

March 26, 1929.

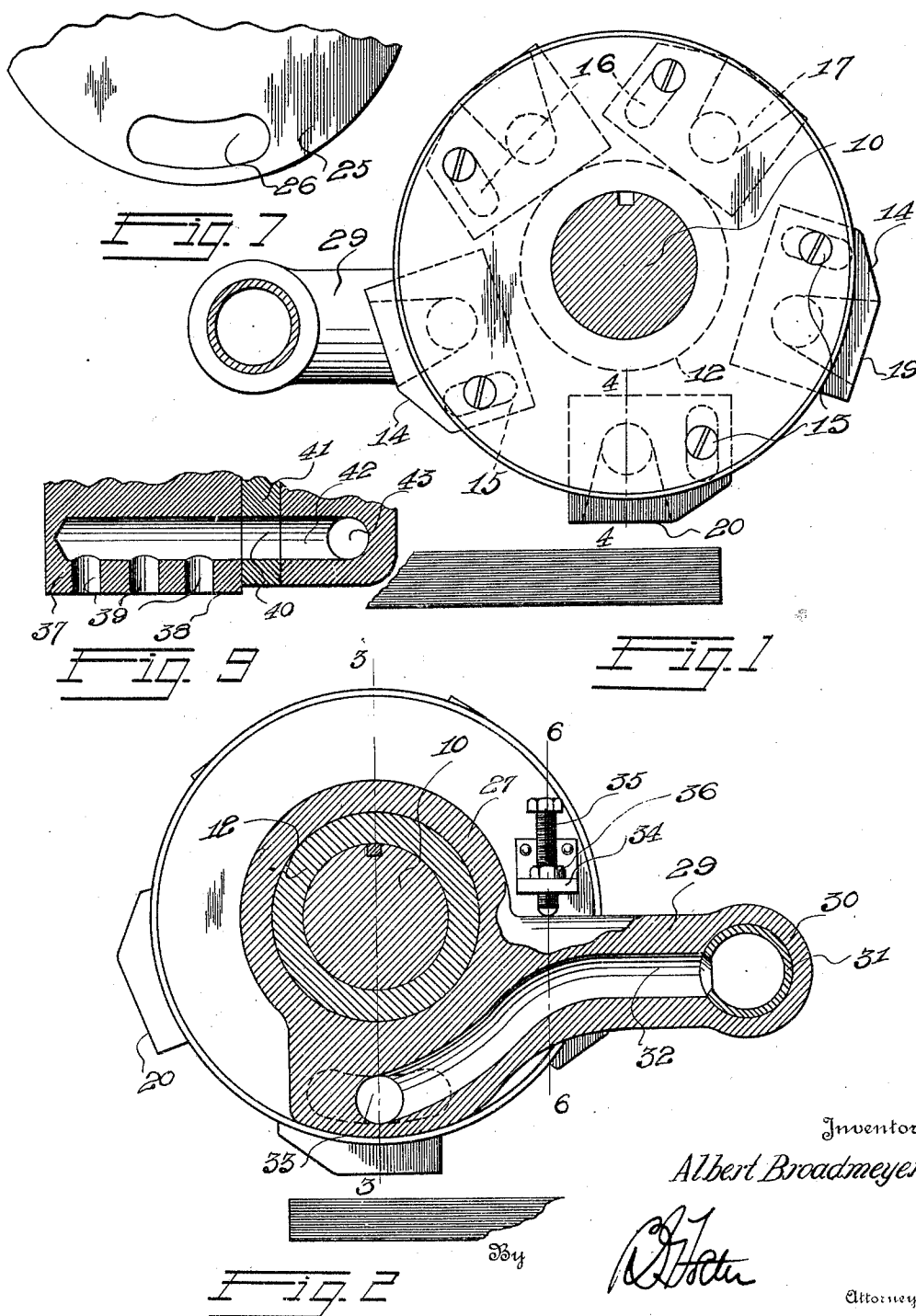
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1,706,952

SUCTION FEED ROLLER

Filed Nov. 19, 1926

2 Sheets-Sheet 1



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UNITED STATES PATENT OFFICE.

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SUCTION FEED ROLLER.

Application filed November 19, 1926. Serial No. 149,471.

The present invention relates to suction rollers of the type disclosed in Letters Patent granted to me on May 13, 1924, No. 1,494,303.

5 The object is to provide an improved mechanism that is peculiarly effective for feeding relatively thick sheets of paper, such as cardboard, which will not give or bend with the curved peripheral surface of the roller—the structure however, being entirely practical for the feeding of light or thin sheets, as well.

A further object is to provide a structure in which the point at which suction takes place can be readily varied.

15 In the accompanying drawings:

Figure 1 is a view in elevation of one embodiment of the invention,

Figure 2 is a similar view of the opposite end with the suction conduit in section,

20 Figure 3 is a side elevation with a portion shown in section and taken on the line 3—3 of Figure 2,

Figure 4 is a detail sectional view taken on the line 4—4 of Figure 1,

25 Figure 5 is a detail perspective view of one of the suction heads,

Figure 6 is a sectional view on the line 6—6 of Figure 2,

30 Figure 7 is a detail face view of the suction controlling disk,

Figure 8 is a view in end elevation of a modified form of construction,

Figure 9 is a sectional view on the line 9—9 of Figure 8.

35 In the embodiment disclosed in Figures 1 to 7 inclusive, a drive shaft 10 is provided, on which is slidably keyed a body, including spaced walls 11, with a hub 12 projecting from one end of the body. The space between the end walls 11 is bridged by a series of pivot pins 13 having their ends mounted in said walls 11.

40 On these pins are movably mounted a set of heads 14 located one behind the other in the space between the walls 11. Each head 14 has forwardly extending ears 15 provided with slots 16, through which the pivot pin passes, and said head is chambered, forming a passageway 17 that opens by means of a port 18 through one end of the head, and has a port 19 in the outer face of said head. This outer face, designated 20, is preferably flat and constitutes in effect an outer section of the face of the drum. The heads can swing
55 freely and have a limited sliding movement

on their respective pins, so that a "floating" action is secured. Their outward movements, however, are limited by reason of each head having at one end a curved shoulder 21 adapted to abut against the inwardly extending margin 22 of a ring 23 suitably mounted on the periphery of one of the end walls 11.

The end wall 11, from which the hub 12 projects, is provided with a series of ports 24 that are aligned with the ports 18 of the different heads, and rotatably mounted on the hub 12 alongside the end wall 11, which has said ports 24, is a disk 25 having a slot 26, with which the ports 24 successively communicate as the head is rotated. Mounted on the hub 70 12, outside the disk 25 is a collar 27, the hub being rotatable in this collar and being held from detachment therefrom by suitable lock nuts 28. The collar is formed with a neck 29 provided with a sleeve 30 surrounding a suction tube 31 and said neck has a suction conduit 32 provided with an inlet port 33 that is in communication with the slot 26 of the disk 25, as clearly shown in Figure 3.

The conduit 31 is connected to the intake 80 end of any suction device, such as a pump, and for an example of the mounting thereof and the connections, attention may be called to patent, No. 1,494,303, above cited.

The disk 25 is held against rotation with 85 the suction roller. To this end it is provided with an ear 34, through which is threaded an adjusting screw 35 that bears on the neck 29. A lock nut 36 serves to hold the screw 35 in its adjusted position.

90 With this construction, it will be evident that when the roller is rotated, the heads are respectively dropped to their lowermost position by gravity, as they pass around the underside of the roller. At that time and 95 as indicated in Figure 4 their internal chambers or passageways 18—19 are in communication through the port 24, slot 26 and inlet end 33 of the passageway 32 with the suction conduit 31. The consequence is that an in- 100 draft of air is created through the port 90. If then, the roller is dropped upon the top of a pile of sheets, the uppermost sheet will be held against the flat lower face of the head, and said head moving forwardly, will carry 105 the sheet with it. At the same time it can remain in substantially horizontal position for a part of its movement from its undermost position. The consequence is that a relatively heavy flat sheet can be picked up and carried 110

forwardly, an action that is not always successful where a rounded surface is employed, because of the inability of the sheet to bend with said surface and thus produce a substantially air-tight joint. A further advantageous action is secured by this device for it has been found that when the head carrying the sheet begins to move upwardly, the relatively sharp corner of its rear end will cause a longitudinal pucker in the sheet that will break said sheet away from the sheet beneath the same, and thus insure their separation, so that the usual air blast can find access to a space between the sheets and thus avoid to a material degree the danger of two sheets being carried along together. The suction operation it will be evident, takes place whenever a port 18 of one of the heads comes into communication with the slot 24 of the disk. By turning the disk through the medium of the adjusting screw 35, the position of the end of the slot 24 can be varied so as to advance or retard the point at which suction begins.

For some purposes, it has been found that relatively movable sheet-engaging heads or elements are not necessary, and therefore a structure, such as is shown in Figures 8 and 9 may be employed.

With such a structure, the rotary body 37 has its peripheral face formed with a series of angularly disposed substantially flat sections 38, through which are formed ports 39 having communication through the slot 40 of an adjusting disk 41 with the intake port 42 of the suction conduit 43.

It will be evident that this structure has the same general advantages of flat faces that will lie flush against the surface of a sheet to start said sheet on its movement from a pile. This particular form is peculiarly useful with thinner sheets than cardboard because said sheets will partially conform to the angular form of the peripheral face, and will produce the pucker that insures the separation of the moving sheet from the sheet underlying it.

From the foregoing, it is thought that the construction, operation and many advantages of the herein described invention will be apparent to those skilled in the art, without further description, and it will be understood that various changes in the size, shape, proportion and minor details of construction, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

What I claim is:

1. A rotatable suction roller having a series of substantially flat peripheral, sheet-engaging surfaces provided with intake ports, means by which the roller is rotated, said roller having passageways communicating with the ports and opening through one end of the roller, and a suction conduit having an inlet end with which the open ends of

the passageways successively communicate as the roller is rotated to cause suction successively through the flat surfaces.

2. A rotatable suction roller having a series of substantially flat peripheral, sheet-engaging surfaces provided with intake ports, means by which the roller is rotated, said roller having passageways communicating with the ports and opening in a circular series through one end of the roller, and a suction conduit having an inlet end at said end of the roller and traversed by the ends of the passageways to cause suction successively through the flat surfaces.

3. A suction roller comprising a body, a head movably mounted on the body and having a mounting that permits its limited free play, said head having a sheet-engaging face provided with a suction port, and means for creating an indraft through the port.

4. A suction roller comprising a body, a head movably mounted on the body and having a mounting that permits its limited free play, said head having a sheet-engaging face provided with a suction port, means for rotating the body and the head mounted thereon, and means for creating an indraft through the port when the head reaches a predetermined point of its rotation.

5. A suction roller comprising a body, a head pivotally mounted in the body and capable of movement toward and from the axis thereof, said head having limited free play on its pivot mounting and being provided through its outer face with a suction port, and means for creating an indraft through the port.

6. A suction roller comprising a body, a pivot pin carried by the body, a head having a loose swinging and sliding mounting on the pin and provided with a port through its outer face, and means for creating an indraft through the port.

7. A suction roller comprising a body, a pivot pin carried by the body, a head having a slot in one end through which the pivot pin passes, means for limiting the outward movement of the head with respect to the body, said head being provided with a suction port through an exposed face, and means for creating an indraft through said port.

8. A suction roller comprising a body with spaced end walls, a pivot pin extending across the space between the walls, a head located between the walls and swingingly mounted on the pin, said head having an outer sheet-engaging face provided with an intake port and a passageway opening through one end of the head and communicating with the port, and a suction conduit with which the passageway communicates.

9. A suction roller comprising a rotatable body, and means whereby it may be rotated, a plurality of heads movably mounted on the body and having outer sheet-engaging faces

with intake ports opening therethrough, and means for creating an indraft through the ports successively as the heads reach a predetermined position on the rotation of the

5 body.

10. A suction roller comprising a rotatable body having spaced end walls, a plurality of heads located one behind the other between the end walls and capable of inward and outward movement with respect to the body, said

10 heads having outer sheet-engaging faces with intake ports opening therethrough, and means for creating an indraft through the ports successively as the heads reach a pre-

15 determined position on the rotation of the body.

11. A suction roller comprising a rotatable body having spaced end walls and pivot pins carried by the end walls, a plurality of heads

20 located one behind the other between the end walls and having slots in which the pivot pins are engaged, said heads having intake ports in their outer faces and passageways from the ports opening through one end of

25 the body, and a suction conduit having an inlet end across which the passageways pass as the roller rotates.

12. A suction roller comprising a rotatable body having spaced end walls and pivot pins carried by the end walls, a plurality of heads

30 located one behind the other between the end walls and having slots in which the pivot pins are engaged, a stop ring on one of the end walls against which the heads abut to limit their outward movement, said heads having

35 substantially flat outer sheet-engaging faces and intake ports through the faces, passageways from the ports opening through one end of the body, and a suction conduit having an inlet end across which the passageways pass

40 as the roller rotates.

13. A suction roller having a series of intake ports through its peripheral portion, passageways from said ports opening through

45 the end of the roller, means whereby the roller is rotated, a suction conduit at the end of the roller and an intake end for said conduit traversed by the passageways, said end being

50 movable to different positions along the path of the passageways.

14. A suction roller having a series of intake ports through its peripheral portion, passageways from said ports opening through

55 one end of the roller about its axis of rotation, a suction conduit, and a device interposed between the conduit and roller and having an intake port for said conduit that is in constant communication therewith, and is trav-

60 ersed by the passageways, said device being movable to place the intake port in different positions.

15. A suction roller having a series of intake ports through its peripheral portion, pas-

65 sageways from said ports opening through one end of the roller about its axis of rota-

tion, a suction conduit, a device interposed between the conduit and roller and having an intake port for said conduit that is in constant communication therewith and is trav-

70 ersed by the passageways, said device being movable to place the intake port in different positions, and means for moving the device.

16. A suction roller having a series of intake ports through its peripheral portion, passageways from said ports opening through

75 one end of the roller about its axis of rotation, a suction conduit, a rotatable plate interposed between the conduit and roller and having an intake port for said conduit that is in constant communication therewith and is trav-

80 ersed by the passageways, and means for moving the plate to and holding it in different positions, to place the intake port in different positions.

17. A suction roller comprising a rotatable

85 body having spaced end walls, one of which is provided with a plurality of ports, pivot pins carried by said end walls, a plurality of heads located one behind the other between the walls and having slots that receive the

90 pivot pins, said heads having outer sheet-engaging faces provided with intake ports and passageways leading from said ports and communicating with the ports in the end

95 walls, a suction conduit having an end located adjacent to the end wall having the ports, a disk rotatably mounted between the conduit and the end wall and having a port communicating with the conduit and movable to different positions with respect to the ports of

100 the end wall so that the latter will communicate therewith as the roller is rotated, and means for fixing the disk in different positions with respect to the conduit.

18. A rotary suction head having a rolling

105 engagement with successive portions of a sheet to cause such sheet to move in a path generally tangential to the head, said roller having a flat surface and provided with a plurality of suction orifices through its pe-

110 riphery including said flat surface, means for rotating the head, and means for causing suction successively through the suction orifices to cause the sheet to be maintained in rolling contact therewith and breaking said suction

115 successively through the orifices to cause the sheet to leave the roller and move edgewise in such generally tangential path, said suction creating and breaking means acting sufficiently long through the orifice in the flat

120 surface to cause the sheet to bend about the rear edge of the flat surface and break from the underlying sheet.

19. A rotary suction head having a rolling

125 engagement with successive portions of a sheet to cause such sheet to move in a path generally tangential to the head, said roller having a plurality of peripheral flat surfaces with substantially straight rear edges and provided with suction surfaces through said

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flat surfaces, means for rotating the head, and means for causing suction successively through the suction orifices of the successive surfaces to attach different portions of the sheet successively thereto and bend it about the rear edges of the flat surfaces, and thereafter successively breaking such suction to successively release the different portions of the sheet from said surfaces and cause its said edgewise movement in said generally tangential path away from the roller. 10

In testimony whereof, I affix my signature.

ALBERT BROADMEYER. 