

July 3, 1928.

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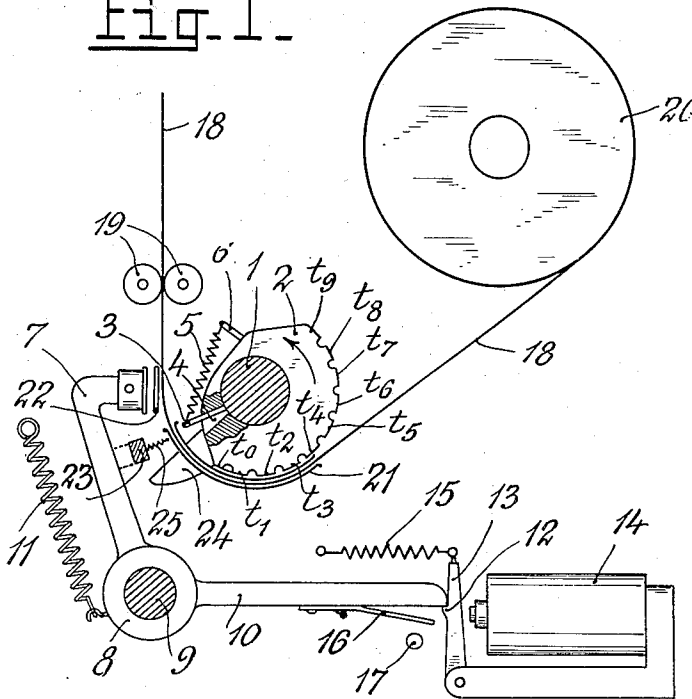
F. R. BULL

AUTOMATIC PRINTING MACHINE

Filed Feb. 18, 1926

2 Sheets-Sheet 1

Fig. 1.



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By: Marks & Clerk
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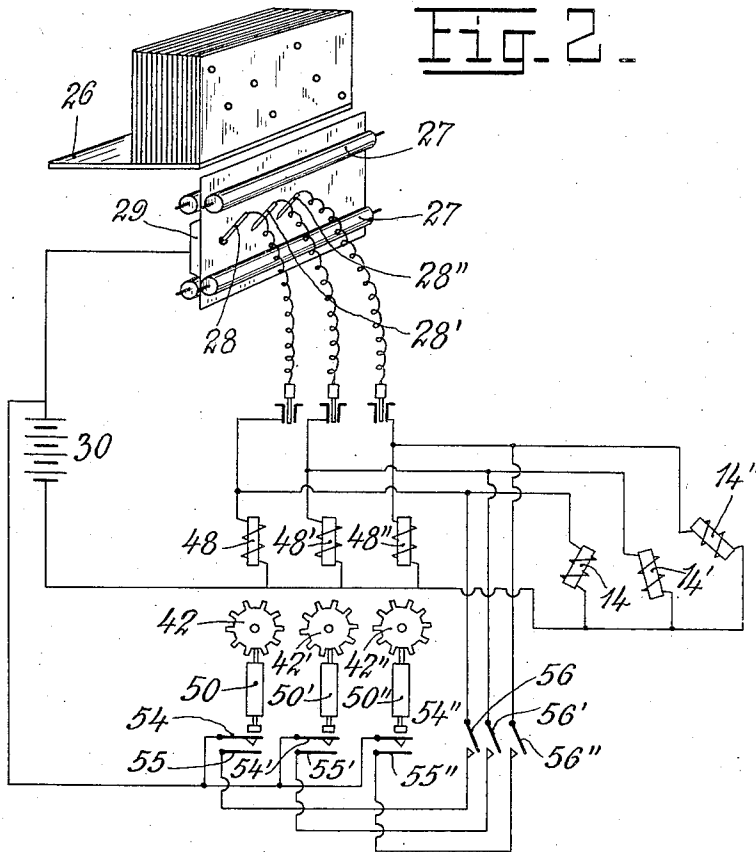
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2 Sheets-Sheet 2



INVENTOR
Fredrik R. Bull, deceased
BY Ernst Hilditch and
Ulrich Strom,
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BY: Marks & Clerk
Attys

UNITED STATES PATENT OFFICE.

FREDRIK ROSING BULL, DECEASED, LATE OF OSLO, NORWAY, BY ERNST HILDITCH
AND ULRICH STRØM, EXECUTORS, OF OSLO, NORWAY.

AUTOMATIC PRINTING MACHINE.

Application filed February 18, 1926, Serial No. 89,265, and in Norway February 20, 1925.

The present invention relates to an automatic printing machine for recording the statements or indications which are given by perforation of cards, paper strips or the like.

The invention is especially adapted to be used in connection with the known registering machines, in which such perforated cards are used, and the machine is arranged in such a manner, that it is possible to record as well the single statements of the cards as the sum total of these single statements.

There are previously known machines for similar purposes, but on account of the complicated construction of the same, these machines can not be operated with so great rate of motion that they can work together with the modern registering machines. The machine according to the present invention however, which is especially characterized by the fact, that the types of the recording apparatus are fixed to or engraved on the circumference of wheels, which are mounted upon a shaft, rotating synchronously with the passing of the card or the like by a contact device, on account of the simple construction and proportionally few moving members will easily be able to work together with the said registering machines, which is to say to be able to print about 8,000 single statements during each hour.

The invention is illustrated in the accompanying drawings, in which:

Figure 1 shows a cross section through the printing machine.

Figure 2 shows a connection diagram.

Referring to Figure 1 —1— indicates a shaft, upon which are mounted several type wheels —2—, lying side by side, each of which in the example shown is provided with number types 0, 1, 2 . . . 9, which are indicated in the drawing by $t_0, t_1, t_2 \dots t_9$. The number of these type wheels is equal to the number of adding wheels in the adding apparatus, with which the printing machine is associated, and usually there are ten. As the arrangement of each single type wheel with the members appurtenant is the same, it is only necessary to describe the construction of a single set.

The fastening of the type wheel —2— to the shaft —1— is made by means of a pin —3— on the shaft, which pin lies in an oblong slot —4— in the type wheel. By means

of a spiral spring —5—, stretched between the pin —3— and a pin —6— on the type wheel, the latter is normally rotated during the rotation of the shaft —1—, but for a moment it is permitted to be kept in a fixed position until the pin —3— engages with the other edge of the slot —4—. Opposite the type wheel —2— a hammer —7— is arranged, which is fastened to a thimble —8—, which is freely rotatable on a shaft —9—. To the thimble —8— is also fixed a rod —10— and a spiral spring —11—, the latter tending to swing the hammer towards the type wheel —2—. The said swinging of the hammer —7— is normally prevented by the rod —10— being locked by a lug —12— on the armature —13— of an electromagnet —14—, which armature is kept in locking position by means of a spiral spring —15—. To the rod —10— is fixed a spring —16—, which co-operates with a stationary pin —17— as hereafter further described. Between the hammer —7— and the type wheel —2— a paper band —18— is arranged, which is by means of rollers —19— unwound from a paper roller —20— and through a leading passage —21— is drawn past the shaft —1—. The width of the paper band is regulated by the number of type wheels, arranged side by side, so that all the type wheels are covered by the paper band. Between the paper band —18— and the hammer —7— an inked ribbon —22— is arranged, which is moved transversely of the band 18 by a suitable mechanism (not shown). —23— indicates a bar, parallel to the shaft —1—, which bar is, by means of cams —24—, one at each side of the shaft —1—, pushed into the position, shown with dotted lines, after all types on the wheel have passed the hammer, and thus brings the same back in its normal position. The bar —23— is influenced by springs —25—, which return it to normal position.

Supposing that the printing machine is arranged for recording the statements of three vertical columns of a pile of perforated cards, accordingly comprising three type wheels with the hammer and electromagnet appurtenant, then the latter will be inserted in the current circuit of a card contact device as shown in Figure 2.

The cards, the statements of which to be recorded, are piled up on a board —26—, from which they are conveyed one by one

in known manner between two pairs of rollers —27—. Between the said pairs of rollers is arranged a contact device, consisting of three contact brushes —28—28'— and —28''—, lying side by side, opposite an electrically conducting contact plate —29—, and each of which is touched by a vertical column of the cards during the conveying.

From each of the said contact brushes a conductor leads to the electromagnets —14—14'— and —14''— of the type wheels, and from these electromagnets a common conductor leads to one pole of a battery —30—. The other pole of the battery is connected with the contact plate —29— by a conductor. The shaft —1— with the type wheels —2— (Figure 1) rotates synchronously with the passing of the cards by the contact brushes —28—, so that the number 9 of the type wheels is standing opposite the hammers —7— at the same moment as the numbers 9 of the cards are standing opposite the contact brushes —28—. Supposed that a perforated number of the card passes the contact brush —28—, then a current circuit will be closed, extending from the battery —30— through the contact plate —29—, the contact brush —28—, the electromagnet —14— and back to the battery. Hereby the armature —13— of the electromagnet (Figure 1) is attracted, and releases the rod —10— with the result that the hammer —7— owing to the effect of the spring —11— swings inwards and strikes the paper band and the colour band against the type wheel —2—, whereby the type of this wheel, corresponding to the said perforation of the card will be printed on the paper. When the hammer —7— strikes against the type wheel, the spring —16— of the rod —10— will strike against the pin —17— and the strain of the spring is adapted in such a manner, that the hammer is brought somewhat back from the type wheel so that it is not constantly pressed against the same.

For each rotation of the shaft —1—, after all types have passed the hammer, the cams —24— will take the bar —23— into the position shown with dotted lines thereby bringing the hammers, which have been released, back to the start position.

The types of the wheels may be as well letters as numbers and the invention is not limited to ten types, certainly all the letters of the alphabet may be placed on each of the type wheels.

The releasing of the hammers of the printing machine may also take place in other ways without departing from the scope of the invention, as the essential feature of the invention consists in the type wheel of the adding apparatus being moved synchronously with the passing of the cards or the like by a contact device or with the shaft for the number wheels of an adding apparatus, when these wheels are moved back to their zero-position, or synchronously with wheels being in mesh with the number wheels.

What is claimed is:

An automatic printing machine for recording statements or indications, given by the perforation of cards, paper strips and the like, in which the types are placed on the circumference of wheels mounted on a shaft which rotates synchronously with the passing of the card or the like by a contact device, said type wheels being arranged on the shaft in such a manner to permit said wheels to remain in a fixed stationary position during partial rotation of the shaft.

In testimony whereof we have signed our names to this specification.

Oslo, April 30th, 1927.

ERNST HILDITCH,
Advocate (One of the Trustees of the Late
Mr. Fredrik Rosing Bull's Estate),
ULRICH STRØM,
Engineer.