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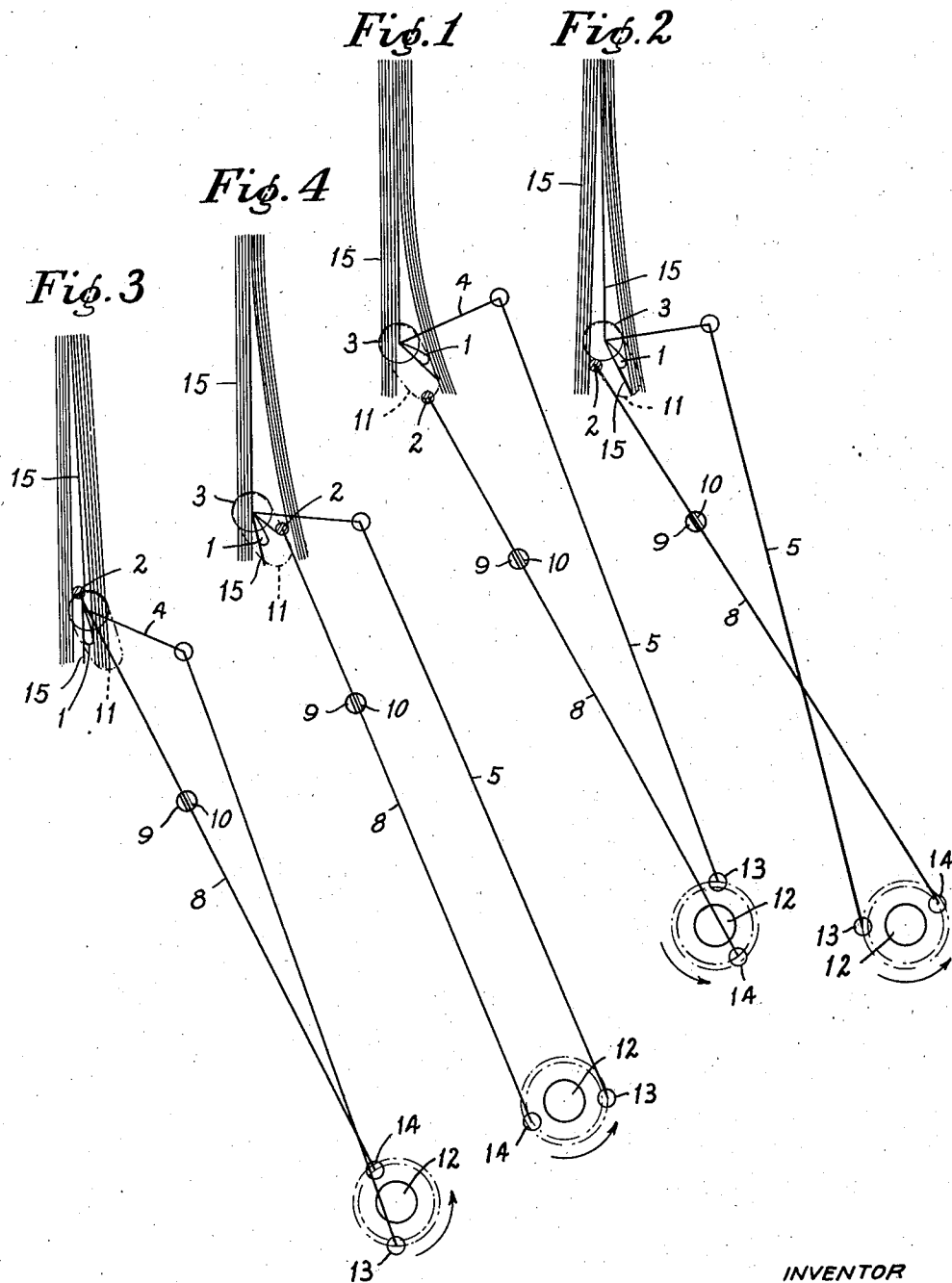
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DEVICE FOR COUNTING OF PAPER LEAVES MADE UP INTO PACKETS

Filed May 19, 1942

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 5

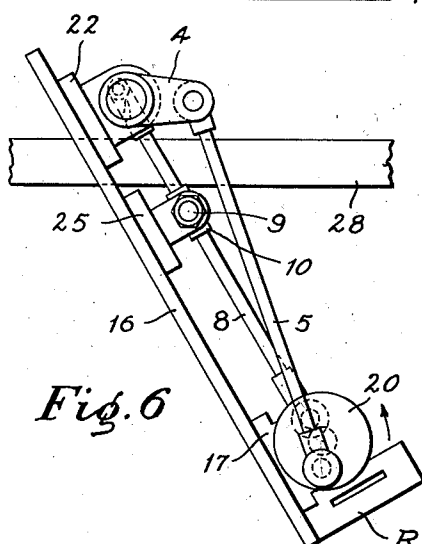
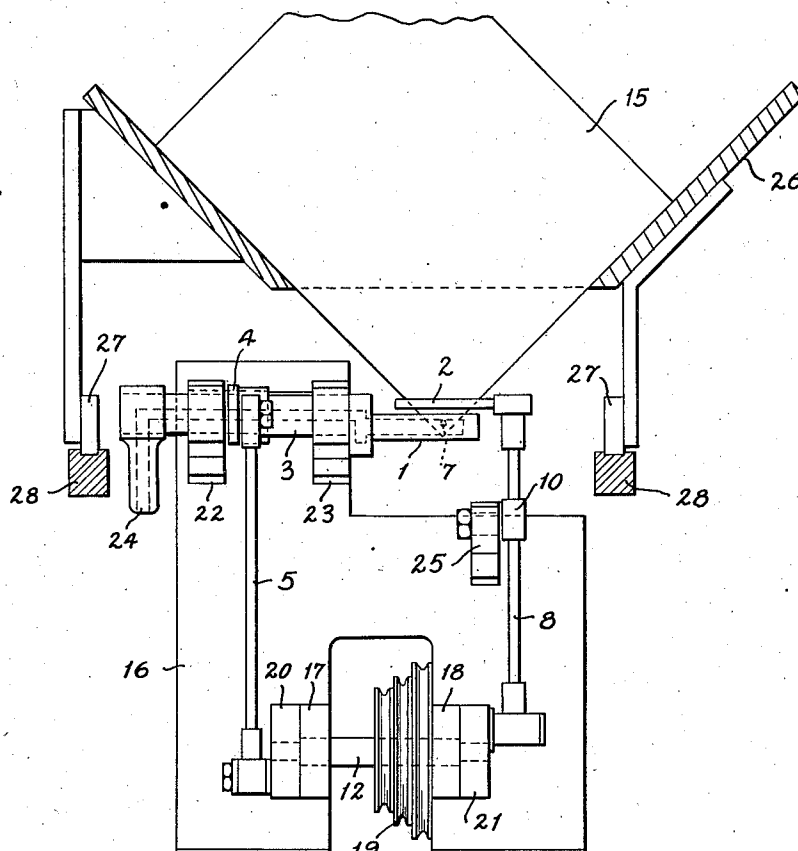


Fig. 6

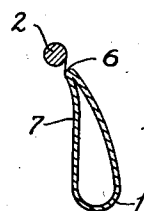


Fig. 7

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DEVICE FOR COUNTING OF PAPER LEAVES
MADE UP INTO PACKETSAxel Edvin Rosswall, Stockholm, Sweden, assign-
or to Telefonaktiebolaget L. M. Ericsson, Stock-
holm, Sweden, a company of SwedenApplication May 19, 1942, Serial No. 443,612
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16 Claims. (Cl. 271-27)

The invention refers to devices for counting of leaves or sheets of paper or the like made up into a packet, by which the leaves are separated from each other by aid of a pneumatic mechanism for detaching of leaves. Up till now, devices of this kind have been so constructed that the counting takes place at the same time as the shifting of the leaves. The present invention is chiefly characterized thereby that the leaves are counted without being separated from the packet, the detacher mechanism and the packet thus being arranged so as to describe a relative motion alongside a corner edge or along one side of the packet respectively. It is therefore best to arrange the packet in an upright position, the relative motion thus taking place horizontally, whereby the packet or the detacher device is so arranged that it can be moved horizontally on a carriage or like conveying device. The moving resistance thus will be so small that the feed, according to the invention, may be effected merely by the actions performed by the detacher mechanism on the packet during the operation of counting. The advantage of this arrangement is that the feed becomes automatically adjusted according to the thickness of the leaves in each specific case.

A closer description of the invention will be given with reference to the enclosed drawings. Figs. 1-4 show a diagrammatic arrangement of the device in different working positions. Fig. 5 shows a vertical projection, partially in section, and Fig. 6 a side view of an embodiment of the device. Fig. 7 shows a cross-section through the pneumatic leaf detacher and the shifting arm co-operating herewith.

The general characteristics and the operation of the device will first be described with reference to Figs. 1-4. The device chiefly consists of an oscillating, pneumatic leaf detacher 1 and a leaf shifter 2, which is arranged to perform a revolving motion around the leaf detacher. The leaf detacher 1 consists of an apparatus in the form of a tubular arm, the interior of which communicates with a suction pipe. The aforementioned suction apparatus is firmly attached to a shaft 3 arranged to revolve and mounted in fixed bearings, which shaft by means of a hereto firmly connected arm 4 and a connecting rod 5 may be brought into an oscillating motion, in which the suction apparatus thus will participate. The suction apparatus 1 is approximately oval in cross section with one side concave thereby forming an edge 6, which lies in the axis of oscillation, said edge running parallel with the paper leaves in the packet, and against which the leaves

are brought to adhere in regular succession. The concave side of the suction apparatus is turned to the leaves and this side is provided with a suction opening 7, Fig. 7.

The leaf shifter 2 consists of an arm in the form of a round bar running parallel with said border 6 of the suction apparatus, which bar is attached to the end of a connecting rod 8, which is arranged to move in a case 10 which oscillates about a shaft 9. The arm 2 now will move in a closed track, which in Figs. 1-4 is indicated by a dashed and dotted line 11. The connecting rods 5 and 8 are operated jointly from a rotating shaft 12, to which the connecting rods are connected by means of the crank pins 13 and 14.

The Figs. 1-4 show only a part of the leaves 15 in the packet, arranged in upright position supported on their edges, the leaves thus assuming vertical position. The detacher mechanism is so arranged that it will cooperate with the packet along a lower corner edge of the same as shown by Fig. 5. In the stage of operation shown in Fig. 1, the leaf lying next to the suction apparatus is held by suction against the concave side of the suction apparatus. At this stage, the suction apparatus occupies an inclined position and hence by means of the bending of the leaves around the edge 6 of the suction apparatus and by means of the bending of the leaves against the concave side of the suction apparatus a guarantee will be had that only one leaf at a time will be detached from the packet. By the continued rotation of the shaft 12 in the direction indicated by the arrow the shifting arm 2 will be introduced into the room between the leaf detached in the described way and the leaf lying next to it as shown by Fig. 2, whereby the leaves which are still uncounted are moved slightly to the left as shown in the latter figure, a free interspace thus forming between the counted and the uncounted leaves, in which interspace the detached leaf is held midway. The suction apparatus 1 now turns from the inclined to the vertical position, shown in Fig. 3. While in this position the shifting arm 2 remains just about above the suction apparatus. By the continued motion of the shifting arm the leaf will be pulled downwardly over the edge 6 and drawn off the suction apparatus as shown by Fig. 4. By thus uncovering the suction opening in the apparatus, the suction apparatus entrains the next leaf, whereupon the operation as described above will be repeated.

Figs. 5 and 6 show the mechanism mounted on a plate 16 arranged in an inclined position, and which may also conveniently be placed in

different positions of inclination. The operating shaft 12 is supported by two bearings 17, 18 and arranged to be operated by means of a motor through the intermediary of the belt pulleys 19. The connecting rods 5 and 8 are operated from the shaft 12 by means of the crank discs 20, 21 and by the crank pins arranged on these. The connecting rod 5 is connected by means of the arm 4 with the shaft 3, which is supported by two bearings 22, 23. The shaft is hollow and provided with a nipple 24 at one end to enable connection to a vacuum conductor which communicates with the suction hole 7 through the hollow interior of the shaft. The suction apparatus is eccentrically attached to the end of the shaft 3 in such a way that its upper narrow edge 6 is disposed just about in the extension of the geometrical axis of the shaft 3. The suction hole consists of a round hole 7 formed in concave wall. If necessary, several such holes can be arranged after one another in the longitudinal direction of the suction hole. The connecting rod 8 is displaceably mounted in a guide 10, which is rotating on a pin 9 mounted in a bearing 25. The shifting arm 2 is firmly attached to the end of the connecting rod 8 in a position parallel to the shaft 3.

In the example of the embodiment shown the leaf packet 15 is arranged above the mechanism in such a way that the mechanism cooperates with a lower corner edge of the leaf packet. The packet is supported by a trough-like holder 26 in the form of a carriage, which by means of the wheels 27 can move on a horizontal track 28. On account of the slight power which is required to move the leaf packet, this movement can be made automatically by means of the operation of the shifting arm on the leaf packet, at which the motion adjusts itself automatically according to the varying thickness of the leaves. The arrangement of the leaf packet above the mechanism as shown in Figs. 5 and 6 has the advantage that it is not necessary to adjust the trough 26 to vertical position for leaves of varying sizes, which would otherwise be necessary, if the mechanism were arranged to cooperate with the upper corner edge. It is possible to arrange a cooperation of the mechanism with the side edges of the leaves, whereby the suction hole and the shifting arm remain parallel to the corresponding leaf edge. The device is of course provided with a counting device R, which is acted upon by the disc 20 and which registers the number of shifting motions performed by the mechanism.

I claim:

1. A device for counting leaves arranged in packet form comprising an oscillating pneumatic leaf detacher for successively engaging and detaching the leaves of a packet, and a leaf shifter movable in a closed path about the leaf detacher whereby the leaves are successively moved from one side to the other of said detacher.

2. A device as claimed in claim 1, characterized in that said leaf detacher includes a hollow body having a suction opening therein engageable with the surfaces of the packet leaves.

3. A device as claimed in claim 1, characterized in that said pneumatic leaf detacher is mounted to oscillate about an axis lying substantially parallel to the leaves, said axis during operation of the device passing through said packet.

4. A device as claimed in claim 1, characterized in that said leaf detacher includes a body member having an edge disposed substantially parallel to the axis of oscillation over which the packet leaves are bent during oscillation of said detacher.

5. A device as claimed in claim 1, characterized in that said leaf detacher is provided with a concave surface and an opening therein over which a packet leaf is held by suction during oscillation of said detacher.

6. A device as claimed in claim 1, characterized by the provision of a shaft of hollow form supporting said leaf detacher for oscillating movement, the leaf detacher having an opening communicating with the interior of the shaft whereby the packet leaves are successively held by suction during movement from one position to another.

7. A device as claimed in claim 1, characterized in that said leaf shifter includes an arm disposed substantially parallel to the axis of oscillation of the detacher and movable in a closed path about said axis and in a direction substantially parallel to itself.

8. A device as claimed in claim 1, characterized in that said leaf shifter includes an arm and a connecting rod supporting said arm for imparting a circular motion thereto about said leaf detacher.

9. A device as claimed in claim 1, characterized by the provision of a common drive for imparting movement to the leaf detacher and the leaf shifter.

10. A device as claimed in claim 1, characterized by the provision of means supporting a packet of leaves in position whereby the corners thereof are presented to said leaf detacher and shifter.

11. A device as claimed in claim 1, characterized by the provision of a counting device for registering the number of operations of said leaf detacher.

12. A device as claimed in claim 1, characterized in that said leaf detacher includes a hollow body substantially oval in cross section having a flattened portion provided with a suction opening engageable with the surfaces of the packet leaves.

13. A device as claimed in claim 1, characterized in that said leaf detacher includes a hollow body substantially oval in cross section having a flattened portion provided with a suction opening engageable with the surfaces of the packet leaves, said body having an edge disposed parallel with the axis of oscillation.

14. A device as claimed in claim 1, characterized in that said leaf detacher includes a hollow body substantially oval in cross section and having one side of concave form and provided with a suction opening.

15. A device as claimed in claim 1, characterized by a carriage supporting said packet for movement with relation to said detacher and said leaf shifter whereby the position of said detacher and said leaf shifter with respect to said packet may vary as the packet leaves are moved.

16. A device as claimed in claim 1, characterized thereby that said leaf detacher includes a body member having a portion over which the packet leaves are bent during oscillation of said detacher.

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