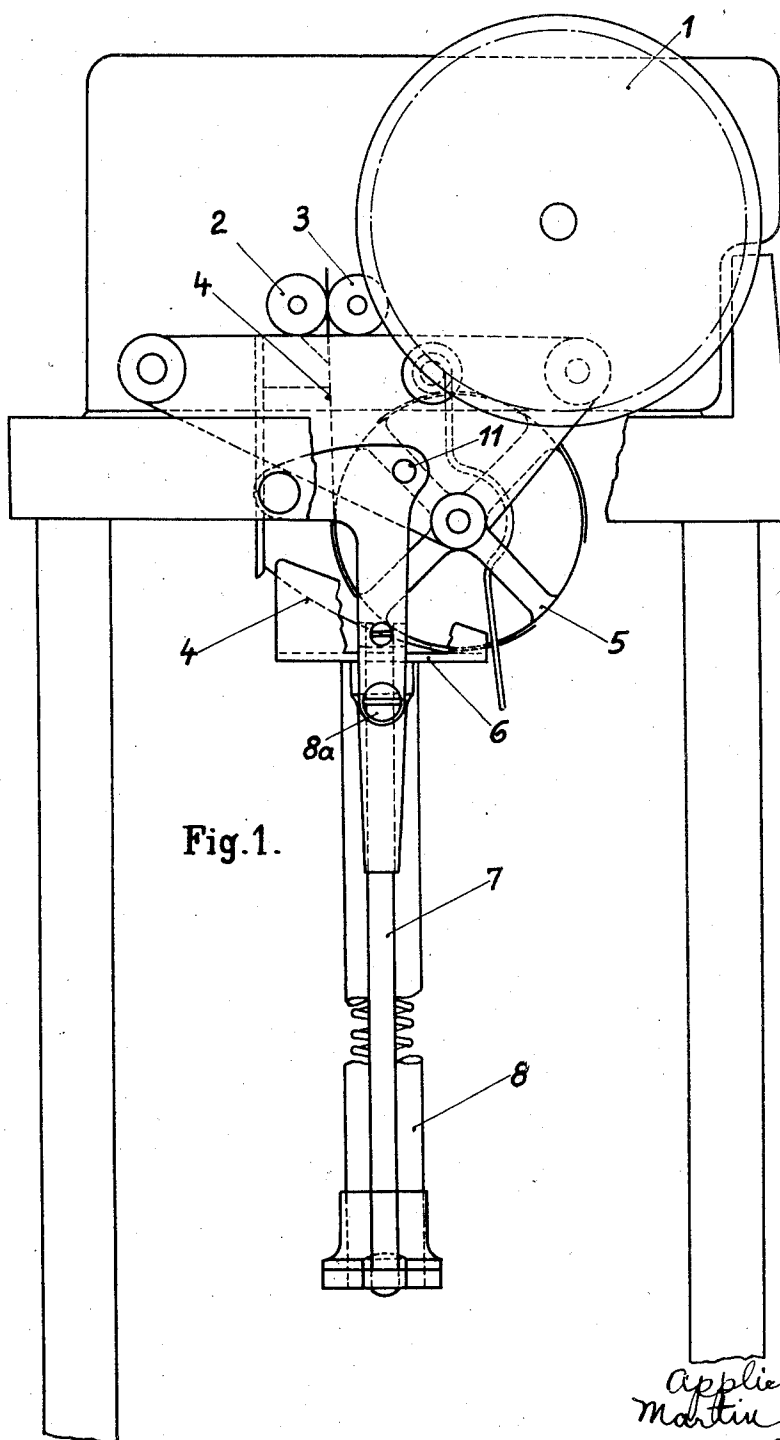


July 19, 1927.

1,636,405

M. F. BRANDT
APPARATUS FOR MECHANICALLY COPYING ENTRIES FROM CARDS
OR SHEETS OR THE LIKE ON A COLLECTIVE SHEET
Filed June 16, 1926

3 Sheets-Sheet 1



Applicant
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3 Sheets-Sheet 2

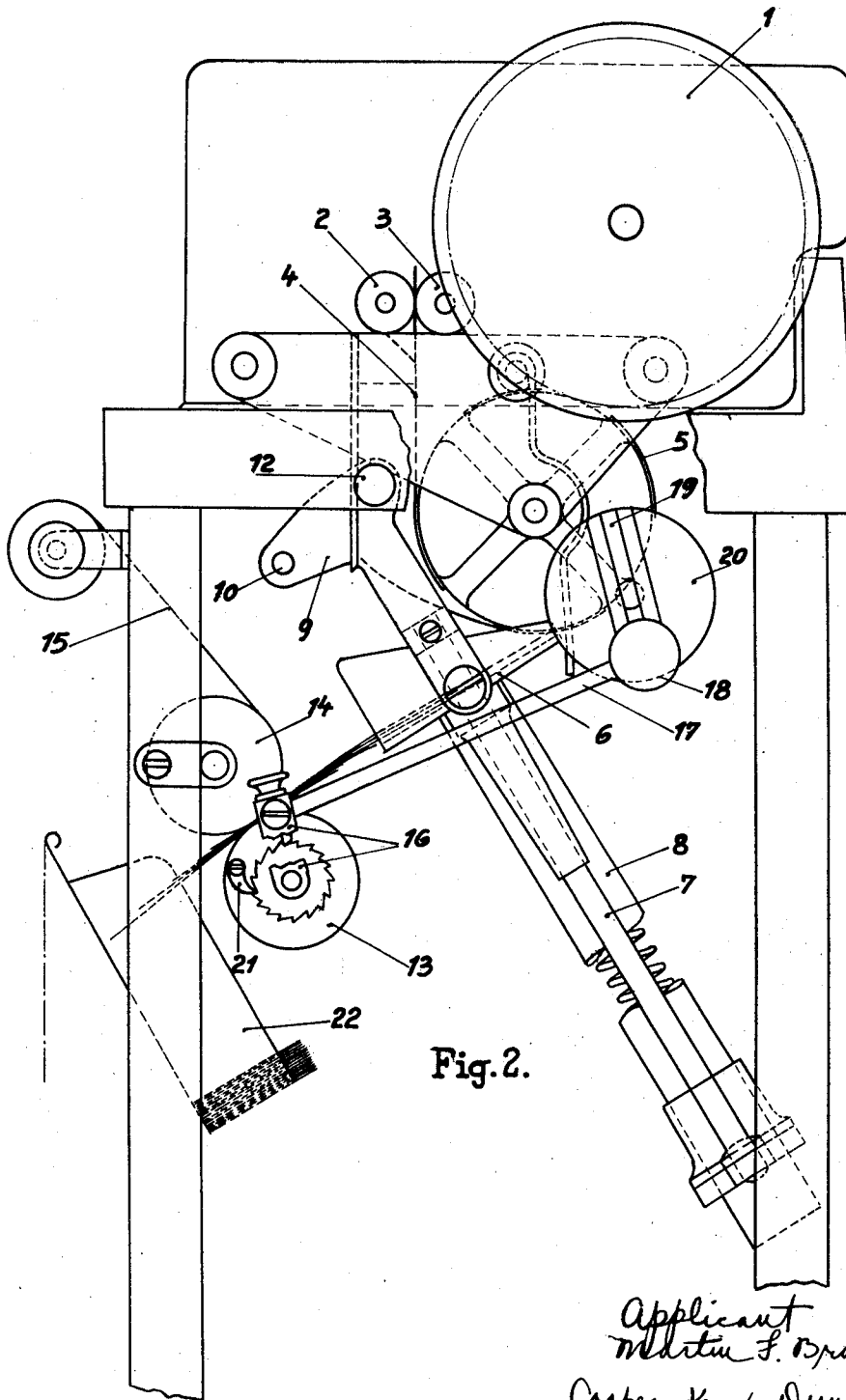


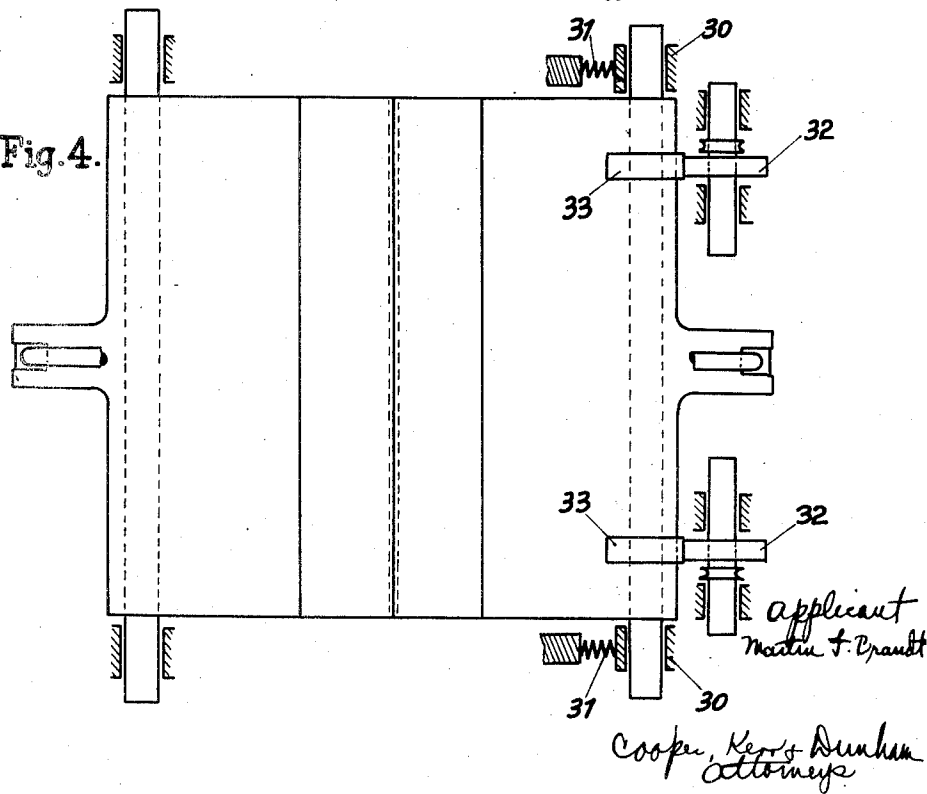
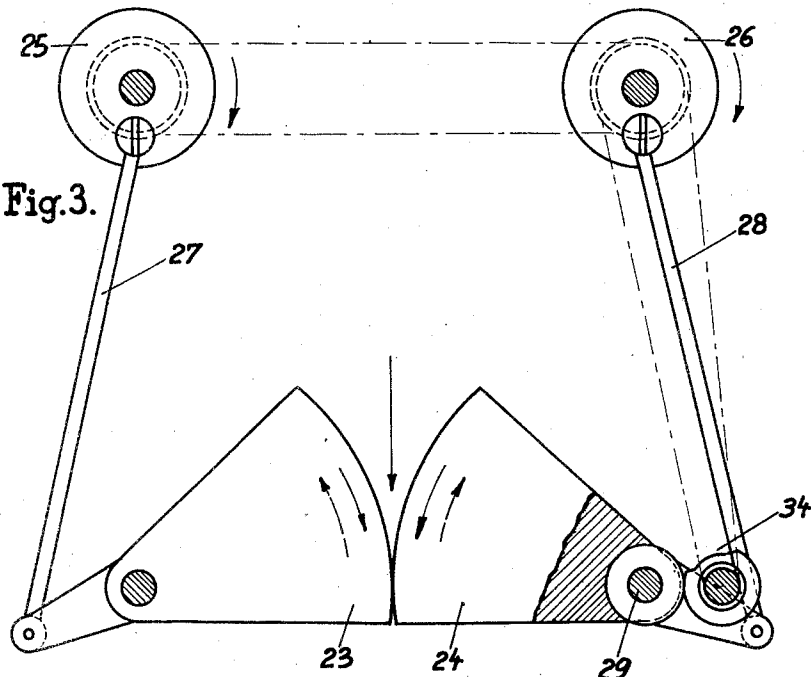
Fig. 2.

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Patented July 19, 1927.

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UNITED STATES PATENT OFFICE.

MARTIN F. BRANDT, OF BERLIN-CHARLOTTENBURG, GERMANY, ASSIGNOR TO THE
TABULATING MACHINE COMPANY, OF NEW YORK, N. Y.

APPARATUS FOR MECHANICALLY COPYING ENTRIES FROM CARDS OR SHEETS OR THE
LIKE ON A COLLECTIVE SHEET.

Application filed June 16, 1926, Serial No. 116,287, and in Germany May 19, 1924.

In business it is sometimes desirable to copy entries or writings, generally speaking, which have been made on single sheets, cards or the like, on a collective sheet for the purpose of counting up such entries and having the same assembled in a manner easy to survey.

To this end it is of importance that the said entries or writings are copied on the collective sheet so as to form or constitute a regular arrangement or sequence and that in particular large or irregular intervening spaces between the single entries are avoided, in order to improve or facilitate the perspicuity and clearness of the arrangement.

The chief object of my invention is to comply with this requirement and specially to overcome the difficulties arising, in order to realize the purpose of obtaining a close arrangement of the copied entries on the collective sheet, from the fact that the entries of the cards or the like to be copied on the collective sheet, occupy a limited field, portion or area of the card only. The cards or the like, therefore, cannot be copied on the collective sheet whilst being placed in a row close by each other as heretofore practised, since in this way the purpose aimed at cannot be realized, it being rather a characteristic feature of my invention that the entries or writings which are to be copied, are received by the collective sheet in a close sequence, so that there will not be any undue free spaces or intervals between the single copies made on the sheet.

With this object in view the cards or the like are conveyed and led according to the present invention, past the collective sheet in overlapping relation, that is to say, in partial superposition in the manner of roofing tiles so that a certain portion or section of each single card or the like only which will show the entry to be press-copied, will be in touch with the collective sheet and will be copied thereon. Alternatively the collective sheet may be given a return movement each time a card or the like has passed by, moving together with the collective sheet, so that the next card or the like will be copied on a portion or section of the collective sheet with which a portion of the preceding card or the like had been in contact before, but without any copying effect, since the contacting section of the said pre-

ceding card or the like had in that portion no copyable entry.

The invention is of particular value in connection with machines serving statistic purposes such as tabulating machines adapted to copy entries from cards onto a collective sheet. In the accompanying drawings forming a part of this specification, I have shown diagrammatically a new device for carrying out the invention and realizing the object aimed at, in connection with a machine for tabulating recording cards wherein the press-copying device is a mere additional arrangement in supplement to a card transporting and depositing device as usually employed in machines of the kind.

In the drawings:

Figure 1 is an elevation of the usual card transporting and depositing device of a tabulating machine without the supplementary press-copying device forming a part of the present invention; Figure 2 is a similar view with the supplementary press-copying device attached thereto and with the card leading table in a modified position; Figures 3 and 4 are an elevation and a plan, respectively, of a modification to be referred to.

Referring to Figures 1 and 2, the reference numeral 1 indicates a cord-pulley adapted to be revolved by a motor of any suitable construction, not shown, and to impart, in turn, the received motion to the card transporting device of the tabulating machine and to the copying rolls. 2 and 3 denote a pair of co-operating rollers for transporting the recording cards 4 past the hole sensing devices of the tabulating machine. The sensing device for the card holes is not shown in the drawings since the same may be of the usual construction and operation. 5 denotes a card gripping cylinder adapted to seize the cards 4 on their passage through or between the rollers 2 and 3, and to convey the same to the depositing table 6. In the machines as hitherto constructed, the card depositing table is not adjustable except in vertical direction, in order to allow it to be lowered in accordance with the growing of the heap of cards piled up thereon. To this end the table is made slidable in guideways 7 of its support 8.

For the purpose of allowing the cards deposited on the table to automatically move

or slide towards the copying rolls 13, 14 and the collective sheet 15, the supports 8 carrying the table 6 are constructed and arranged according to the present invention, so as to be adjustable by rotation about a pivot 8^a. To this end a table support 8 is connected with a segment or arm 9 having two holes 10 and 11 for the reception of a stud 12 for the purpose of locking the support either in the position shown in Figure 1 or in the position illustrated in Figure 2, a registering hole being provided in the frame for receiving and holding the pin or stud 12 in the one or the other locking position.

When the table is adjusted to occupy the inclined position shown in Figure 2, the cards deposited thereon slide, due to gravity, downwards towards the two copying rolls 13 and 14 until they come in contact with the collective sheet or copying band 15 in order to pass, together with the sheet or band 15, through or between the two rollers, the latter exercising a pressure upon the card and the sheet or band sufficient for the copying purpose, so that when subsequently the card leaves the rollers, the entry or writing of the card will have been copied on the sheet or band.

Intermittent or stepwise motion is imparted to the roll 13 by a feed mechanism comprising a pawl 16 and a co-operating ratchet wheel, the pawl 16 being attached to a pushing rod 17 pivotally connected with a crank-head 18 adjustably mounted in a diametrical groove 19 of a crank disc 20, so that the stroke of the rod and consequently the length of each single step the roll 13 is to be revolved, can be varied, as desired or required, and will be more or less extensive according to and depending upon the distance at which the crank-head or arm 18 has been adjusted and set with relation to the centre of the disc 20. Thus the pawl 16 will act to feed the copying roll 13 intermittently, in accordance with the adjustment of the crank or arm 18, and will impart to the roller an angular movement of a predetermined adjustable length at each feeding step. 21 indicates the arresting or locking pawl of the feed wheel for preventing unintentional back rotation and 22 denotes a container for the reception of the copied cards.

The operation of the gripping cylinder 5 for guiding and depositing the cards to be copied onto the table and the operation of the feed mechanism of the copying roll 13 are synchronized in a manner that the copying roll 13 will be at rest each time and at the moment a card is laid down upon the table 6, and will remain at rest until the forward edge of the said card sliding down from the table, reaches the meeting line or gap of the two copying rolls 13 and 14 and is in contact with the sheet or band 15. Immediately as this occurs, the roll 13 re-

ceives a feeding movement causing the card to pass through between the two rolls, due to frictional action. The card, however, does not travel fully through between the rolls at each feeding step, but remains therebetween for a certain time, so that the next following card will be superposed to occupy an overlapping position on top of the previous card as will be clearly understood on inspection of Figure 2. In accordance with and by the adjustment of the crank head or arm 18 in the groove 19 of the disc 20 the feeding movement of the cards, at each revolving step of the roll 13, can be adjusted in a manner that any desired number of overlapping cards will travel just like a unit through the gap between the two rolls 13 and 14 contacting therewith, the lowermost card of the travelling pile dropping upon or at each feeding step of the roll 13 while at the same time a new card is supplied by the table 6 to occupy the uppermost position in the pile.

It goes without saying that the crank or arm 18 is adjusted in a manner that the entries of the cards to be copied on the sheet or band 15 are copied on the latter without leaving any undue intervals or spaces between the single copies or, in other words, the desired spaces or intervals between the successive copies on the sheet or band are determined by the adjustment of the crank or arm 18.

The modification shown in Figures 3 and 4 serves the purpose of ensuring the close arrangement of the copied entries on the collective sheet without partial superposition of the record cards when contacting with the collective sheet.

To this end according to Figures 3 and 4 the pressure and transporting for the collective sheet and for the record cards comprises two co-operating roll segments 23 and 24 adapted to reciprocate in the directions indicated by arrows in Figure 3. Reciprocating motion is imparted to the two segments by a pair of crank discs 25 and 26 positively connected with the latter, respectively, by means of rods or links 27 and 28. The trunnions of the supporting shaft or axle 29 of the segment 24 are supported in sliding bearings 30 provided with pressure springs 31. The springs 31 normally act to hold the two segments in a separated position, that is to say, out of contact with each other, and revolving cams 32 are provided to periodically or intermittently counteract the action of the springs 31. The cams 32 cooperate with discs or rollers 33 mounted on the supporting shaft or axle 29, in order to allow the segment 24 to separate and remove from the segment 23 only when the recessed portion 34 of the cams is in engagement with the peripheral surfaces of the rollers 33.

By suitably adjusting the angular position

of the cams 32 on their carrying shafts and by suitably dimensioning the angular width of the recesses 34 of the cams the segments 23 and 24 can be caused to engage or contact with each other for a predetermined period or apportioned space of time during the return movement thereof so that they will take the collective sheet or copying band along with them, and to remain out of contact or separated during a further period of the return movement thereof, so that the sheet or band will remain at rest during such period. Thus each and any new card or sheet from which a copy is to be made, will be brought in contact with a certain portion of the collective sheet or band passing through between the two segments and it will be seen that the said portion of the collective sheet had passed through between the two segments once before while being in contact with a previous card or the like.

In order to not be bound to read the press-copy through the thickness of the copying sheet or band, the cards or the like to be copied, may be printed so as to show the figures or characters in copyable ink on their back, and such cards may be run through the copying device so as to contact with the collective sheet with their back sides, so that the reversed characters or figures (of the so-called mirror type) are copied thereon and are readable from the front side of the copying sheet or band.

It will be evident that my invention, whilst still being adhered to in its main essentials, may be varied and adapted in many ways, according to the requirements desired, or most suitable under different circumstances. I would therefore have it understood that I do not limit myself to the embodiments of the invention shown for purposes of exemplification, but hold myself at liberty to make such departures therefrom as fairly fall within the spirit and scope of my invention.

What I claim is:

1. A copying device comprising in combi-

nation, a pair of intermittently driven copying rolls, means for intermittently revolving said copying rolls through fractions of a revolution, and a mechanism for transporting and guiding cards or the like to be copied to the said copying rolls, whilst the latter are at rest.

2. A copying device comprising in combination, a pair of intermittently driven copying rolls, means for intermittently revolving said copying rolls, a mechanism for conveying and guiding cards or the like to be copied to the said copying rolls, whilst the latter are at rest, and means for adjusting or varying the length of the intermittent movements of the said rolls.

3. A copying device including copying rolls, means for feeding records to the rolls in overlapping relationship leaving a portion only of each record exposed for copying and means for intermittently driving the rolls by increments corresponding to the uncovered portions of the records.

4. A copying device including copying rolls and means for intermittently driving them, means for feeding records to be copied singly to said rolls during successive rest periods, the intermittent movements of said rolls being adjusted to feed a portion only of each record during a movement whereby the records are passed between the rolls in overlapping relationship.

5. A copying device including copying rolls and means for intermittently driving them, means for feeding records to be copied singly to said rolls during successive rest periods, the intermittent movements of said rolls being sufficient to feed a portion only of each record during a movement whereby the records are passed between the rolls in overlapping relationship and means for adjusting the increments of movement of the rolls to permit variation in the portion of each record exposed for copying.

In witness whereof I affix my signature.

MARTIN F. BRANDT.