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R. L. A. VALTAT
PROCESS AND APPARATUS FOR REJUVENATING
PERFORATED ACCOUNTING MACHINE CARDS
Filed Oct. 31, 1927

1,777,947

2 Sheets-Sheet 1

Fig. 2

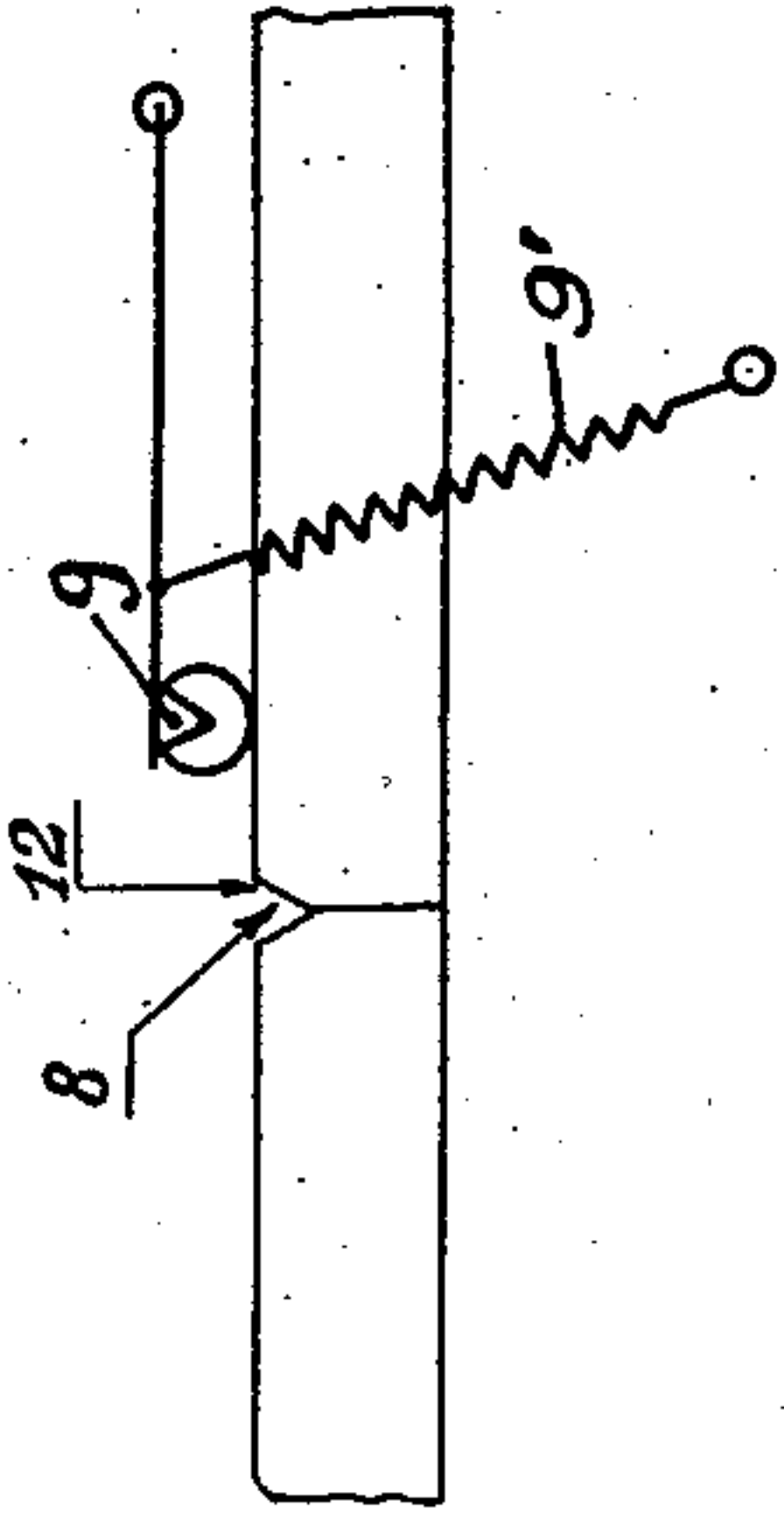


Fig. 3

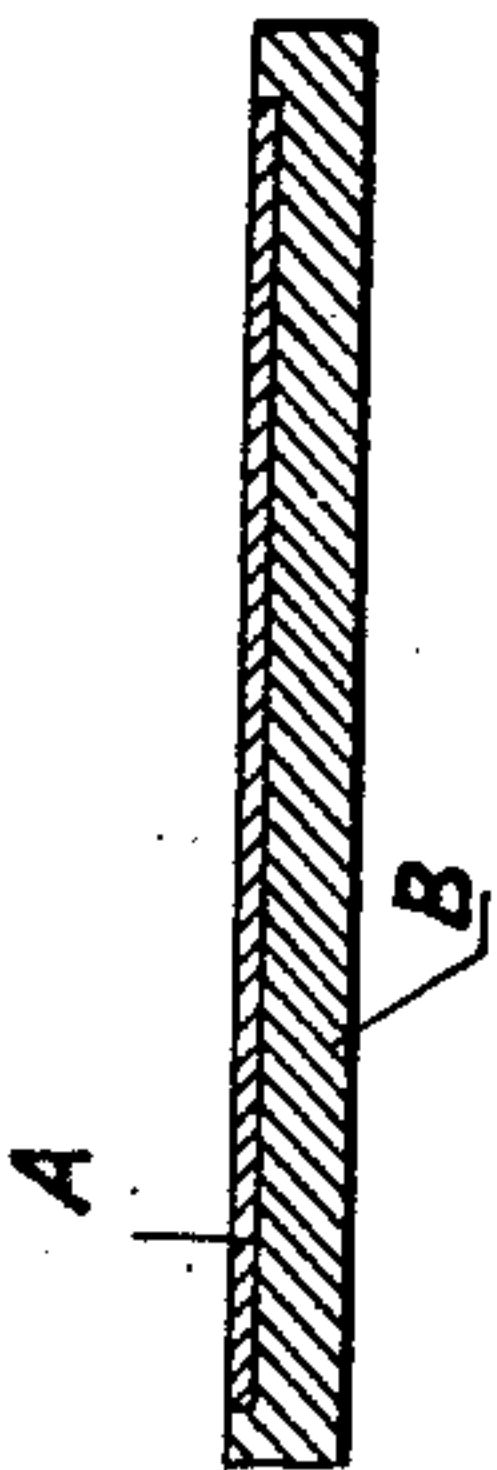


Fig. 1

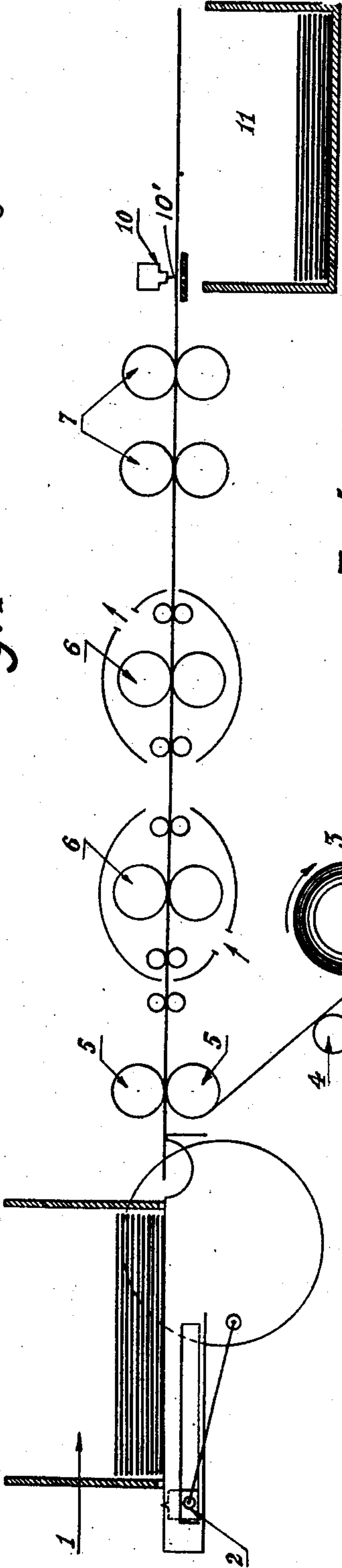
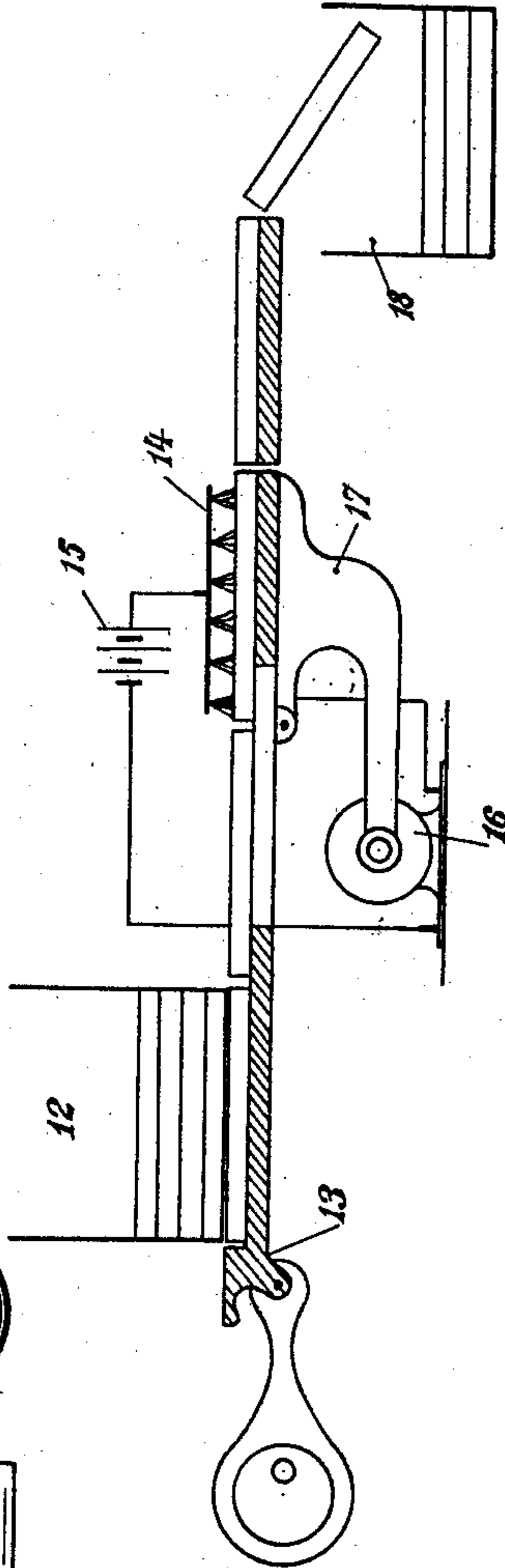


Fig. 4



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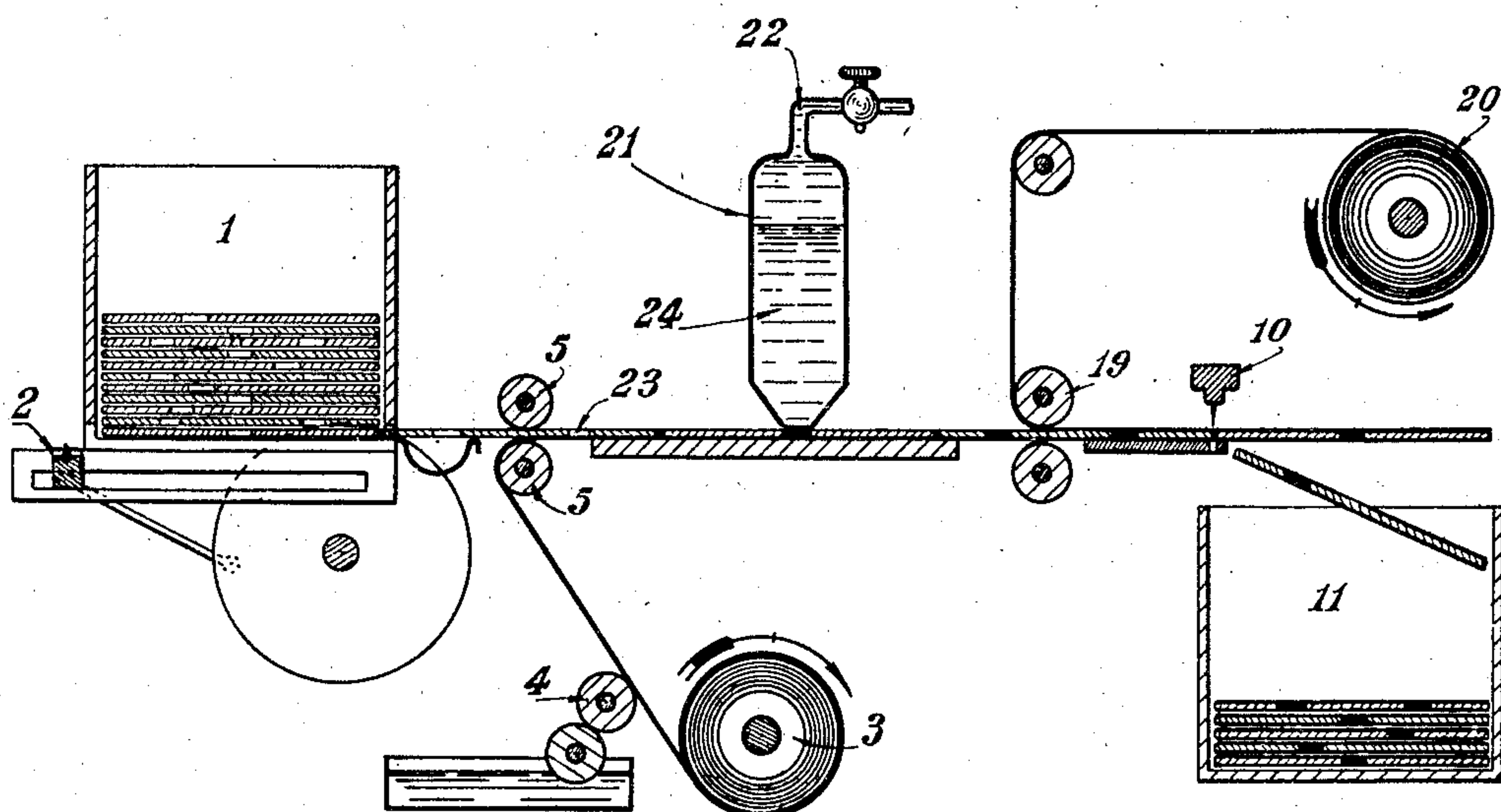
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Fig. 5



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UNITED STATES PATENT OFFICE

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PROCESS AND APPARATUS FOR REJUVENATING PERFORATED ACCOUNTING-MACHINE CARDS

Application filed October 31, 1927, Serial No. 230,198, and in France November 13, 1926.

My invention relates to a process and an apparatus for rejuvenating cards of the type used in accounting machines.

In the drawing—

Fig. 1 is a diagram of a machine for carrying out the process;

Fig. 2 is a diagrammatic representation of a separating mechanism;

Fig. 3 is a sectional detail of a rejuvenated card;

Fig. 4 represents a diagram of the testing apparatus; and

Fig. 5 shows the machine adapted to fill the perforations with plastic material.

In certain types of accounting machines cards or tickets made of a special kind of cardboard are utilized upon which various numerical indications are inscribed in the form of perforations. Manifestly the cards may only be used a single time.

As the said cards are of special construction a single utilization of each card becomes a costly proposition and it is one of the objects of this invention to provide a process for treating the said cards in order that they may be used more than a single time.

Another object of the invention is to provide a machine which will enable said process to be carried into practice economically.

The problem, however, presents great difficulties by reason of the specific technical conditions which the said cards must satisfy and which are essentially as follows:

First, the cards must be perfectly regular in thickness and must not vary beyond the limits permitted by the various machines in which they are to be utilized, which variation is of the order of one one-hundredth of a millimeter.

Second, the length and width of the card are limited to a variation on the order of a tenth of a millimeter.

Third, the planeness of the card surfaces must be almost perfect.

Fourth, the stiffness of each card must be such as to permit the punching of regular holes at fixed points.

Fifth, when used in machines operating by electric contact, the cards must have a practically perfect resistance when the surfaces

thereof are subjected to a difference in potential equal to that which is employed in the machine in which the cards are to be utilized.

Sixth, the mechanical resistance of the cards must be such that the cards can safely withstand the friction and shock of the hunting brushes or needles (according to whether the machine operates mechanically or electrically) without danger of tearing or perforation.

The process forming the subject of the present invention consists in sticking, on one side or the other of the card or simultaneously on both sides of the card, a sheet of material whose characteristics and the mode of fixation will now be described.

The material chosen is first subjected to an examination for regularity of thickness.

The thickness of the material in any spot must at no time be greater than a value equal to the difference between the actual thickness of the card and a maximum thickness determined by the permissible allowance of the various machines through which the cards are to be passed.

Furthermore the thickness of the sheet of material chosen must be sufficient to allow ease of manipulation and to prevent rupture during the passage of cards through the machine. A good thickness, in this respect, would be anything between .02 and .04 centimeters.

In the event that the two last conditions, above mentioned, cannot be fulfilled my process may nevertheless be utilized by taking certain precautions which will be later enumerated.

When the cards are to be used in accounting machines operating on the electric contact principle, the sheet of material is subjected to an examination for determining the electrical insulating properties thereof and only material possessing good insulating properties is chosen. Consequently the material chosen must, in this case, be free of holes, jags or metallic particles.

The cards, during their travel through the machine, must be able to slide easily upon one another in order not to drag on the feeding mechanism. It follows that the sur-

face of the material chosen must be smooth. In the event that the material chosen only possesses a medium smoothness of surface a thin coat of talc may be subsequently applied to the surface of the rejuvenated cards.

It has been found after prolonged experiment that the above specified conditions are satisfied by a paper known in commerce by the name of "cellulose muslin".

In the event that the cards are to be used in a mechanically operating machine, the insulating properties of the material become no longer necessary and a very thin sheet of aluminium may be employed to advantage.

The width of the sheet of material chosen must be such that a slight margin will subsist along the corresponding edges of the rejuvenated card in order that the rejuvenated cards will have exactly the same thickness as new cards along the aforesaid edges. Consequently the feeding mechanism of the accounting machine can take new or rejuvenated cards indiscriminately without modifying its adjustment.

By way of example, said margin along both edges may be in the neighborhood of 1 millimeter but may be reduced to a much less value if desired.

The sheet of material thus being chosen and prepared as above described is stuck upon the perforated cards by mechanical means to be subsequently described. This sticking operation is produced by means of a liquid paste with which the sheet of material or the card is smeared or by utilizing a sheet of material gummed in advance and moistening it at the time of application.

The liquid paste employed must be specially prepared as it must be very homogeneous in character in order to prevent over-thick lumps which would interfere with the rejuvenated card passing properly through the machine in which it is used.

The paste chosen must also possess the property of drying rapidly and at the same time produce perfect adherence.

I prefer to use a paste prepared after the following formula:

A	
Gum arabic (powdered)-----	Grams 20
Sugar-----	5
Boiling water-----	75
B	
Starch-----	15
Cold water-----	30

The paste is prepared by stirring the mixtures A and B together and adding 300 grams of boiling water.

It is absolutely essential and extremely difficult to prevent warping of the cards during drying and hence a loss of the planeness of surface necessary for their regular

passage through the machine due to the irregular shrinking of the pasted surfaces of the card, of the sheet of material thereon and of the paste itself.

The composition of the paste as given above the texture of the material indicated and the method of drying to be subsequently explained have been found to produce the desired result.

As previously mentioned, the sheet of material chosen must in no spot be greater than a certain maximum value determined by the thickness of the card and the characteristics of the machine in which it is to be used. It frequently happens that the actual thickness of the card is very near that of the maximum allowable thickness of the machine in which it is used. In such a case the material chosen is of a thickness greater than that previously indicated and the pasted card is subjected to a rolling operation which pushes back the sheet of pasted material into the body of the card in such a manner as to form a practically negligible thickness in the rejuvenated card.

In the event that the maximum allowable thickness imposed upon the sheet of material does not give it sufficient mechanical strength, it is reinforced by filling the holes in the card with a cement or putty which will strongly adhere to the internal surface of the sheet or sheets of material employed.

A mechanism for carrying the above described process into practice will now be described with reference to the accompanying drawing forming part of this specification.

Referring to Fig. 1, the cards to be rejuvenated are placed in a feeding receptacle 1 and are extracted therefrom by means of a suitable feeding mechanism 2 of known type which pushes the said cards one after another and in abutting relation through a pair of pressure rollers 5. The parts thus far described, by way of example might readily be of the type employed in accounting machines themselves or again of the type used in addressing machines.

The paper material is rolled upon a roller 3 and passes over a paste roller 4 and then between the pressure rollers 5 where it is continuously pasted upon the cards passing through the said pressure rollers.

In case it is desired to cover both sides of the card as above explained, it is to be understood that two rolls of paper will be provided as well as two pasting rollers and two sets of pressure rollers arranged in the same manner as those illustrated but on the opposite side of the cards.

If it is desired to reinforce the card at the perforations, putty or cement is inserted therein by means of a mechanical mechanism of known type which will automatically perform the puttying operation, that is the filling of the holes to be closed and the scraping

off of the excess. This operation would take place after the pasting of the paper on one side of the card but before the pasting takes place on the other side.

Upon leaving the pressure rollers 5, the cards covered with the paper pass between a series of heated rollers 6 for drying the rejuvenated cards and maintain their straightness. The rollers 6 may be heated by a current of air heated with electrical resistances which current of air would also contribute to the drying of the card.

The rejuvenated cards then pass between a series of laminating rollers 7 which press the sheet of paper material A (Fig. 3) into the body B of the card in such a manner that the increase in the thickness of the rejuvenated card is substantially negligible.

The continuous string of rejuvenated cards thus formed passes through a separating mechanism 10 provided with a cutting blade 10'. As is well known in the art, the cards used in accounting machines generally have cut off corners, i. e., bevelled edges 12 (Fig. 2) which gives rise to a notch 8 between adjacent cards along the entire edge of the continuous string of cards.

A friction roller 9 is adapted to bear against the edge of the string of cards by means of a spring 9' and each time the said roller moves into a notch 8 it causes the blade 10' (Fig. 1) to descend and separate successive cards as they pass, the said blade being very thin in order to enter readily between the cards in abutting relation. The finished cards finally fall into a receiving bin 11.

The construction for filling the holes is shown in Fig. 5, the parts common to Fig. 1 being designated by the same reference characters.

The punched cards first have applied to their under side the paper from roll 3 by rolls 5 and then pass under a reservoir 24 for pasty filling material or putty. This material in the reservoir is under pressure of a column of water or other fluid conducted to the reservoir through a pipe 22. The filled cards then pass between pressure rolls 19 that apply a strip of paper to the upper face of the cards from a roll of paper 20. The cards faced on both sides with a strip of paper pass to the cutter 10 and fall into the bin 11.

The apparatus for testing the finished cards is shown in Fig. 4 and comprises a receiving receptacle 12 arranged exactly the same as that upon the machine in which the cards are to be utilized. At the lower part, the said receptacle is provided with a mechanism 13 destined to take the cards one by one. When the cards have been tested as to their feeding qualities by the said mechanism they subsequently pass between a series of brushes 14 disposed on the upper side of the passing card and connected to a source of E. M. F. 15. The card moves over a flat metallic surface

17 which is carried by an electrically operated mechanism 16. The other terminal of said source is connected to a terminal of the mechanism 16 and the other terminal of said mechanism is connected to the plate 17 thereof. The said mechanism 16 is adapted to move the plate 17 downward when current passes therethrough.

The voltage of the source 15 is such that a difference in potential is maintained between brushes 14 and plate 17 which is superior to that maintained in the machines in which the cards are to be utilized.

If the resistance of the passing card is not up to standard a break-down occurs which causes current to pass through the mechanism 16, lowering plate 17 and causing the faulty card to be automatically ejected. The cards which pass the test subsequently fall into a box 18 in which they are to be delivered.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is—

1. The process of rejuvenating used punched accounting machine cards, which comprises feeding the punched cards successively onto a continuous web, previously supplied with adhesive, filling the perforations, drying the web with the adhering cards, subjecting the web to pressure and severing the strip between the cards.

2. A process of rejuvenating used, punched accounting machine cards, which comprises feeding the cards onto a continuous web, narrower than the cards and previously supplied with adhesive, rolling the web onto the body of the cards and severing the web between the cards.

3. A process for rejuvenating bevelled and punched used accounting machine cards, which comprises feeding the cards in abutting relation onto a continuous web previously supplied with adhesive, drying and pressing the web with the cards thereon and severing the web between the abutting edges under the control of the adjacent beveled edges.

4. A process for rejuvenating bevelled and punched used accounting machine cards, which comprises feeding the cards onto a continuous web narrower than the cards, successively in abutting relation, previously supplying the web with a homogeneous paste having the same shrinking characteristics as the web, drying the web with the cards thereon, compressing the web to countersink the web in the cards and severing the web between abutting cards.

5. A process for rejuvenating used bevelled and punched accounting machine cards, which comprises feeding the cards in abutting relation onto a strip of cellulose muslin previously supplied with adhesive having substantially the same shrinking characteristics as the muslin, drying the strip with the

cards thereon, rolling the muslin into the cards to countersink it therein, and severing the strip between the abutting edges of the cards.

5 6. A process of rejuvenating used bevelled and perforated accounting machine cards, which comprises feeding the cards in substantially abutting relation onto a continuous strip of cellulose muslin previously supplied
10 with an adhesive having substantially the same shrinking characteristics as the muslin, drying the strip with the cards thereon, counter-sinking the muslin in the cards by pressure and severing the strip between the
15 abutting edges of the cards under the control of their abutting edges.

7. A process of rejuvenating used, bevelled, perforated accounting machine cards, which comprises supplying the cards in substantially abutting relation onto a strip of material previously supplied with an adhesive having substantially the same shrinking characteristics as the strip, filling the holes with a putty, applying a second strip on the
20 opposite face of the cards, drying the strips with the cards between them and severing the strip between the adjacent edges of the cards.

8. A previously used and punched card
30 for accounting machines, having a sheet of material on a face and its holes filled with a putty.

9. A previously used and punched accounting machine card having its holes covered
35 with a sheet of material narrower than the card and countersunk therein.

10. A previously used and punched accounting machine card having its holes covered with a sheet of material countersunk
40 in the card and the holes filled with putty.

In testimony that I claim the foregoing as my invention, I have signed my name.

RAYMOND LOUIS ANDRÉ VALTAT.

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