United States Patent

[11] 3,604,061

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[54] **APPARATUS FOR DELIVERY END CLEANING OF CARDING MACHINES**
12 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **19/107,** 19/111
[51] **Int. Cl.** **D01g 15/76**
[50] **Field of Search** 19/107, 109, 111

[56] **References Cited**

UNITED STATES PATENTS

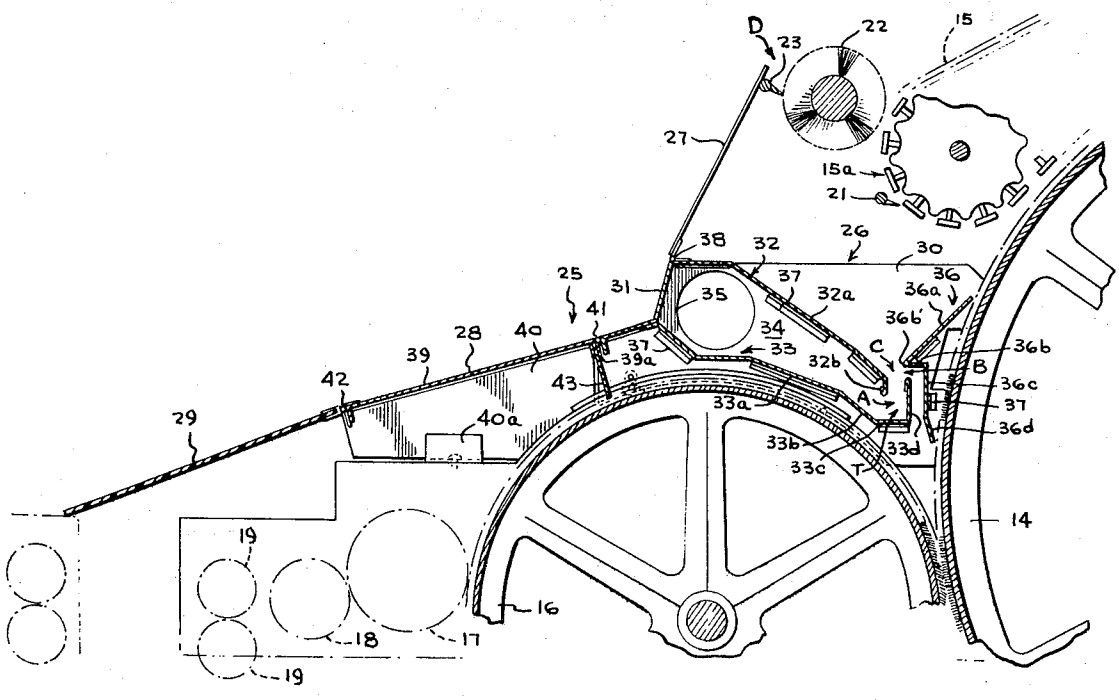
2,683,901	7/1954	Griswold	19/107 X
2,774,994	12/1956	Hayes	19/109 X
3,376,610	4/1968	Williams	19/107
3,387,337	6/1968	Crowley, Jr.	19/107

FOREIGN PATENTS

1,070,792	6/1967	Great Britain	19/107

Primary Examiner—Dorsey Newton
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ABSTRACT: A suction manifold assembly for pneumatic cleaning of the delivery end section of a carding machine, including a plenum section forming a suction chamber overlying the doffer cylinder in open communication with the latter and with an adjacent portion of the main cylinder, and a hoodlike extension of hinged plural sections form other plenums overlying most of the other card components in the delivery end section. A baffle movable responsive to internal static pressure variations in the plenum section varies the amount of air admitted from the other plenums into the plenum section to maintain substantially constant internal static pressure in the latter. An air intake orifice is formed adjacent the flats chain at the delivery end bight to form air currents which sweep fibers from the flats clothing.



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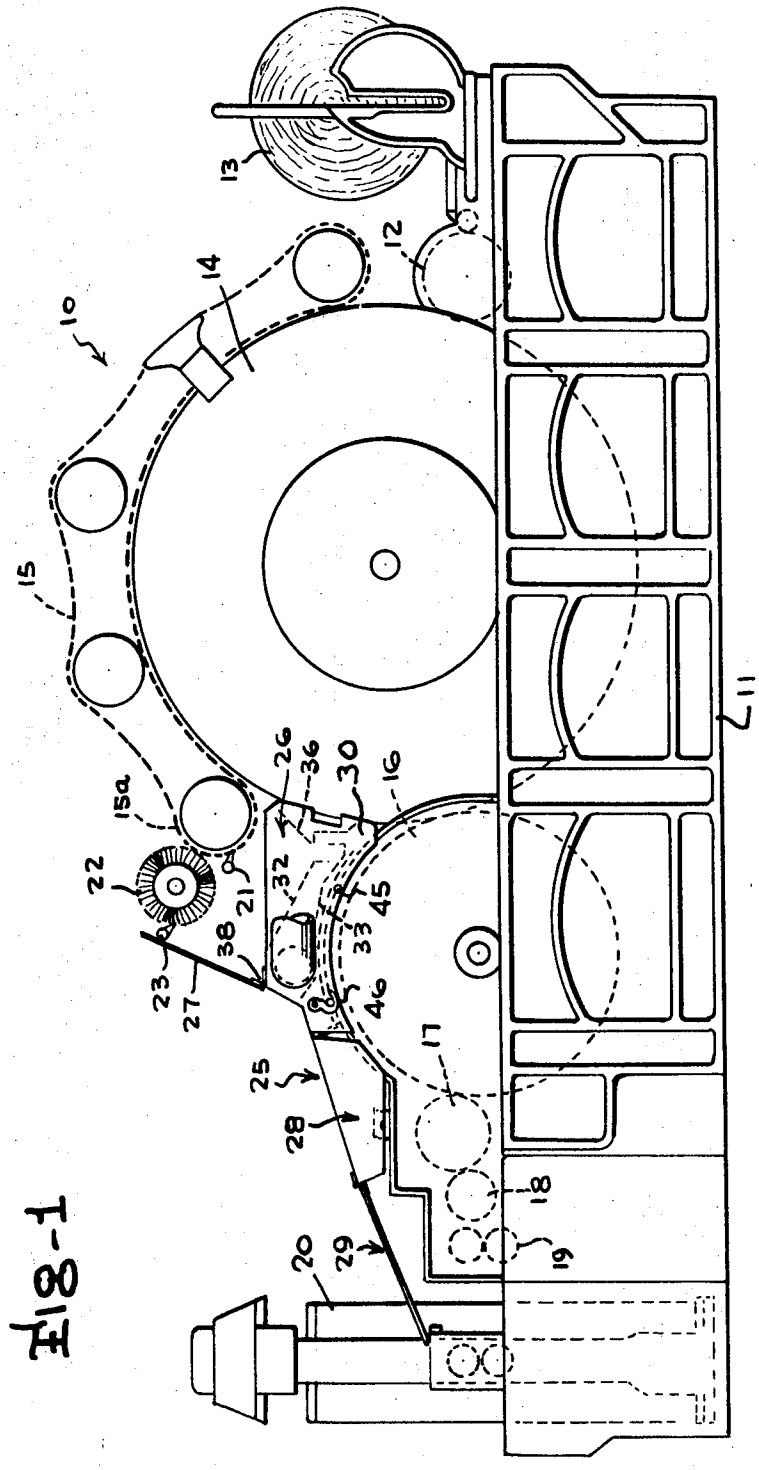


FIG-1

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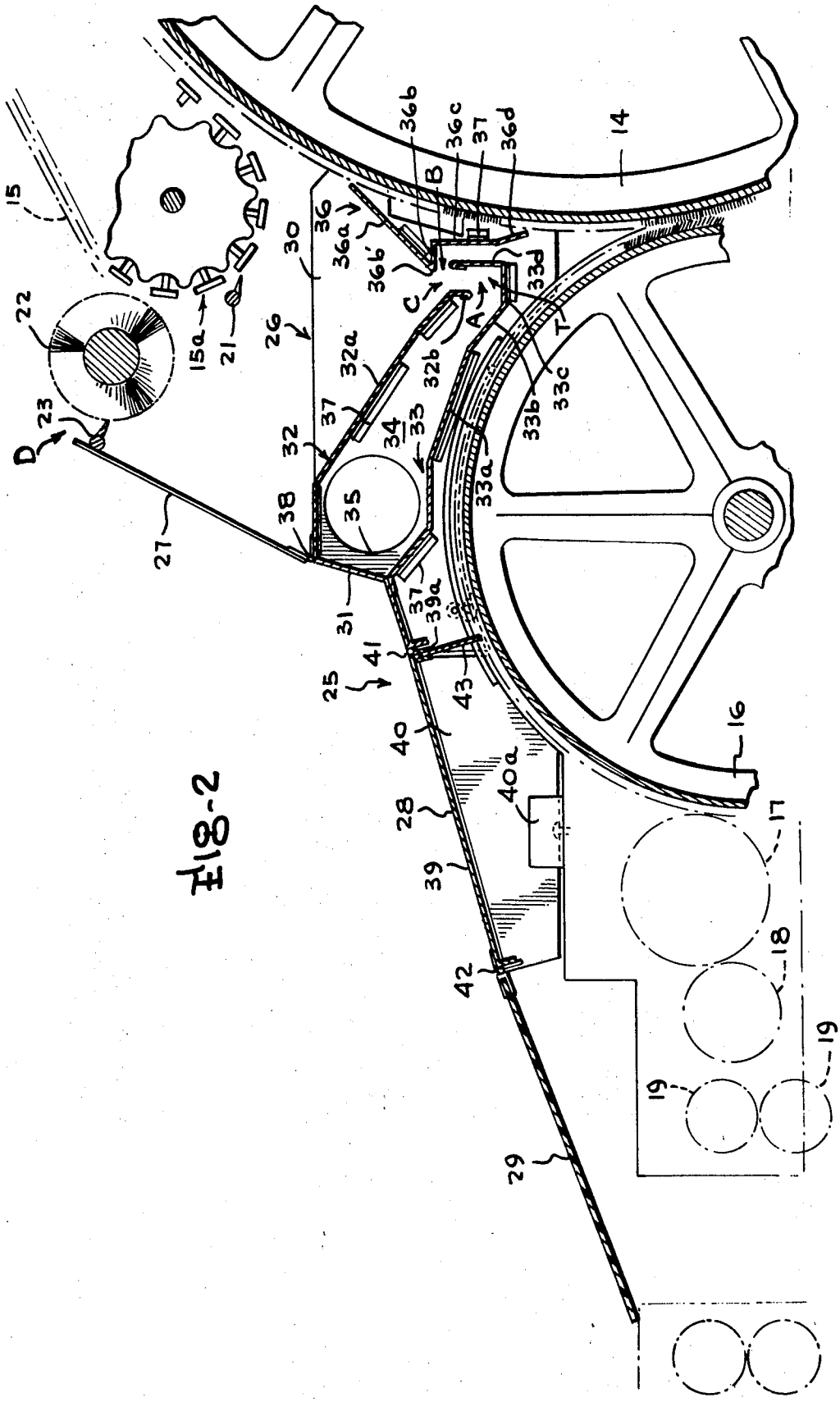

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FIG-2

Fig-3

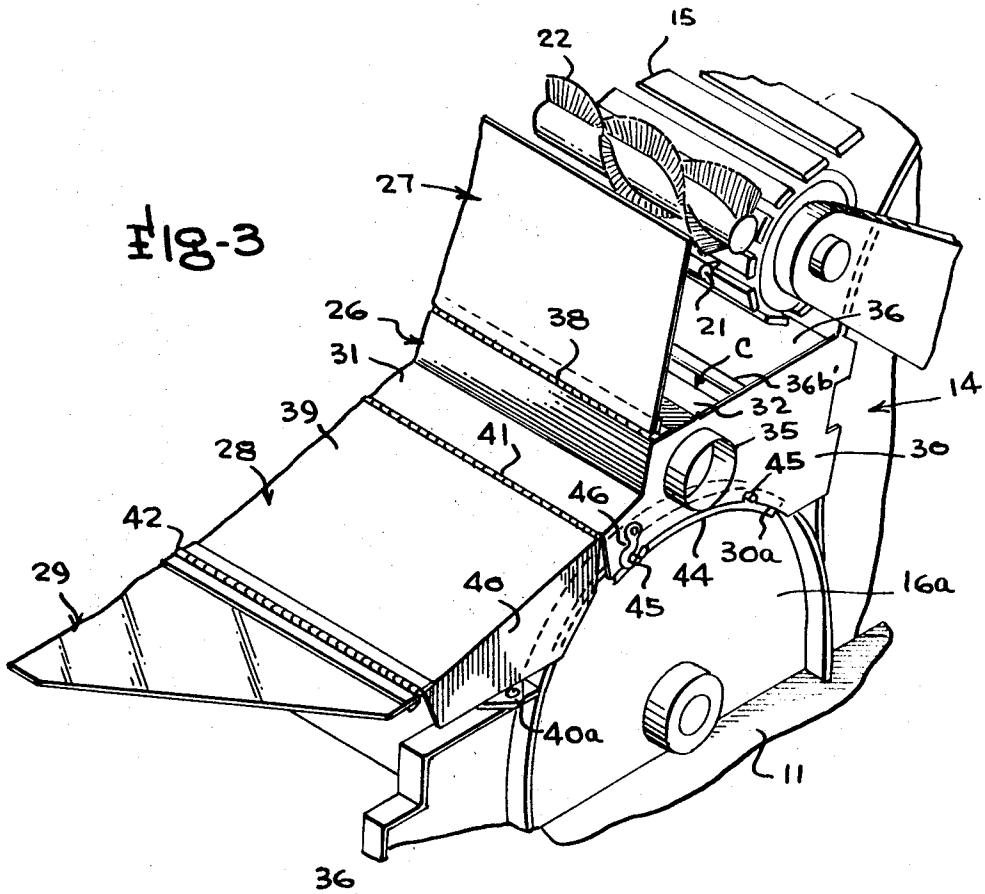
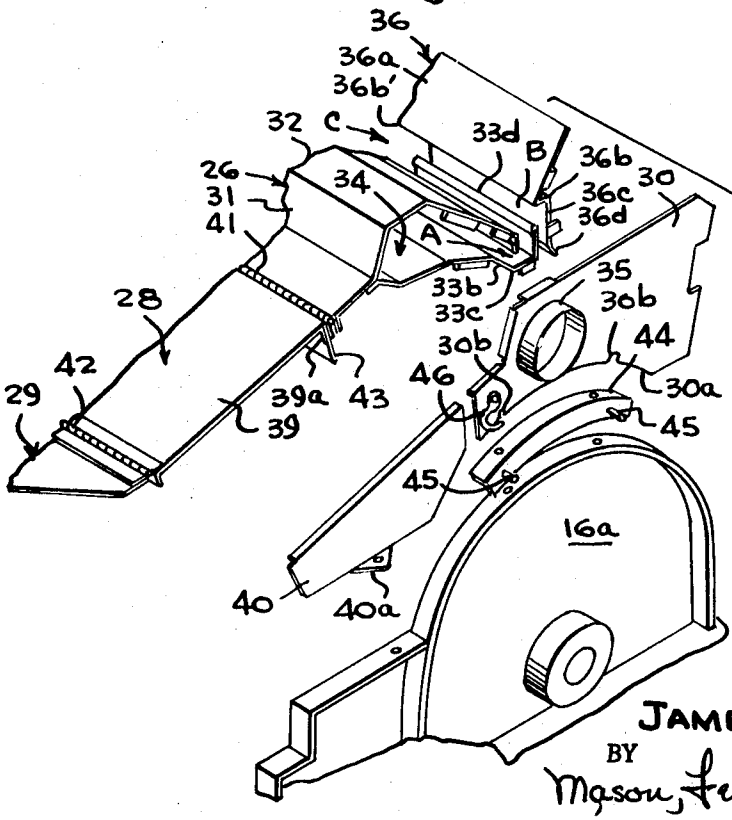


Fig-4



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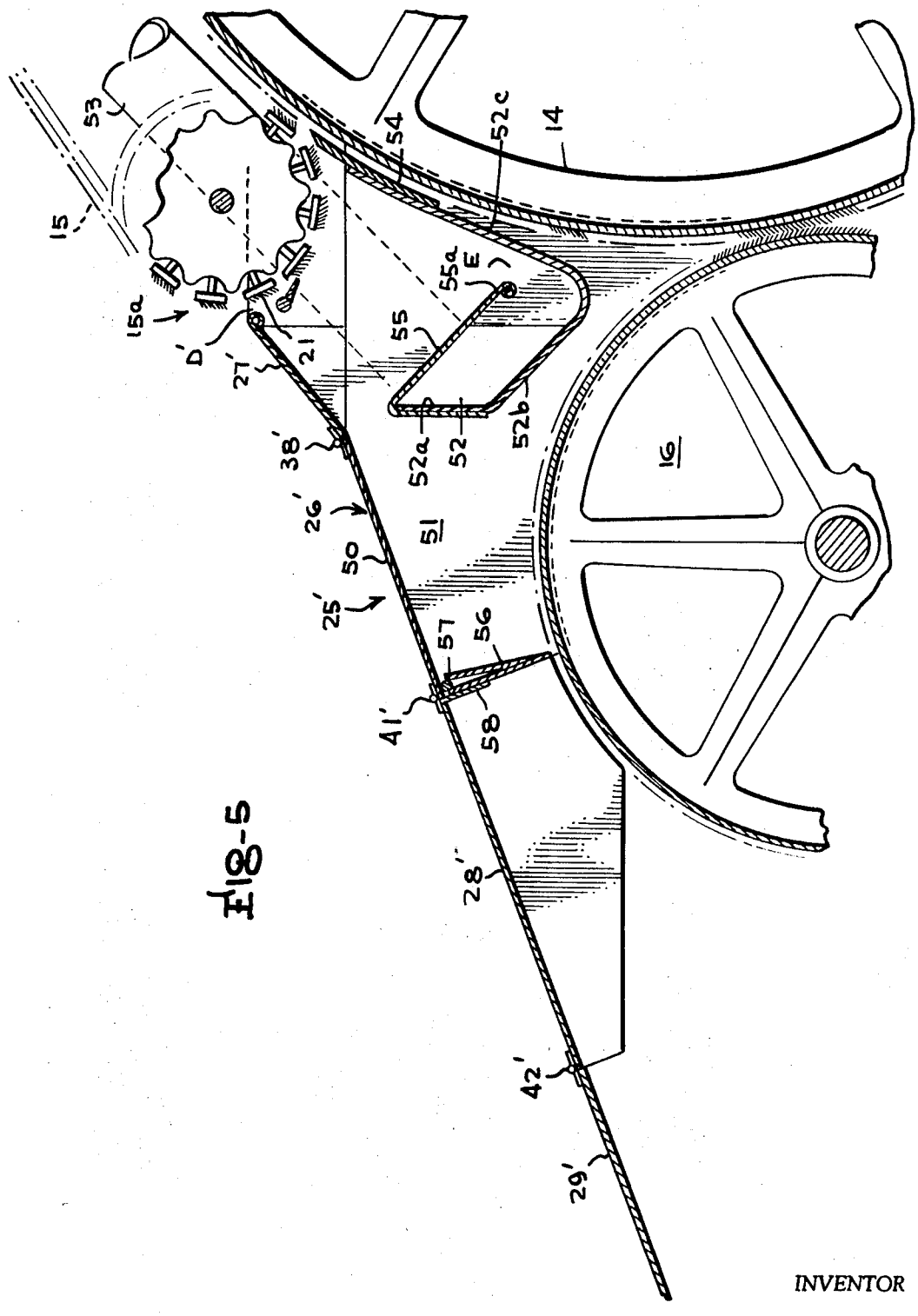


FIG-5

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APPARATUS FOR DELIVERY END CLEANING OF CARDING MACHINES

BACKGROUND AND OBJECTS OF THE INVENTION

The present invention relates in general to pneumatic cleaning of carding machines, and more particularly to suction manifold structure for the delivery end region of a carding machine for pneumatically capturing and removing trash and fly being discharged from or released at that region, particularly in the area of the doffer and the adjacent portion of the flats chain, and for automatically maintaining a selected static pressure in the manifold.

Much effort has been devoted to the elimination or reduction of escape of fly and trash, usually in the form of a mixture of short waste fibers and assorted dust and trash particles, from carding machines, especially as the problem of fiber and trash escape increases with increasing speeds of operation of the carding machine. It is important to eliminate or minimize the escape of such fibers and trash into the air in the textile machinery room, as the resultant contamination would produce unhealthy working conditions for the operators, impair the quality of the sliver because of intermingling of the trash therewith, and cause deposits of the contaminants on the machinery in the room, creating fire hazards and interference with proper operation of the machinery.

Various pneumatic cleaning devices have been proposed to effect suction withdrawal of fly and trash from various portions of carding machines to reduce the escape of the fly into the surrounding atmosphere and withdraw it before it becomes intermingled with the sliver. Most frequently, this has taken the form of several pneumatic suction pipes extending transversely across the carding machine and connected to a suction source, the pipes having slots extending along their full length and located in specific zones which form predominant sources of fly and trash escape. To effectively capture and remove the fly and trash from the many locations in the carding machine where discharge of trash and fly is prevalent, both in the lickerin region and in the delivery end region of the carding machine, requires a large number of such pipes disposed at many different locations, since such narrow suction slots are capable of withdrawing trash and fly from only a very limited distance immediately adjacent the slot. Examples of prior efforts to effect pneumatic removal of trash and fly from limited zones are found in the GRISWOLD U.S. Pat. No. 2,683,901; HAYES U.S. Pat. No. 2,774,994; FOWLER et al., U.S. Pat. No. 3,212,138; and O'NEAL et al., U.S. Pat. No. 3,357,062.

As will be appreciated by those skilled in the art, the delivery end region of the conventional carding machine includes a doffer cylinder which rotates in close proximity to the main cylinder or swift of the carding machine and which rotates beneath a doffer cover or bonnet disposed closely adjacent to the periphery of the doffer. A flats chain overlies the upper arcuate portion of the main cylinder and negotiates a flats drive sprocket defining a delivery end bight centered about the drive shaft of the drive sprocket generally above the transfer zone between the main cylinder and the doffer. Customarily, there are provided adjacent the drive end bight of the flats chain a flats stripping comb which oscillates through a selected stroke to sweep the accumulated strips of short fiber particles on this clothing of the flats bars from the surface of the clothing, as well as a spiral flats brush which brushes any residue in the form of individual fibers loose from the flats, and a hackle comb which cleans the flats brush. It is well known that both the spiral flats brush and the hackle comb shed large quantities of individual fibers out into the room and because of their size and location it is difficult or expensive to cover them in such a way that suction air can capture and carry away the material that is being centrifuged off of the spiral brush. However, the trash and fibers dislodged from the flats by the flats stripping comb, and by the brush and hackle comb if present, must be removed to avoid undesirable contamination of the sliver or of the air in the room.

Also, the conventional carding machine has a percentage plate which is carefully positioned with its upper edge in close proximity to the flats and to the cylinder to control air currents where the flats leave the cylinder and adjust the amount of cotton that is carried away from the carding process as flats strips relative to the amount that is carried on by the cylinder to be transferred to the doffer. Below this percentage plate there is usually provided a hinged inspection cover as well as a bolted-on front plate that extends the seal all the way down to the junction between the main cylinder and the doffer. In some cards, the cotton fibers which are transferred from the main cylinder to the doffer are removed by a stripper roller and transferred by a redirecting roller through crusher rolls, and in other cards the web is stripped from the doffer by a doffer comb and advanced through the crusher rolls, after which the sliver is drawn through takeoff rolls and fed to the sliver can. Numerous areas in the delivery end region of the carding machine, particularly the transfer zone between the main cylinder and the doffer and the zone of the rolls which receive cotton from the doffer, and the stripper comb, flats brush, and hackle comb, are sources of substantial discharge of trash and fly.

It is believed that the close fitting doffer cover and the front plate below the percentage plate are detrimental to proper carding operation since they allow windage to build up between the clothing of the respective cylinders and the underside of the plate and this windage must be dissipated in some manner at the contact point between the two cylinders. Also, it has been found that with proper design of a pneumatic cleaning manifold in the delivery end region, the need for the flats spiral brush and hackle comb can be eliminated.

An object of the present invention, therefore, is the provision of a novel suction manifold structure for use in the delivery end region of carding machines to define a low pressure, low velocity suction chamber which includes substantially all the components on the delivery end region of the card from which waste and fly normally originate to capture and remove this fly and trash.

Another object of the present invention is the provision of a novel suction manifold structure as described in the preceding paragraph, wherein the close fitting doffer cover and front plate normally employed can be eliminated.

Another object of the present invention is the provision of a novel suction manifold structure for use over the delivery end region of a carding machine to effect suction collection of trash and fly from carding machine components in this region and which effects suction stripping of fibers and trash from the flats stripping comb in a manner eliminating the need for the conventional flats brush and hackle comb.

Yet another object of the present invention is the provision of a novel suction manifold structure for the delivery end region of a carding machine, of the type described in the preceding paragraphs, which permits ready inspection of and access to the components of the carding machine covered by the manifold, and which provides for automatic throttling of air admission into the plenum zone defined above the doffer to maintain substantially constant predetermined negative static pressure therein.

The present invention is a suction manifold assembly for pneumatically cleaning the delivery end section of a carding machine in the region of the doffer cylinder, the transfer zone between the doffer cylinder and the main cylinder, and the web transfer rollers which withdraw the fibers from the doffer cylinder and transfer them as a web to the delivery end of the carding machine. The suction manifold assembly includes a plenum section forming a suction chamber overlying the doffer cylinder in open communication with the doffer cylinder and with a portion of the main cylinder adjoining the transfer zone to the doffer cylinder. The manifold assembly includes a hoodlike extension of hinged plural sections extending substantially to the delivery end of the carding machine in covering relation to the web which extends from the withdrawal zone of the doffer to the delivery end and defines a second plenum zone overlying the web. A baffle member is

located between the first plenum section overlying the doffer and the second plenum zone overlying the web and defines a variable area opening between the two plenum sections, with a surface of the baffle member exposed to the internal static pressure conditions in the first plenum section to automatically move responsive to variations in these internal static pressure conditions and thus vary the area of the opening between the two plenum zones.

Other objects, advantages, and capabilities of the present invention will become apparent from the following detailed description, taken in conjunction with the accompanying drawings illustrating a preferred embodiment of the invention.

BRIEF DESCRIPTION OF THE FIGURES

FIG. 1 is a side elevation view of a carding machine with the suction manifold structure of the present invention positioned thereon;

FIG. 2 is a vertical section view, to enlarged scale, of the manifold structure, and the associated portions of the delivery end sectionof the carding machine, taken longitudinally of the carding machine;

FIG. 3 is a perspective view of the manifold structure with adjacent parts of the carding machine;

FIG. 4 is a fragmentary exploded perspective view of the manifold and portions of the carding machine, showing the components by which the manifold is mounted on the carding machine; and,

FIG. 5 is a fragmentary vertical section view of a modified form of the manifold structure and associated portions of the delivery end section of the carding machine, for use in an arrangement wherein the flats spiral brush and hackle comb are eliminated.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Referring to the drawings, wherein like reference characters designate corresponding parts throughout the several figures, and particularly to the embodiment illustrated in FIGS. 1–4, there is shown in somewhat schematic or diagrammatic form a standard carding machine **10** having a main frame **11** supporting the usual lickerin **12** which receives the lap from the lap roll **13** in the conventional manner, a main cylinder or swift **14** having the usual flats chain **15** overlying the same, the doffer **16**, the stripper roller **17** and redirecting roller **18**, and the crusher rolls **19** between which the sliver is delivered through takeoff rolls (not shown) in the conventional manner to the sliver can **20**. While the type of carding machine herein shown employs the stripper roller **17** and redirecting roller **18** for withdrawing the cotton web from the doffer **16** and transferring it to the junction between the crusher rolls, it will be apparent that the present invention will be equally applicable to carding machines wherein the web is withdrawn from the doffer by a doffer comb. Adjacent the delivery end bight **15***a* of the flats chain **15** are the usual oscillatory flats stripper comb **21**, flats spiral brush **22**, and hackle comb **23**.

The suction manifold structure of the present invention is indicated generally by the reference character **25** and may be described in general as a plurality of hingedly interconnected sections including a plenum section **26** removably fixed to the carding machine to provide support for the whole manifold assembly, a front baffle **27** extending forwardly and upwardly therefrom in hinged relation adjacent the hackle comb, an extension shield section **28** hinged to the plenum section **26** and overlying a portion of the doffer **16** and the stripper roll **17**, and a web cover **29** hinged to the extension shield section **28** and overlying the remaining portion of the delivery end of the carding machine.

Referring more particularly to FIGS. **2, 3** and **4**, showing the details of construction of the suction manifold assembly **25**, the plenum section **26** comprises a pair of sideplates **30** having concave arcuate lower edges **30***a*, to be disposed in vertical relation at the opposite sides of the carding machine, between which extend an angular front plate **31** and a top and bottom plenum wall member **32, 33**, which collectively with portions of the sideplates **30** and front plate **31** define an air-handling duct **34** transversely spanning the width of the carding machine at a location above the doffer **16**. The sideplates **30** of the plenum section **26** extend longitudinally of the carding machine from a region generally above the transfer point between the main cylinder and doffer along a major portion of the upper perimeter of the doffer with the upper edges of the sideplates **30** located adjacent the delivery end bight **15***a* of the flats chain **15**. Preferably, both of the sideplates **30** have a fitting or nipple **35** communicating with the interior of the air-handling duct **34** for connection to conduits at each side of the card leading to the air-handling system of the mill the double intakes permitting suction to be applied to the air-handling duct **34** in a manner which substantially equalizes the distribution of suction pressure. The top plenum wall member **32** may, if desired, by unitary with the front wall **31** and has a downwardly inclined wall portion **32***a* which may be formed of plural, angularly related panels, declining generally toward the main cylinder **14** from the level of the uppermost edges of the sideplates **30** for a substantial distance and terminating at its lower free edge in a vertically depending lip portion **32***b*. The bottom plenum wall member **33** is also formed of a bent sheet having a plurality of angularly related panels, as illustrated in FIG. **2**, and includes inclined panel portions **33***a* and **33***b* declining generally toward the main cylinder **14** in somewhat convergent relation with the panel portion **32***a* of the top plenum wall member together with horizontal and vertical panels **33***c* and **33***d*, defining an upwardly opening narrow collecting trough T, the uppermost free edge of the vertical panel **33***d* being spaced horizontally from the lip portion **32***b*.

A backplate member **36** is also fixed at its opposite edges to the sideplates **30** in the region adjacent the main cylinder **14** and includes an upper panel **36***a* inclining downwardly in a direction opposite the inclination of the inclined top plenum wall portion **32***a* and forming a downwardly converging hopper formation therewith, as well as a horizontal panel **36***b* extending toward the main cylinder from its junction with the upper panel **36***a* defining a nose **36***b* ' therewith located vertically above the panel **33***d*, and downwardly extending panels **36***c* and **36***d* extending in selected spaced relation to the panel **33***d* on the opposite side thereof from the lip portion **32***b*. Each of the plenum wall members **32** and **33** and the backplate member **36** are formed of sheet material and are secured to the sideplates **30** in any suitable manner, such as by angle mounting members **37** spot-welded to the respective members to be joined, or by providing flanges at the edges of the sheet members.

The front baffle **27** is merely a planiform sheet which is hinged at its lower edge to the plenum section **26** by a hinge **38** secured to the top plenum wall member **32** adjacent its junction with the front plate **31** and extends upwardly to a level slightly beyond the hackle comb support rod present on the standard carding machine so that it can rest directly upon it with the free upper edge of the front baffle **27** disposed in close proximity with the flats bars as they negotiate the chain path at the delivery end bight **15***a*.

The extension shield section **28** is simply a U-shaped piece of metal which forms a cover over the portion of the doffer **16** not covered by the plenum section **26** and also over some carding machine components adjacent the doffer in the direction of the sliver can, and comprises a flat top panel **39** and depending sides **40** which extend down from the top panel **39** to keep air from entering too freely from the sides of the card. Angle feet **40***a* may be provided on the sides **40** for releasably fastening them to a stationary component of the card, for example, the housing for the bearings for stripper roller **17** to support the extension shield section in appropriate position. The transverse edge of the top panel **39** of the extension shield section **28** nearest the plenum section **26** is hinged to the plenum section by hinge **41** and the opposite transverse edge of the extension shield section **28** is connected by hinge

42 to the web cover 29 to permit the web cover 29 and the extension shield section 28 to be swung upward from their normal covering position to gain access to the card components therebeneath. The web cover 29 is preferably a transparent panel to permit continuous observation of the web and underlying card components and, for example, is supported an appropriate position by resting its free transverse edge nearest the sliver can on the bearings for the takeout rollers at the delivery end of the card.

In the form shown in FIGS. 2–4, a resilient doffer flap 43 is fixed adjacent its upper edge to a depending flange 39*a* at the transverse edge of the top panel 39 of extension shield section 28 adjoining the hinge 41, and depends downwardly to dispose its lower edge immediately adjacent the surface of the doffer 16. This doffer flap 43 forms a resiliently deformable damper or valve to admit variable amounts of air from the area under the extension shield section 28 and web cover 29 into the area below the plenum section 26 and to modulate responsive to negative static pressure variations in the region below the plenum section 27 and change the airflow through the zone of this damper flap to maintain a predetermined negative static pressure beneath the plenum section.

The configuration and arrangement of the top and bottom plenum wall members 32 and 33 is such that the lip portion 32*b* terminates in close proximity to the junction between the panels 33*b* and 33*c* to form an orifice A extending transversely all the way across the card which is subjected to the maximum suction pressure available in the system. The disposition of the upper free edge of the panel 33*d* and the nose 36*b*′ of the backplate member 36 is also arranged to form an orifice B which is also under a partial suction pressure because of its proximity to the orifice A but which does not feel the full effect of the pressure since it is partially exposed to the atmosphere. A third orifice C is defined between the nose 36*b*′ and the bend between lip portion 32*b* and inclined wall portion 32*a*, at the bottom of the hopperlike configuration defined by the inclined panel portions 36*a* and 32*a*, which admits atmospheric air to the suction system with this air coming from the vicinity of the delivery end bight 15*a* and from the region of the flats stripper comb 21, the flats spiral brush 22, and the hackle comb 23.

Thus, the orifice C is positioned substantially directly under the generation point for the flats strips which are removed by the stripper comb 21, spiral brush 22, and hackle comb 23 to collect these flats strips and dislodged trash as they fall and urge them into the narrow collecting trough T defined by the panels 33*c* and 33*d* immediately adjacent the orifice A for suction withdrawal into the air-handling duct 34 and discharge to the external collecting facility. The orifice B produces suction conditions communicating with the zone immediately above the transfer point between the main cylinder and the doffer where substantial fly and trash may be discharged to capture this fly and trash and direct it into the collecting trough zone where it can be withdrawn through orifice A into the air-handling duct 34. Since the orifice B is in effect in a vertical side of the narrow collecting trough T and is shrouded or protected above the orifice B by the nose 36*b*′, the flats strips are allowed to fall all the way past the orifice B into the zone immediately outwardly of the main orifice A so that they tend to drop into the zone immediately along the main orifice A during any period of time that the card is running but the suction is cut off, as for example, when the filter of the main air-handling system is being cleaned. Also, the particular arrangement of the orifices A, B, and C herein shown provides shrouding of the orifice B so that any mechanical components which may happen to work loose and fall from the upper section of the card will fall into the main collecting trough T defined by the panels 33*c* and 33*d* rather than down into the card between the main cylinder and doffer. Furthermore, this particular arrangement of the orifice tends to eliminate the possibility of the flats strips laying over the top orifice C and allowing the suction air to short circuit through the orifice B so that the suction pressure cannot be exerted against the flats strips and thereby draw an accumulation of these strips into the main suction opening A.

It will also be observed that the suction manifold assembly is located in such relation to the delivery end components of the card that the orifice D which exists between the front baffle 27 and the delivery end bight 15*a* causes airflow from the outside of the card at high velocity if negative static pressure is maintained within the manifold, tending to sweep the clothing of the flats free of entrained fibers and deliver these removed fibers downwardly to be withdrawn into the air-handling duct 34 through the main orifice A.

It will be understood that the suction manifold assembly is positioned over the delivery end region of the card after removal of the usual doffer cover and the front plate usually located below the percentage plate. When the carding machine is operating and suction is applied in ample quantity to the air-handling duct 34, air will flow through the main orifice A in large quantities to withdraw fibers and trash from the shallow collecting trough T defined by the panels 33*c* and 33*d*, and partial suction pressure conditions will be created at the orifices B and C, producing not only airflow through the various leakage points around the manifold assembly, but also down through the orifice D at high velocity and upward from the transfer zone between the main cylinder 14 and doffer 16 to capture trash and fly from this region. The airflow from the orifice D, the leakage points around the manifold, and the transfer region between the main cylinder and doffer cannot supply the total demands of the orifice A, and the remainder of the air required is drawn through the space between the free edge of the damper flap 43 and the doffer surface. Since the doffer flap 43 resiliently distorts and responds to variations in the negative static pressure in the region beneath the plenum section 26, it automatically modulates to vary the size of the opening and the quantity of air admitted from the region beneath the extension shield section 28 and web cover 29 to automatically control the suction pressure and maintain a substantially constant negative static pressure.

It will be noted that the entire assembly is so constructed that the transparent web cover 29 can be folded directly back onto the extension shield section 28 so that the rollers of the card beneath the web cover can be inspected more carefully or touched if necessary. If still further exposure to the card cylinders is required, the folded assembly of the web cover 29 on the extension shield section 28 can then be folded upwardly about the hinge 41 and pushed back against the front baffle 27 where it will stay since its center of gravity has gone past the vertical centerline of hinge 41.

One form of mounting assembly for removably securing the suction manifold on the card is illustrated in FIG. 4. This comprises a pair of arcuate angle members, one of which is indicated at 44, having a curved lower flange designed to rest on and be bolted to the peripheral flanges of the usual cast iron sideplates of the carding machine flanking the doffer cylinder and having a pair of outwardly projecting cylindrical lugs 45 at circumferentially spaced positions thereon. The lower arcuate edge 30*a* of each of the sideplates 30 is provided with two notches 30*b* to align with and receive these lugs 45. A pivoted gravity operated latch 46 is associated with each of the notches 30*b* located furtherest from the main cylinder 14 so that, when the manifold is slipped into place over the top of the card which has been previously equipped with the two arcuate angle members 44, the notches 30*b* engage the lugs 45 and the latches 46 fall under the lugs to hold the manifold in place until it is desired to be removed.

FIG. 5 illustrates another form which the suction manifold may take, indicated generally by the reference character 25′, shown in proper position in association with the main cylinder 14, the doffer 16, and the delivery end bight 15*a* of the flats chain 15. In this modified form, the plenum section 26′ comprises a generally U-shaped hood structure formed of a top wall 50 and sidewalls 51 located generally over the doffer 16 with the sidewalls 51 depending downwardly along the sides of the carding machine. A front baffle 27′ is hinged at its lower

edge, as indicated at 38', to the upper edge of the top wall 50 and has a rounded upper edge disposed in close proximity with the flats bars as they negotiate the delivery end bight 15*a* and defining an air entry orifice D' therebetween.

An extension shield section 28' is hinged at 41' to the plenum section 26' and has transparent web cover 29' hinged at 42' thereto, all in a manner similar to the previously described embodiment. In this modified form, a generally trapezoidal air-handling duct 52 transversely spans the distance between the sidewalls 51 and extends through both of these sidewalls to a distance approximately 6 inches beyond them. The portions of the duct 52 protruding outwardly from the sidewalls c8 51 have four complete sides and an end cap to form airtight ends, and have a suction tube 53 in the top of each of the two outside extremities connected to the suction source of the air-handling system of the mill, providing double intakes to tend to equalize the distribution of air through the manifold. Inside of the plenum between the sidewalls 51, the top and front wall portions of the duct 52 are removed so that it consists only of the backwall panel 52*a* and bottom wall panel 52*b*. An extension of the bottom 52*b* extends toward the main cylinder 14 through the lower radius and upward in a flat plate portion 52*c*, the width of the card, to be sealed against the percentage plate indicated at 54. A cover 55 is installed over the partial duct 52 between the two sideplates 51 which is long enough to extend virtually all the way between the sideplates 51 and has a rounded free edge 55*a* spaced a selected distance from the flat plate portion 52*c* to define an orifice E therebetween.

It will be apparent that when suction is established in the air-handling duct 52, outside air will be drawn downwardly through the orifice D' sweeping the clothing of the flats free of entrained fibers and drawing these captured fibers together with the trash and fibers removed from the flats clothing by the stripper comb 21 downwardly through the orifice E and into the air-handling duct 52 for removal to the remote collecting facility. Also, fly discharged from the transfer zone between the main cylinder 14 and doffer 16 and from the region immediately above the doffer will be drawn through the plenum into the zone of action of the orifice E and withdrawn into the air-handling duct 52.

A pivoted damper 56 secured to a shaft 57 which is free to rotate in holes drilled through the sideplates 51 is located at the end of the plenum section 26' adjacent the extension shield section 28', the pivot axis being immediately below the top wall 50 and the free edge of the pivoted damper 56 being adjacent the upper periphery of the doffer 16. A stop tab 58 is provided for the damper 56 causing the damper to have a rest position which effectively closes the opening that would have existed between the lower end of the stop tab 58 and the clothing of the doffer cylinder 16. The damper is made of appropriate weight so that, in response to a certain amount of suction static pressure within the plenum section 26', the damper will open and allow air to flow from the area of the extension shield section 28' and the web cover 29'. In practice, when suction is applied to the air-handling duct 52, some air flow from this area will occur at all times, although the damper 56 will modulate to allow a change in the airflow to maintain a predetermined negative static pressure in the plenum section 26'.

I claim:

1. In a carding machine having a main cylinder and a delivery end section including a doffer cylinder having a portion adjacent the main cylinder at a transfer zone for doffing fibers therefrom and web transfer means for withdrawing the fibers from the doffer cylinder at a withdrawal zone and transferring them as a web to the delivery end of the carding machine, a of manifold assembly for capturing fly and trash in said delivery end section and to the same to an external collecting station comprising wall means collectively with parts of the carding machine defining a suction chamber transversely spanning the carding machine in overlying relation to said doffer cylinder and extending from adjacent said main cylinder over said web transfer means substantially to said delivery end, suction connection means for communicating the interior of said suction chamber with an external suction source to establish selected internal static pressure conditions therein for capturing and pneumatically removing fly and trash released from the web and carding machine parts into said suction chamber, said suction chamber being in open and direct pneumatic communication throughout with an upper sector of the doffer cylinder extending from said transfer zone over a major portion of the upper half of the doffer cylinder toward said withdrawal zone, said manifold assembly including a first section defining a first plenum zone overlying said doffer cylinder and a hood section hingedly connected to said first section and extending therefrom substantially to the delivery end of the carding machine in covering relation to the web extending from said withdrawal zone to said delivery end defining a second plenum zone overlying the web and communicating with the first plenum zone to establish air currents for capturing fly and trash released in the second plenum zone and conveying the same into said first plenum zone, and a baffle member in said chamber forming boundary means between said first and second plenum zones defining a variable area opening therebetween with a surface thereof exposed to the internal static pressure conditions in said first plenum zone, said baffle member being automatically movable responsive to variations in said internal static pressure conditions to vary the area of the opening defined thereby and thereby vary the admission of air from said second plenum zone to said first plenum zone in selected relation to maintain substantially constant static pressure in said first plenum zone.

2. Apparatus as defined in claim 1 wherein said baffle member is a rigid damper transversely spanning the suction chamber and pivoted for movement about a horizontal axis located adjacent its uppermost edge, said damper having a horizontal lower edge disposed upwardly adjacent the periphery of the doffer cylinder at a location between said withdrawal zone and the uppermost part of the doffer cylinder and defining said variable area opening between said lower edge and the periphery of the doffer cylinder.

3. Apparatus as defined in claim 1 wherein said baffle member is a resiliently deformable flap transversely spanning the suction chamber and fixed along its uppermost edge to said wall means, the flap having a lower edge disposed upwardly adjacent the periphery of the doffer cylinder at a location between said withdrawal zone and the uppermost part of the doffer cylinder and defining said variable area opening therebetween, the spacing between said lower edge and the periphery of the doffer cylinder being varied upon variable flexing of the flap responsive to variations in the internal static pressure in said first plenum zone to vary the size of said opening.

4. Apparatus as defined in claim 1 wherein the carding machine includes a flats chain of clothed flats upwardly adjacent the periphery of the main cylinder having a delivery and bight spaced above the doffer cylinder and a flats comb for sweeping accumulated fiber strips from the flats clothing as the flats move along the path of said bight from the main cylinder, said wall means including wall portions terminating adjacent said bight and defining an air inlet orifice spanning the width of the flats chain outwardly adjacent the flats in a region beyond the flats comb from the main cylinder and communicating with said first plenum zone to induce air currents inwardly through said orifice adjacent the flats and pneumatically clean fibers from the flats clothing.

5. Apparatus as defined in claim 4 wherein said first section includes vertical sidewalls adjacent the opposite sides of the carding machine and a plurality of partitions extending between said sidewalls including first and second portions defining upper and lower walls of a suction duct communicating with said suction connection means transversely spanning said first plenum zone above the doffer cylinder and an upwardly opening narrow trough formation underlying said bight, said upper wall and a third portion of said partitions

defining downwardly converging hopper walls underlying said bight and leading downwardly into said trough formation, and said upper and lower walls defining a laterally opening main suction orifice along a side of said trough formation adjacent the bottom thereof for drawing material from the latter into said duct.

6. Apparatus as defined in claim 5 wherein said third portion of said partitions includes means defining a second laterally opening suction orifice spaced above the level of said main suction orifice along the opposite side of said trough formation for communicating suction pressure conditions from said main suction orifice to the region of said first plenum zone immediately over said doffer cylinder, and said third portion including a nose formation immediately above to said second suction orifice to shield the latter against passage therethrough of matter falling from the region of said bight.

7. In a carding machine having a main cylinder and a delivery end section including a doffer cylinder having a portion adjacent the main cylinder at a transfer zone for doffing fibers therefrom and web transfer means for withdrawing the fibers from the doffer cylinder at a withdrawal zone and transferring them as a web to the delivery end of the carding machine, a suction manifold assembly for capturing fly and trash in said delivery end section and removing the same to an external collecting station comprising wall means collectively with parts of the carding machine defining a suction chamber transversely spanning the carding machine in overlying relation to said doffer cylinder and extending from adjacent said main cylinder over said web transfer means substantially to said delivery end, suction connection means for communicating the interior of said suction chamber with an external suction source to establish selected internal static pressure conditions therein for capturing and pneumatically removing fly and trash released from the web and carding machine parts into said suction chamber, said suction chamber being in open and direct pneumatic communication throughout with an upper sector of the doffer cylinder extending from said transfer zone over a major portion of the upper half of the doffer cylinder toward said withdrawal zone, said manifold assembly including a first section defining a first plenum zone overlying said doffer cylinder and a hood section hingedly connected to said first section and extending therefrom substantially to the delivery end of the carding machine in covering relation to the web extending from said withdrawal zone to said delivery end defining a second plenum zone overlying the web and communicating with the first plenum zone to establish air currents for capturing fly and trash released in the second plenum zone and conveying the same into said first plenum zone, the carding machine including a flats chain of clothed flats upwardly adjacent the periphery of the main cylinder having a delivery end bight spaced above the doffer cylinder and a flats comb for sweeping accumulated fiber strips from the flats clothing as the flats move along the path of said bight from the main cylinder, said wall means including wall portions terminating adjacent said bight and defining an air inlet orifice spanning the width of the flats chain outwardly adjacent the flats in a region beyond the flats comb from the main cylinder and communicating with said first plenum zone to induce air currents inwardly through said orifice adjacent the flats and pneumatically clean fibers from the flats clothing, said first section including vertical sidewalls adjacent the opposite sides of the carding machine and a plurality of partitions extending between said sidewalls including first and second portions defining upper and lower walls of a suction duct communicating with said suction connection means transversely spanning said first plenum zone above the doffer cylinder and an upwardly opening narrow trough formation underlying said bight, said upper wall and a third portion of said partitions defining downwardly converging hopper walls underlying said bight and leading downwardly into said trough formation, said upper and lower walls defining a laterally opening main suction orifice along a side of said trough formation adjacent the bottom thereof for drawing material from the latter into said duct, said third portion of said partitions including means defining a second laterally opening suction orifice spaced above the level of said main suction orifice along the opposite side of said trough formation for communication suction pressure conditions from said main suction orifice to the region of said first plenum zone immediately over said doffer cylinder, and said third portion including a nose formation immediately above said second suction orifice to shield the latter against passage therethrough of matter falling from the region of said bight.

8. In a carding machine having a main cylinder and a delivery end section including a doffer cylinder having a portion adjacent the main cylinder at a transfer zone for doffing fibers therefrom and web transfer means for withdrawing the fibers from the doffer cylinder at a withdrawal zone and transferring then as a web to the delivery end of the carding machine, a suction manifold assembly for capturing fly and trash in said delivery end section and removing the same to an external collection station comprising wall means collectively with parts of the carding machine forming a suction chamber defining a plenum zone transversely spanning the carding machine and overlying said doffer cylinder, suction connection means for communicating the interior of said suction chamber with an external suction source to establish selected internal static pressure conditions therein for capturing and pneumatically removing fly and trash discharged into said plenum zone, said suction plenum zone being in open and direct pneumatic communication throughout with an upper sector of the doffer cylinder extending from said transfer zone over a major portion of the upper half of the doffer cylinder toward said withdrawal zone and with said transfer zone and immediately adjacent peripheral portions of the main cylinder, a baffle member transversely spanning the suction chamber at a location above the doffer cylinder and spaced toward said delivery end from said main cylinder forming the boundary of said plenum zone nearest said delivery end, said baffle member having a surface thereof exposed to the internal static pressure conditions in said plenum zone and defining a variable area opening with adjacent surface portions of the doffer cylinder for admission of air from the region above said web transfer means into said plenum zone, the baffle member being automatically movable responsive to variations in said internal static pressure conditions to vary the area of said opening thereby varying the admission of air from said region in selected relation to maintain substantially constant static pressure in said plenum zone.

9. Apparatus as defined in claim 8 wherein said baffle member is a rigid damper transversely spanning the suction chamber and pivoted for movement about a horizontal axis located adjacent its uppermost edge, said damper having a horizontal lower edge disposed upwardly adjacent the periphery of the doffer cylinder at a location between said withdrawal zone and uppermost part of the doffer cylinder and defining said variable area opening between said lower edge and the periphery of the doffer cylinder.

10. Apparatus as defined in claim 8 wherein said baffle member is a resiliently deformable flap transversely spanning the suction chamber and fixed along its uppermost edge to said wall means, the flap having a lower edge disposed upwardly adjacent the periphery of the doffer cylinder at a location between said withdrawal zone and the uppermost part of the doffer cylinder and defining said variable area opening therebetween, the spacing between said lower edge and the periphery of the doffer cylinder being varied upon variable flexing of the flap responsive to variation in the internal static pressure in said plenum zone to vary the size of said opening.

11. Apparatus as defined in claim 8 wherein said carding machine includes a flats chain upwardly adjacent the main cylinder having a delivery end bight spaced above the doffer cylinder, said wall means defining said plenum zone including vertical sidewalls adjacent the opposite sides of the carding machine and a plurality of partitions extending between said sidewalls including first and second portions defining upper

and lower walls of a suction duct communicating with said suction connection means transversely spanning said suction chamber above the doffer cylinder and an upwardly opening narrow trough formation underlying said bight, said upper wall and a third portion of said partitions defining downwardly converging hopper walls underlying said bight and leading downwardly into said trough formation, and said upper and lower walls defining a laterally opening main suction orifice along orifice side of sad trough formation adjacent the bottom thereof for drawing material from the latter into said duct.

12. Apparatus as defined in claim 11 wherein said third portion of said partitions includes means defining a second laterally opening suction orifice spaced above the level of said main suction orifice along the opposite side of said trough formation for communicating suction pressure conditions from said main suction orifice to the region of said plenum zone immediately over said doffer cylinder, and said third portion including a nose formation immediately above said second suction orifice to shield the latter against passage therethrough of matter falling from the region of said bight.