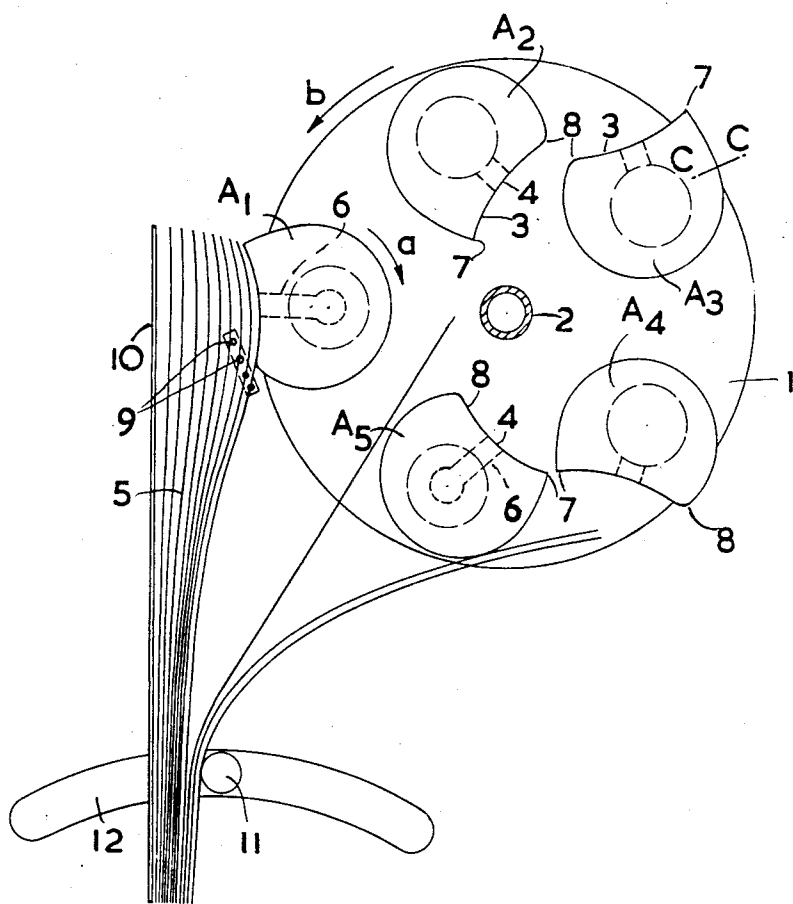


Nov. 3, 1959

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APPARATUS FOR THE COUNTING OF SHEETS OF
MATERIAL FOR EXAMPLE, BANK NOTES
Filed Sept. 21, 1956

2,911,216



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APPARATUS FOR THE COUNTING OF SHEETS OF MATERIAL, FOR EXAMPLE, BANK NOTES

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Application September 21, 1956, Serial No. 611,122

Claims priority, application Great Britain
October 18, 1955

1 Claim. (Cl. 271—27)

This invention relates to apparatus for counting sheets of material, such as paper, for example, bank notes, and in particular it relates to apparatus of the kind described in the specification of the co-pending application of Kristian Holmen, Serial No. 512,106 now Patent 2,810,575, dated October 22, 1957.

In the apparatus described in Patent No. 2,810,575, use is made of a rotating disc which carries a number of symmetrically arranged sucker heads which, besides rotating on the axis of the disc, rotate individually in the opposite direction on their own axes parallel to the axis of the disc and which are caused, one at a time, to make contact with the foremost sheet, near one of its edges, of a stack of sheets mounted in a position to be counted by the apparatus. The apparatus works in such a manner that the foremost sheet adheres to a sucker head for only a very short period and is released after such a brief circular movement of the sucker head that the sheet substantially is not moved in its plane. The distance between the sucker heads is made so small that, when a sheet is released from a sucker head, the following sucker head will prevent it from springing back to its original position. The overall effect is that the sheets are separated by suction in a manner similar to the leafing over of the pages of a book, the adhesion in turn of each sheet to a sucker head causing its movement to be recorded by a counting apparatus.

According to the present invention, in apparatus of the kind described, each sucker head includes at least one cusp formed by a concavely curved face around the periphery of the head, which face embraces the suction orifice, the surface of the head adjacent the cusp and removed from the curved face, acting on the sheets to cause longitudinal bowing thereof so that, on continued rotation of the sucker head, the bowed portion of the sheet is drawn into the said curved face of the head by suction applied through the suction orifice.

Preferably means is provided to separate any sheets which may adhere to one another before the foremost sheet of a stack is drawn into the sucker head.

Preferably also each sucker head includes two cusps, one at each end of the concavely curved face, one cusp being more accentuated and projecting further from the axis of rotation of the sucker head than the other, the surface of the head which causes bowing of the sheet being situated immediately adjacent said accentuated cusp.

Preferably also the apparatus includes means for maintaining a stack of sheets on edge tangentially to the rotary disc.

The invention will now be described by reference to the accompanying drawing which illustrates a plan view of the apparatus. In the drawing A1 to A5 denote five individually rotatable cylindrical suction heads arranged on a rotating disc 1 on a vertical hollow axle 2 which may serve to rotate the disc.

During operation, the disc 1 rotates anti-clockwise as indicated by the arrow "b," while the sucker heads A1—

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A5 revolve in the opposite direction, as indicated by the arrow "a." Each sucker head is shaped to include a concave face 3, which embraces a suction orifice 4, and the arrangement is such that each sucker head arrives at the position occupied by the sucker head A1 with the suction orifice 4 turned towards a stack of sheets 5 at the same time as the suction orifice is brought into connection with a vacuum source by way of a duct 6. The concave face 3 provides two cusps 7, 8, on each sucker head at the junctures of the face 3 and adjacent parts of the periphery of the sucker head. The cusps are asymmetrically arranged, the cusp 7, which is in advance of the cusp 8 in the direction of rotation of the sucker head, being more accentuated than the cusp 8 by decreased curvature of the sucker head in the region thereof and projecting further from the axis of rotation of the sucker head than the cusp 8.

Immediately below the stack 5 of sheets, such as bank notes, and carried by the apparatus frame, is a member arranged to supply a blast of air through a number of holes 9, which will prevent any one note adhering to another.

The sheets 5 are held securely against a support member 10 by a spring member 11 working in a slot 12 in the said frame. The springiness of the member 11 allows suitable accommodation against the member 10 of various sizes of stacks of sheets.

In order to count the numbers of sheets assembled in a stack 5, the disc 1 is driven in an anti-clockwise direction, whilst the sucker heads A1—A5 are also rotated simultaneously in the clockwise direction. As the cusp 7, for example, of each sucker head in succession contacts the stack 5, the stack is caused to bow longitudinally by contact therewith of the surface of the sucker head, adjacent the cusp, and removed from the curved face, that is to say, the portion of the sucker head between the cusp 7 and that indicated by the line C—C.

This bowing tends to separate the sheets, one from another, with the result that, when the foremost sheet is contacted by the concave portion 3 of each sucker head, and suction is applied through the orifice 4, only that sheet adheres to the sucker head; in order to ensure that only one sheet adheres to the sucker head, the operation of the suction is assisted by an upward air blast through the holes 9.

What is claimed is:

In apparatus for counting sheets of material, such for example as bank notes, a disc, a number of sucker heads each including a suction orifice, said heads being symmetrically arranged and carried by said disc, and means for rotating said discs and said heads together in one direction and said heads also individually in the opposite direction on their own axes parallel to the axis of the disc, whereby said heads are caused one at a time to make contact with the foremost sheet, near one of its edges, of a stack of sheets mounted in a position to be counted by the apparatus, each of said sucker heads having a concavely curved face embracing said suction orifice and extending partially around the periphery of said head and forming two cusps respectively at the junctures of opposite ends of said concavely curved face and the adjacent parts of the periphery of said head, the cusp which is in advance of the other cusp in the direction of rotation of said sucker head being more accentuated than said other cusp and projecting further from the axis of rotation of said sucker head, the surface of the head situated immediately adjacent said more accentuated cusp being engageable with said foremost sheet to cause longitudinal bowing thereof, whereby on continued rotation of said disc and said sucker head, the

bowed portion of the sheet is drawn into the said concavely curved face of the head by suction applied through the suction orifice.

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