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R. L. A. VALTAT

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CARD FOR STATISTICAL MACHINES AND METHOD FOR MANUFACTURING SAID CARD

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Fig. 1.

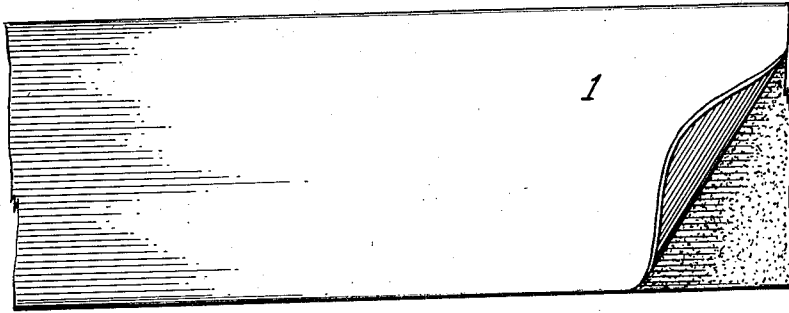


Fig. 2.

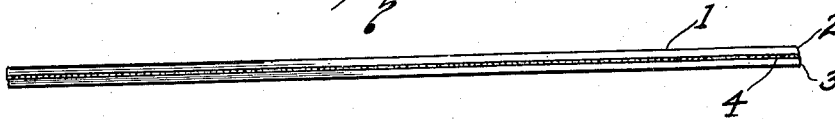


Fig. 4.

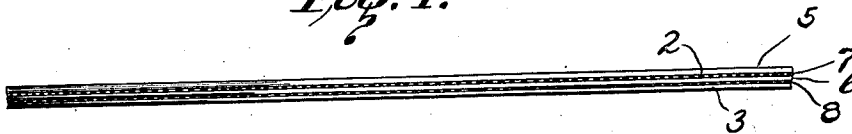
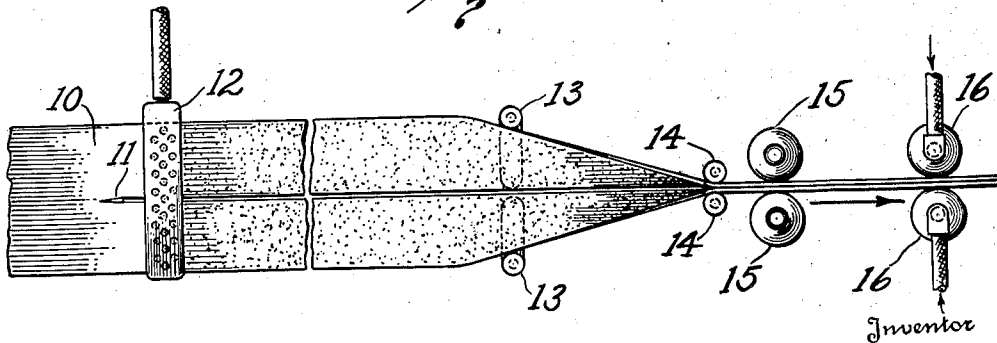


Fig. 3.



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2,041,880

CARD FOR STATISTICAL MACHINES AND
METHOD FOR MANUFACTURING SAID
CARD

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7 Claims. (Cl. 154-2)

My invention has for its object a card for statistical machines, and a method for manufacturing said card.

As it is well known, the paper (thin card-board) of which are made the cards that are to be perforated and subsequently sorted and classified in statistical machines must meet certain requirements, which are very strict, and will be hereinafter described in detail.

Up to now, a single factory, located in the United States of America, has been able to manufacture cards made of a paper that meets these requirements. Though it has been endeavored since many years in various countries to create a similar industry, it has never been possible to produce a paper having the required characteristics. People who utilize statistical machines are therefore compelled to buy the paper from said factory and that de facto monopoly necessarily involves a high price.

The great interest of the present invention will readily be understood in view of the fact that not only will it enable people to buy their cards for statistical machines at a much lower price, but it will make them sure that their statistics and accounts do not risk to be stopped due to a lack of raw materials.

Before describing my invention, I will state the characteristics which a paper for statistic cards must have:

1. *Inertia*.—The paper must remain stable under variations of atmospheric conditions.

2. *Nervosity*.—The paper must be nervous so as to withstand the action of the feed knives of the distributing mechanism of statistical machines. Consequently, it must not be liable to deformation or have its edges burred, as said deformations or burrs prevent said cards from being utilizable in statistical machines.

3. *Firmness*.—The card must not bend under the action of the feed knives, because they are intended to penetrate into a groove whose size is substantially equal to the thickness of one card. The card must, furthermore, be sharply perforated by the punches of the perforating machines.

4. *Planeness*.—The cards cut from the paper must be plane and so remain either in a dry or in a humid medium, provided that they are symmetrically exposed either to a dry or to a humid atmosphere.

5. *Thickness*.—The paper must be of a uniform thickness comprised between rather narrow limits (substantially between 0.155 and 0.175 millimeter).

It will readily be understood that these combined requirements are not easily met, the more so as the conditions of inertia and nervosity seem, so to speak, to be contradictory. For when it is desired to obtain a paper having inertia, use is made of a pulp having short fibers, which implies a nearly complete lack of firmness. On the contrary, the use of a pulp having long fibers implies nearly necessarily the mobility of the paper. Paper manufacturers who have tried to produce a paper meeting these various requirements have all met with failure. The chief defect of their products was the lack of homogeneity in a direction at right angles to the mean fiber, which unavoidably resulted, after a more or less long time, a warping of the cards preventing their use in statistical machines. Furthermore all these products were extremely expensive.

The chief object of my invention is to provide a card for use in statistical machines, manufactured from an easily available material which is not required to have characteristics different from, or more accurate than, those that it has usually.

In the accompanying drawing illustrating two embodiments of articles according to my invention,

Figure 1 is a plan view of a card;

Figure 2 is a side view of a card formed of two sheets of paper;

Figure 3 illustrates diagrammatically the method of manufacturing a card according to Figure 2; and

Figure 4 is a side view of a card formed of two similar outside sheets of paper and an intermediate sheet.

In a general way, the cards for statistical machines according to my invention consist of two layers of strong paper (preferably kraft paper) the similar faces of which are glued against each other.

Figure 2 of the drawing shows a side view of a card 1 formed of two finished and cured sheets of paper 2 and 3 having similar sides glued together by adhesive 4.

Of course, in order to avoid warping of the cards, the two sheets of paper must be carefully chosen so as to have characteristics as identical as it is possible.

Said result may be obtained by carefully choosing, among several sheets of paper, those that are as similar as possible.

However that result may be obtained in a way that is at once more certain, more perfect and

more simple by cutting longitudinally a spool of paper (preferably kraft paper). Thus I will divide a spool 120 cms. high into two bands 60 cms. wide. In that way, I am sure that, if variations occur in the characteristics of the paper, said variations will exist in an identical way on both faces of the cards for statistical machines made from the paper thus prepared. The size and grade of kraft paper to be utilized are of course such that the combination of the two sheets of paper after they have been pasted together may have the dimensions that are desired for the cards. By way of example, the papers may be chosen of a weight of 70 grammes per square meter.

The usual kraft papers found in the market generally have a sufficiently uniform thickness in order that, after pasting together the two sheets that form the cards, the thickness of said cards may be comprised between the limits that are imposed. However, it might be advantageous to utilize kraft papers of a thickness slightly greater than the required thickness and to subject the finished cards to a rolling operation which both reduces their thickness and makes it uniform, so as to obtain the required dimension by a method analogous to that described in my prior U. S. Patent 1,777,947, filed Oct. 7, 1930.

The glue to be used must be suitably chosen. It may be such that its shrinkage is slightly different from that of the paper when drying, provided that the internal stresses that result therefrom are not too considerable, since said stresses are symmetrically directed and do not impair the planeness of the cards.

Of course, in order that the process may be industrially utilized, the pasting must be effected in a continuous manner, by employing spools of paper and treating it by means of machines provided with cylinders. The papers, pasted against each other when they leave the machine, pass between pressing cylinders, and, if need be, rolling cylinders, for ensuring a perfect adhesion. Eventually, the papers may be caused to pass through a drying chamber or between heated rollers before winding around receiving drums, the finished product constituting the material for making cards for statistical machines according to my invention. That material will be subsequently cut and printed for making the cards for statistical machines.

In Figure 3, the method of making the card paper according to Figure 2 is diagrammatically illustrated. The strip 10 of suitable paper is continuously passed in the direction indicated by the arrow and may be cut by suitable means as knife 11, forming two narrower strips. An adhesive may be applied to one side of the paper either before or after the cutting. Mechanism for applying the adhesive is diagrammatically illustrated as a roll 12. The surfaces of the strips to which the adhesive has been applied are then brought together by suitable guide mechanism such as roll guides 13, 13 and 14, 14, and the combined strip may then be passed between pressure rolls 15, 15 to ensure uniform thickness and a perfect adhesion. The combined strip may then be dried by passing over or between heated drying rolls 16. The strip may then be wound in rolls for storage or used directly in the manufacture of statistical cards.

It may also be advantageous to utilize three superposed sheets of paper for making the cards. In that case also to make the external sheets of kraft paper or a similar product, the intermedi-

ate sheet of paper consist of an inert material which merely serves to insure the desired thickness.

Figure 4 of the drawing shows a side view of a card 5 formed of two oppositely disposed sheets of paper 2 and 3 and an intermediate layer 6 glued together by adhesive 7 and 8.

I may use for the intermediate sheet a very ordinary paper having short fibers, while the outer lateral sheets will be made of strong papers of light weights (40 grammes for instance). These last mentioned sheets will give the card the required firmness.

Considering the chief characteristics which the material for making cards for statistical machines must have, it may be seen:

1. That inertia and planeness are obtained owing to the symmetrical mode of making the product;

2. That nervosity and thickness are obtained owing to the use of a paper having long fibers and a given weight per square meter;

3. That firmness essentially results from the pasting: two papers of equal thickness pasted against each other have a firmness that is notably greater than that of a paper of the same kind having a double thickness.

I wish it to be very clear that my method is wholly different from that which consists in making the paper of the cards for statistical machines of two sheets of paper which are superposed with the back of one sheet applied against the face of the other one, in the course of the manufacture. In the last mentioned method, the all important condition of symmetry (without which the cards could not remain plane) is not obtained. Besides, there is an essential difference between the method which consists in assembling two sheets of paper during the course of the manufacturing process (that is when they are in the fresh state and have not reached their definitive state of equilibrium) and the process according to my invention which consists in utilizing papers that have already shrunk and have reached their state of equilibrium.

What I claim is:

1. As a new article of manufacture, a card for statistical machines consisting of two substantially identical sheets of paper, corresponding faces of the sheets being placed together with their fibres disposed in like direction and an adhesive securing said faces together and forming a card of uniform thickness.

2. As a new article of manufacture, a card for statistical machines consisting of two substantially identical sheets of kraft paper, corresponding faces of the sheets being placed together with their fibres disposed in like direction, and an adhesive securing said faces together and forming a card of uniform thickness.

3. As a new article of manufacture, a card for statistical machines consisting of a sheet of short fibre paper, and two substantially identical sheets of kraft paper glued to the first mentioned sheet on either side thereof, the like faces of the kraft paper being in contact with the short fibre paper and the fibres of the two sheets of kraft paper being similarly disposed.

4. A method of manufacturing cards for statistical machines which comprises slitting a band of paper longitudinally into two strips and gluing said bands against each other so that the respective faces thereof that are glued together are those that form the same faces of the initial band of paper prior to the slitting thereof and so that the

fibres in the two strips when glued together are similarly disposed.

5 5. A method of manufacturing cards for statistical machines which comprises applying adhesive to a paper band, slitting the band longitudinally into two strips, folding the adhesive covered faces of the strips against each other, and then integrating the laminated strip with the fibres of the two strips similarly disposed.

10 6. A method of manufacturing cards for statistical machines which comprises taking two substantially identical bands of paper and securing them together by means of an adhesive so that the like or corresponding faces of the sheets are
15 adjacent to each other and so that the fibres of

the two sheets lie in the same direction, and rolling the composite sheet thus obtained so as to give it a more uniform thickness of the desired value.

7. A method of manufacturing cards for sta- 5
tistical machines which comprises taking two substantially identical bands of kraft paper and securing them together by means of an adhesive so that the like or corresponding faces of the sheets are adjacent to each other, and so 10
that the fibres of the two sheets lie in the same direction, and rolling the composite sheet thus obtained so as to give it a more uniform thickness of the desired value.

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