted through such apertures in different groupings, a large number of receivers may be individually selected for the reception of the cards. For instance single apertures and different ver-

tical groupings of a plurality of apertures along four horizontal lines I, II, III and IV may be used to obtain over ten different classifications or, if the cards instead of or in addition to the sorting, are used for calculating purposes, to express the numerals 1-9 and 0, as shown in Figs. 7 and 8. Again, by arranging several vertical groupings such as A, B, C and D (Fig. 6) together, any desired number may be expressed, in order to enable such cards to be punched by means of elements which are set automatically by clock-work, say, in a machine for checking workmen's time, or by the mechanism of a calculating or like machine, the following arrangement is provided:—

For expressing four-figured numbers, the punching device is furnished with sixteen punches which are arranged so as to form rows I, II, III and IV in a horizontal direction, and rows A, B, C and D in a vertical direction, as shown in Fig. 3. The punches 10 are slidably guided in a plate 11 and are formed with shoulders 10^a by means of which they are normally supported on the plate. The die 13 is capable of being reciprocated within a guide-block 1 which also carries the plate 11. The cards are inserted through a slit 14 between the die 13 and a stripping block 12 which is connected to the die so as to move together with the same.

For selecting the different punches for operation there is, for each vertical row of punches, a roller composed of four notched discs 4 keyed in juxtaposition to a shaft 3 which is mounted in frame members 1^a and 2. Each roller cooperates with four levers which rock about a shaft 5 and which are formed with hammer-heads 20 resting on different punches. For convenience in the construction, there are two sets of single-armed levers 7, and two sets of bell-crank levers 8. Each lever is formed with a nose-piece 9 which is held close to the outer circumference of one of the discs 4, and the lever is therefore prevented from rocking except when the nose-piece is faced by one of the notches in the discs.

When a card is inserted in the slit 14 and the die 13 is raised, the punches will be engaged by the card. Each punch whose lever is supported by the disc 4 will oppose

the card and punch a hole in it. Those levers which are in register with notches in the discs 4 move into the notches and allow the punches to be raised by the card without punching it. Figs. 7 and 8 show different developments of the rollers which are made up according to the manner in which the numerals are to be expressed, the shaded spaces representing notches, and the white spaces the full, or punch-producing portions of the discs. The arrangement according to Fig. 8 has the advantage that all the numerals are represented by no more than two holes.

The levers are supported by the punches and are normally out of touch with the discs 4. The rollers are therefore, except at the moment of punching the card, completely free and can be geared to a clock-work or to the mechanism of a calculating or like machine so as to be set thereby. For this purpose three of the shafts are fitted with one-tooth wheels 17 which at each revolution of the shaft advance the next shaft by one number through the medium of an idle wheel 16 and a gear 15 secured to the next shaft. The gearing ratio depends on the nature of the counting. For ordinary calculations or numberings the ratio is 1:10, while for the expression of time it is correspondingly modified. At the front end of the shafts there are indicating discs 18 the numbers of which pass behind windows in a plate 19. The punch marks shown in the card in Fig. 6 represent the number exhibited by the indicating plate 19 according to the scheme shown in Fig. 7.

Instead of cards, a long strip may be used which is passed through the slit 14 for punching.

I claim:—

1. A punching device for statistical and like cards, comprising a reciprocating die, a plurality of axially guided and loosely suspended punches arranged in rows above

said die, a rotatable selecting roller for each row of punches adapted to support the punches for co-operation with the die, the roller being notched so as to leave individual punches unsupported in certain positions of rotary adjustment, and connection between the different rollers for collected rotary adjustment.

2. A punching device for statistical and like cards, comprising a reciprocating die, a plurality of axially guided and loosely suspended punches arranged in rows above said die for co-operation with the latter, a rotatable selecting roller for each row of punches, a rocking lever placed between each punch and its selecting roller so as to support the punch by abutment against the roller, the roller being notched so as to leave individual punches unsupported in certain positions of rotary adjustment, and connection between the different rollers for collective rotary adjustment.

3. A punching device for statistical and like cards, comprising a reciprocating die, a plurality of axially guided and loosely suspended punches arranged above said die so that they can be engaged and raised by a card placed on the reciprocating die, the punches being arranged in rows of four so that all the numerals and zero can be represented by different selections of punches for operation in each row, a rocking lever supported on each punch, a notched selecting roller for each row of punches, such roller being arranged so as to form an abutment for the levers and cause a punching of the card by stopping the punch movement except when the levers register with the notches, and gears connected to the different rollers so that they can be set in unison and so that the apertures punched in the cards will represent series of numbers.

MARTIN LEBEIS.