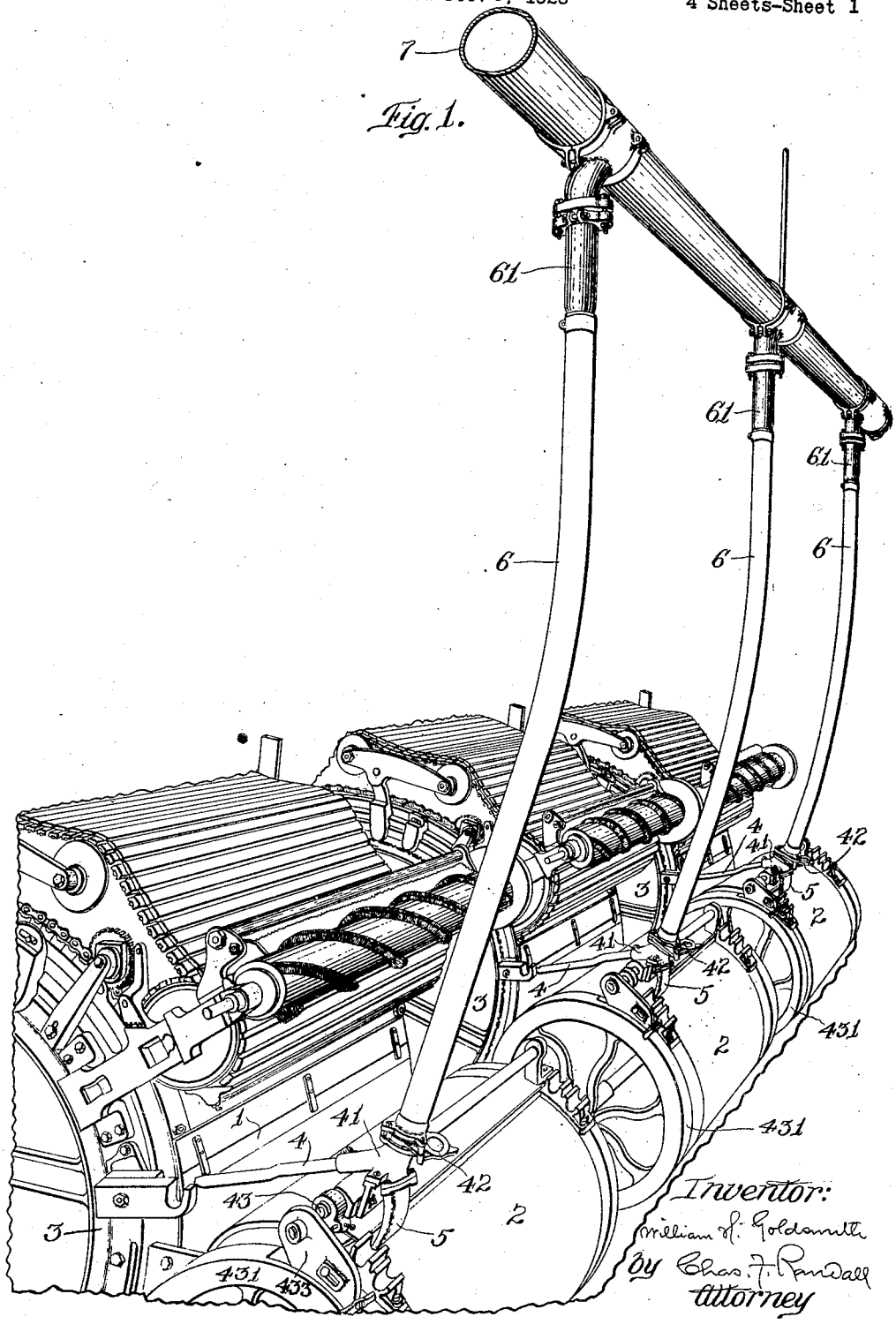
July 12, 1927. 1,635,834

W. H. GOLDSMITH

PNEUMATIC CARD STRIPPER SYSTEM

Filed Dec. 9, 1926 4 Sheets-Sheet 1

Fig. 1.



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PNEUMATIC CARD STRIPPER SYSTEM

Filed Dec. 9, 1926 4 Sheets-Sheet 2

Fig. 2.

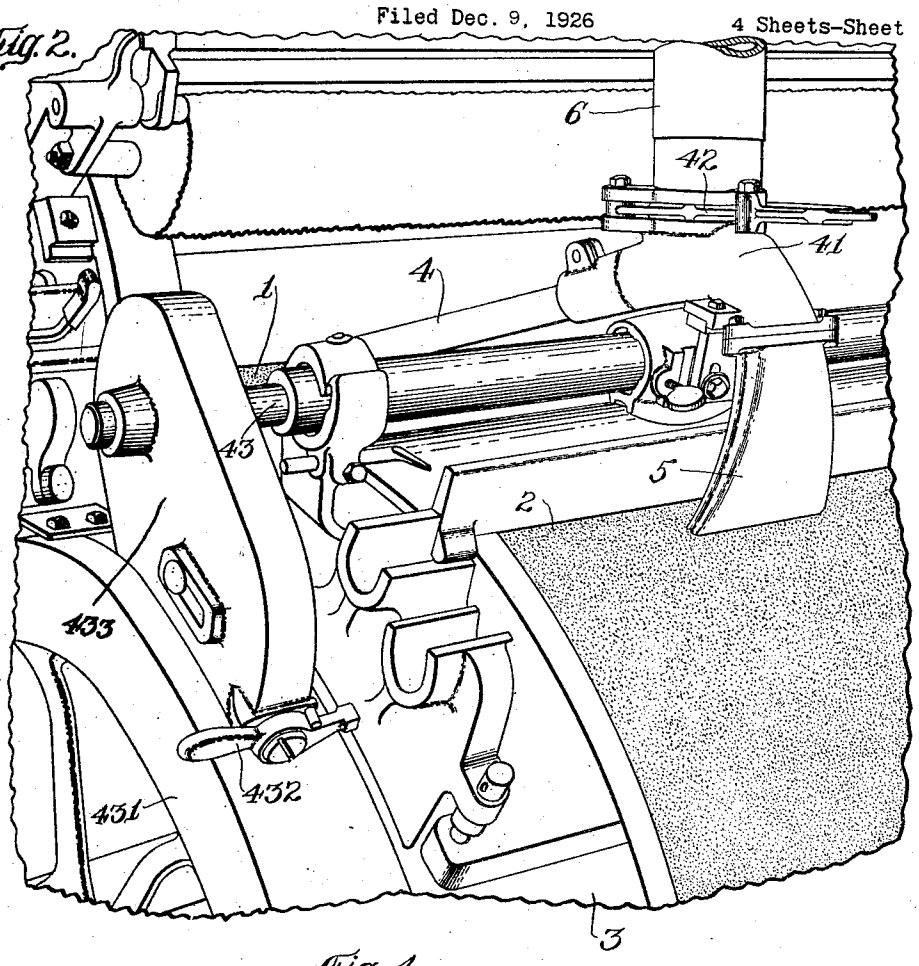
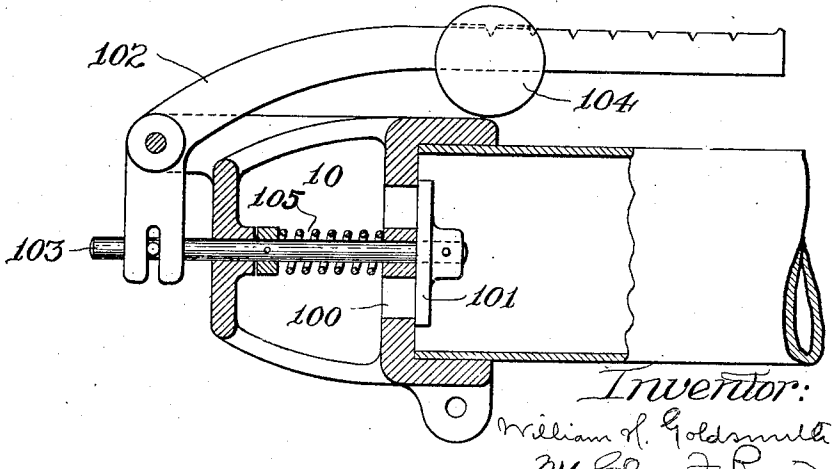


Fig. 4.



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PNEUMATIC CARD STRIPPER SYSTEM

Filed Dec. 9, 1926 4 Sheets-Sheet 3

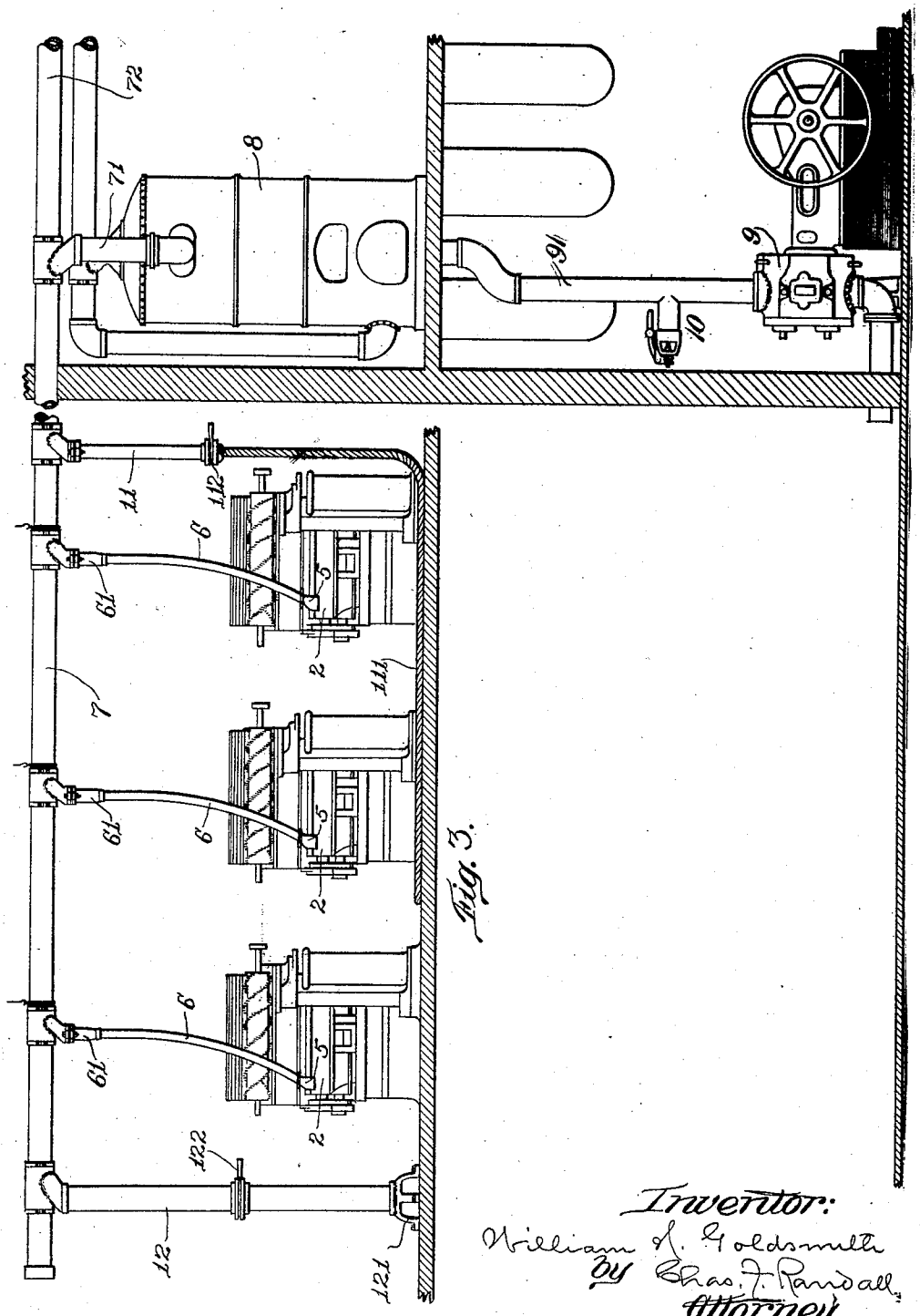


Fig. 3.

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PNEUMATIC CARD STRIPPER SYSTEM

Filed Dec. 9, 1926 4 Sheets-Sheet 4

Fig. 5.

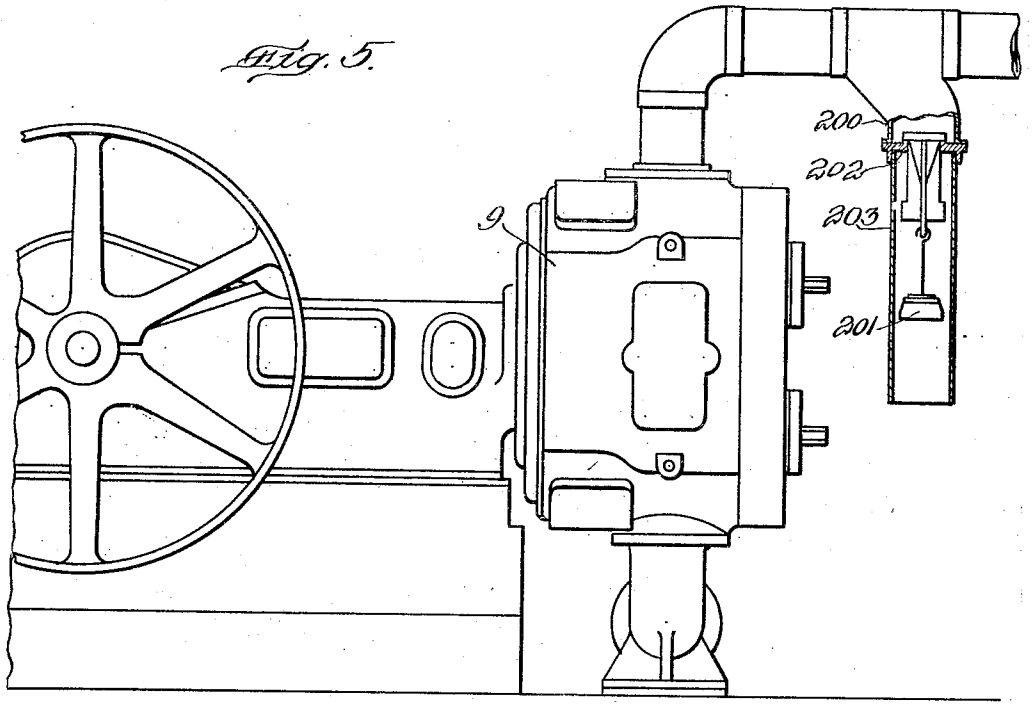
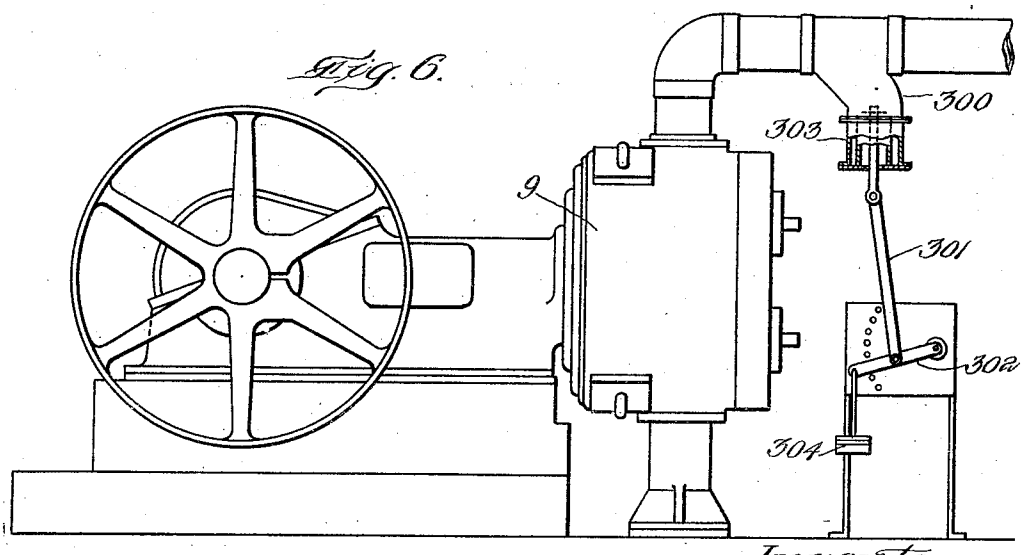


Fig. 6.



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UNITED STATES PATENT OFFICE.

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PNEUMATIC CARD-STRIPPER SYSTEM.

Application filed December 9, 1926. Serial No. 153,555.

The invention is an improvement in pneumatic stripper equipment of the general class composed of those equipments which are organized to extract by means of suction waste fibers, dirt, dust, and the like, from among the teeth of card-clothed surfaces, more especially the peripheral surfaces of main cylinders, doffers, and other carding elements of carding engines; and to convey the strippings, dirt, dust, etc., by the flow of air to a suitable place of discharge or deposit, for instance into a collecting and filtering receiver.

Suction stripper equipment has attained an important standing in the art. It has competed successfully with other means for effecting card stripping, and it has superseded the latter to a considerable extent by reason of its convenience and of its various advantages. Among the last are the quick performance of stripping operations thereby, without dissemination of dust and flyings in the air in the neighborhood of the carding engines, and without injury to the teeth of the card-clothed surfaces that are stripped. In addition to these various advantages, the convenience of having the matters which are removed from the carding engine conveyed pneumatically to a suitable receiver may be mentioned. Stripping by suction is performed in actual practice with but short interruption of the productive working of the carding engines, inasmuch as the suction is caused to act in connection with the required card-clothed surface or surfaces during rotation of the cylinder and doffer, without lessening the speed of rotation thereof, with merely the feed at the licker-in end of the machine suspended temporarily; this suspension not being invariable, so that sometimes there is no interruption. Suction stripper equipment has still other convenient and desirable features.

The general objects of the present invention are three-fold. One of the said general objects is to provide suction stripper equipment capable of operating efficiently without production of so-called curl, a tendency to which has been an incident to the operation of equipment of the said class as constituted heretofore.

Another of the said general objects is to produce pneumatic stripper equipment of greater efficiency than equipment of the said class heretofore in use, and under this head may be noted the exceedingly important coordinate object of enabling a plurality of carding engines to be stripped simultaneously, which is something that has not been found feasible in practice with the suction-stripper equipment heretofore in use. Primarily, the importance of enabling a plurality of carding engines to be stripped simultaneously resides in the possibility attained thereby of "bulking" within the piping-system the strippings thus taken simultaneously from the said plurality of carding-engines. What is meant by bulking, and the beneficial results secured thereby, are explained later on in this specification. Secondly, in addition to the beneficial results in question, the ability to strip a plurality of carding engines simultaneously is of great economical advantage.

Another general object is to provide equipment of the said class adapted to be utilized for important ancillary purposes which have not been subserved heretofore in the case of prior related equipment.

Curl is a change or alteration in the state or condition of the fibrous material comprised in the strippings and constituting the largest proportion of the bulk thereof. This change or alteration is of economic importance in many instances, in which, through lowering the quality or grade of the strippings, it lessens the desirability of the strippings for re-working purposes, and consequently lessens correspondingly the market value and salability of the strippings. Avoidance of curl, it will be obvious, is an exceedingly important practical desideratum. Such avoidance means better condition of the strippings and better adaptation and fitness for reworking, suitability for use for purposes for which strippings full of curl are not suitable, and enhanced salability and market value.

The nature of the invention is explained in the following specification with reference to the illustrative embodiment of the features of the invention which is shown in the accompanying drawings, and the said features are particularly pointed out in the claims at the close of this specification.

In the drawings,—

Fig. 1 is a perspective view of a group of carding engines having combined therewith

certain portions of a suction-stripper equipment embodying the invention.

Fig. 2, Sheet 2, is a perspective view, on a larger scale than Fig. 1, showing portions of one of the carding engines of Fig. 1 and of the suction-stripper appliance of Fig. 1.

Fig. 3, Sheet 3, is a diagrammatic view illustrating on a small scale in simplified form a small group of carding engines having combined therewith a general equipment containing the various features of the invention.

Fig. 4, Sheet 2, is a sectional view on a scale similar to that of Fig. 2, showing more particularly one form of vacuum equalizing valve.

Fig. 5, Sheet 4, is a view showing a second form of vacuum equalizing valve, in combination with a portion of a vacuum main, and with a vacuum pump.

Fig. 6, Sheet 4, is a view similar to Fig. 5, showing means for controlling automatically the working of the vacuum pump so as to maintain a predetermined working degree of vacuum within the piping-system.

The elements, relations, etc., of the suction-stripper equipment that is shown in the drawings will first be briefly referred to, as follows:—

The said equipment is organized, etc., to effect the stripping of the main cylinder 1 (Figs. 1 and 2) and doffer-cylinder 2 of each of the carding engines of a series of the latter. Only three carding engines are shown, but in practice the piping-system, and the series of stripper appliances, etc., are coextensive with the much larger series of carding engines which generally is employed in a mill.

Each carding engine shown in the drawings has combined therewith a suction-stripper appliance of well-known type and form, comprising a suction-box 41, Figs. 1 and 2, and associated nozzles 4, 5, the mouth or inlet of the nozzle 4 having working relations in close proximity to the surface of the card-clothing of the main cylinder 1 of such engine, and the mouth or inlet of the nozzle 5 having working relations in close proximity to the surface of the card-clothing of the doffer-cylinder 2.

The suction-box 41 of the suction-stripper appliance of each of the respective carding engines is in communication through a hose-pipe 6 with an overhead trunk-pipe or main, 7, which is in communication with a receiver 8, Fig. 3. In practice, the said trunk-pipe or main, including its extensions and branches, is coextensive with the series of carding engines which it serves. At 9 is air-exhausting means, constituted by an air-pump, connected by a pipe 91 with the receiver. By means of such air-pump air is withdrawn from the receiver, the trunk-pipe or main, and the suction-boxes, to produce the required degree of exhaustion or vacuum in such elements of the system.

Briefly, summarized, the trunk-pipe or main 7, including its extensions and branches, constitutes a piping-system having the various suction-stripper appliances of the equipment connected therewith, so as to receive from such appliances flow of air and material passing through the appliances, and the said piping-system being itself connected with the receiver and discharging into the latter.

Each suction-box 41 is furnished with a valve 42 in connection with the passageway therethrough, such valve being manually operable to close or open said passageway so as to prevent or permit inflow of air through the air-inlets. When stripping is to be effected by means of the stripper-nozzles of a given suction box, the valve 42 of such suction-box is placed in open condition; on the completion of a stripping operation such valve is placed in closed condition, and it remains in the latter condition until stripping is to be performed again by the said stripper-nozzles.

In operation, withdrawal of air from the receiver through the action of the air-pump induces flow of air from the main 7 into the receiver, and in addition thereto flow of air inward into the main through the inlets of those nozzles which for the time being are in open communication with the main through the associated suction-boxes and hose-pipes 6, 6, thus crating the effect of suction at such inlets. By such suction the fibers, dirt, dust, etc., compacted among the teeth of the card-clothed surfaces to which the inlets are presented are extracted from the card-clothing, and by the air-movement through hose 6 and piping 7 the material thus extracted is conveyed to the receiver.

The specific construction of the suction-stripper appliances is not material, so far as the invention is concerned. Nor is the number of nozzles with which one of such appliances is furnished material to the invention.

Sometimes in practice, as is well-known, a suction-stripper appliance on the order of that shown in the drawings in connection with each of the carding engines has been provided with a single suction-inlet, for service in stripping the main cylinder, alone of a carding engine, or the doffer-cylinder thereof alone, or other carding element thereof, as has been desired, but usually such an appliance has been equipped with two stripper-nozzles, as in the case of the equipment shown in the drawings, in order to provide thereby for stripping the cylinder and doffer simultaneously by means of two suction-inlets.

It is of course well-known that for successful suction stripping, one requisite is that the air-inlets of the suction appliances must

be located in immediate proximity to the card-clothed surfaces which are being stripped, so that the air entering the said air-inlets shall come mainly from among the teeth of the card-clothing, thereby providing against weakening of the force of the moving current of air through the mingling therewith of air from points external to the card-clothing. Another requisite is that the said air-inlets, also, must be so proportioned in respect of their cross-sectional area that air shall enter an inlet under the urge of the external atmospheric pressure in a concentrated stream exerting its influence within a very small localized area among the said teeth at such inlet. These two requirements must be met, in order to attain a degree of lifting power sufficient for successful and satisfactory disengagement, by suction, of the fibers, dirt, dust, etc., from among the teeth of the card-clothing of cylinders and doffers, etc., of carding engines, some of which materials is embedded more or less compactly around the base-portions of such teeth.

In practice, in recognition of the second of the working requirements which have just been stated, the air-inlets of the suction appliances of a suction stripper are given the form of narrow slots. Also, usually the stripping action is caused to take place progressively, lengthwise of the cylinder operated upon, in connection with successive small portions of the length thereof, each of such portions being only a small fractional portion of the said length. The progressive stripping lengthwise of the cylinder is provided for in different known ways in the case of different types of vacuum stripper equipment. In the case of an equipment employing a nozzle or nozzles 4, 5, such as shown in the drawings, it is provided for through the employment of mechanism whereby, while the carding elements are in rotation, the nozzle or nozzles is or are traversed bodily from one side of the carding engine to the other, throughout the full length of the card-clothed surface or surfaces of the rotating cylinder, or doffer, or cylinder and doffer. One customary means of traversing the said nozzle or nozzles comprises a traverse-screw of well-known character having its shaft 43, Figs. 1 and 2, geared to the doffer-gear, the latter and the customary gearing being enclosed by the doffer-gear guard 431. Except during a stripping operation, the said gearing is held disconnected from the doffer-gear, as for example, by means of a manually operable lifting lever 432, Fig. 2, with the suction-stripper appliance at the starting point of its traverse, at one side of the carding engine. The hose-pipe 6 connecting the suction stripper-appliance with the overhead piping-system is of sufficient flexibility to permit its lower end to participate in the traversing movement of the suction-stripper appliance, with which latter such lower end is engaged. It will be understood that during this traversing movement, air entering with considerable velocity into the nozzle-inlet or inlets, from among the teeth of the card-clothing of the cylinder, or doffer, or both, as the case may be, extracts the fibers, dirt, dust, etc., from among the teeth of the successive portions of card-clothing with which said inlet or inlets assumes or assume stripping relations.

Having in the foregoing introductory matter summarized the features and mode of operation of suction-stripper equipment on the order of that to which the present invention is applicable, I will proceed now to explain the invention.

Although the occurrence of curl in the fibrous component of the strippings within suction-stripper equipment has been recognized heretofore as undesirable and as something to be avoided if possible, the cause or causes of its production has or have not been understood, and how to obviate the same has not been discovered prior to my present invention. I have experimented exhaustively in the undertaking to ascertain such cause or causes, and the manner or means of remedying the same or otherwise avoiding the said occurrence, and have discovered that the production of curl in the practical operation of the suction-stripper equipment heretofore known is associated with certain characteristics which I have found in the said equipment.

Suction-stripping equipment established heretofore in manufacturing plants has been characterized by having the piping-system thereof (that is to say, the piping intermediate the suction-stripping appliance and the receiver and air-exhausting means) composed of piping of relatively small cross-sectional area. By reason of the said small cross-sectional area, the said piping has been of relatively small volumetric displacement capacity. In brief, the cross-sectional area and capacity of the piping embraced in the said system have corresponded closely, usually, with the cross-sectional area and capacity of the inlet of one suction-stripper appliance, or with the combined cross-sectional area and capacity of the usual two inlets of a suction-stripper. Apart from certain other practical considerations to which reference is made immediately hereinafter, such small cross sectional area is objectionable, I have discovered, because of contributing materially to the production of curl. In short, I have found that if strippings are pulled or carried at high speed through a restricted opening or passageway, injury to the fiber through the production of curl begins. Hence, the injury consequent to being

pulled or carried through piping of small cross-sectional area. The other practical considerations to which I have referred just above are as follows:—On account of the relatively small cross-sectional area of the piping, and the resulting frictional impedance to air-movement through the piping, the volumetric flow and the degree of vacuum produced within the portions of piping more remote from the air-exhausting means and the receiver are considerably reduced. Hence, the degree of vacuum at the confluence of a suction-stripper appliance with the piping is much less than that at the receiver and air-exhausting means. At this point it should be stated that the necessity for producing within the receiver a high degree of vacuum, in order to secure effective suction at the suction-stripper inlets, has required a correspondingly strengthened and consequently expensive, construction of receiver and piping, in order to enable them to withstand the tendency to collapse.

Moreover by reason of the small cross-sectional internal proportions of the piping heretofore, the air displacement within the piping at and near the confluence of the stripper devices with the main has not been great enough volumetrically to produce the most effective suction at the inlet or inlets, notwithstanding the high degree of vacuum at and adjoining the receiver. The degree of vacuum usually attained at the inlet or inlets has been that represented by the lifting of a column of mercury one inch; the maximum found attainable in the case of the usual equipment has been that which is represented through the lifting of a mercury column two inches. Furthermore, because of the deficiency of the suction it has not been found feasible to strip more than one carding engine at the same time through the employment of a plurality of suction-stripper appliances connected with the same piping. The practice in the past has been to strip the carding engines of a series one at a time in succession, employing a single suction-stripper appliance for the series and shifting it from one carding engine to another, transferring the hose-pipe from time to time from one point of connection with the overhead piping to another such point.

To sum up: The list of deficiencies thus far referred to, of the old suction-stripper equipment, include the feature of its small piping and insufficiency of vacuum adjacent the stripper-device, the considerable frictional impedance, the high vacuum necessary to be maintained within the receiver and adjacent portions of such piping, the expensive construction necessitated thereby, the small volumetric displacement of air effected within the piping by means of the air-movement toward the receiver, the stripping efficiency held down by the relatively small internal volumetric displacement, and the inability to strip more than one carding engine at the same time. To these is to be added the important drawback consisting in the tendency to change or alteration of the state or condition of the fibrous material so as to lower its grade and desirability for re-working purposes, and lessen its re-sale value. By two important improvements in suction-stripper equipment, involving the adoption of two leading principles, one of such improvements paving the way for the other, I not only have attained important results in respect of avoiding the formation of curl and improving the condition in which the fibrous component of the strippings is left, but have produced a suction-stripper equipment of greatly enhanced efficiency. The said improvements, moreover, remedy certain conditions, etc., of the prior equipment that from the standpoint of the present invention may be regarded as deficiencies.

The first of the principles referred to involves, essentially, the utilization, throughout the piping-system of a suction-stripper equipment for carding engines, or other machines having toothed working surfaces, that is to say, throughout the said system as far as the confluence of the suction-stripper with the piping-system, of a working degree of vacuum that is substantially uniform with the degree of vacuum at the air-exhausting means pertaining to the equipment. I have discovered that, under conditions producing within the piping system, as far as the confluence of the suction-stripper with the piping-system, a working degree of vacuum that is substantially uniform with the degree of vacuum at the air-exhausting means and the receiver, the production of curl is eliminated or substantially so, and, further, much higher efficiency in stripping is attained. Such conditions have not been attained heretofore, and the necessity and importance thereof have not been perceived, so far as I am aware.

So far as is known to me, this principle has never been applied in connection with a suction-stripper system heretofore. The adoption thereof produces, also, an equipment having greatly increased capacity and capabilities, rendering it feasible to operate a plurality of suction-stripper appliances concurrently or simultaneously at a plurality of carding engines for stripping purposes, and thereby rendering it practicable to apply and utilize the second of the principles aforesaid, which consists in the bulking, to which reference has been made, of strippings within the piping-system through feeding into the said piping-system, the strippings from a plurality of carding engines simultaneously, so that the greater portions thereof shall pass onward in a more or less assembled or collective volume. As will be ap-

parent, this capability for operating suction-stripper appliances concurrently or simultaneously on a plurality of machines gives great economical advantages and importance.

In carrying the invention into effect I employ a piping-system comprising a main or vacuum chamber such as that shown at 7 in the drawings, embodying new principles enabling a very much more effective suction to be produced and maintained at the stripper inlets, and securing new and advantageous results. This main or vacuum chamber is characterized by a large cross-sectional area and proportionately large volumetric capacity. It is constituted by a cylinder of relatively large internal diameter, considerably exceeding in cross-sectional area the combined cross-sectional areas of the suction-inlets of a plurality of suction-appliances. Usually in practice I employ in connection with this new main or vacuum chamber 7 hose-pipes 6, 6, etc., corresponding in number with the carding engines, every carding engine having its own associated hose-pipe 6. In practice I permit all of these hose-pipes 6, 6, to remain permanently in place, constituting connections leading to the said main or vacuum chamber from suction-stripper appliances remaining permanently mounted in working relations with the card-clothed elements of the respective carding engines. In the drawings the upper end of each hose-pipe is joined to a short length of intake pipe 61 extending down from the main or vacuum chamber, while the lower end of each hose-pipe is shown engaged with the suction-box 41 of a suction-stripper appliance. Except while a stripping operation is being performed by a given suction-stripper appliance the manually operable valve 42 thereof is in closed position.

The large volumetric capacity general mode of operation is as follows: The vacuum chamber 7 being in communication with the receiver 8, the withdrawal of air from said receiver and the vacuum chamber, by means of air-pump 9 will produce a working degree of vacuum within the main or vacuum chamber which throughout the length of the latter will be substantially uniform with the degree of vacuum at the said air-pump. In fact, the large volumetric displacement capacity of the main or vacuum chamber, coupled with that of the large hose-pipes 6, 6, which I employ will provide as far as the stripper-inlets a working degree of vacuum having such uniformity. The opening of the valve 42 of a given suction-box and associated hose-pipe 6 will permit inflow of air through the inlets of the nozzles of such suction-box, and through the hose-pipe, to the vacuum chamber, and create thereby the suction by which the card-clothed elements of the corresponding carding engine will be stripped. Turning of the lifter-lever 432 so as to permit the traverse-gearing to become engaged with the doffer-gear will result in the traverse-mechanism being actuated to traverse the suction-stripper appliance across the carding engine.

By reason of the cross-sectional capacity of the main or vacuum chamber 7 being considerably greater than the combined cross-sectional capacities of the inlets of the group of suction-stripper appliances which it is planned to have in use at any one time, external air will be caused by atmospheric pressure to flow inward through the individual inlets of the said group at a velocity very much higher than that of air-movement taking place within the vacuum chamber toward the receiver and air-pump, in the effort to balance the withdrawal of air from the vacuum chamber by the air-pump. Hence, without exceeding moderate velocity of air within the vacuum chamber in the direction of the receiver and air-pump, it is possible to occasion within the large-capacity main or vacuum chamber a displacement of air in such direction sufficient to induce air-inflow through the inlet or inlets of one or more suction-stripper appliances at an accelerated velocity giving highly effective stripping, and greatly in excess of the capacity for inflow in the case of the inlet or inlets of the suction-stripper appliance of a single carding engine.

The large cross-sectional area of the main or vacuum chamber 7 enables the air occupying such chamber to flow therein toward the receiver 8, on its way to the air-pump 9, with much less frictional resistance than heretofore in the case of the small-capacity piping to which reference has been made in explaining the prior art. There is greater uniformity throughout all portions of the main or vacuum chamber in respect of the degree of partial vacuum than in the case of the said piping. A much lower degree of vacuum within the vacuum chamber than heretofore required in the case of the small-capacity of piping will meet all the usual requirements of practical operation.

The strippings, which in bulk are chiefly fibers, pass through the vacuum chamber and are collected in the receiver, without curl, and hence are much superior in appearance, much more workable, and more valuable, their price in the market being considerably enhanced.

One feature of the invention enables the condition of the strippings to be still further improved in respect of the avoidance of curl; namely, by bulking, as it may be termed, the strippings within the main or vacuum chamber, through feeding into the said chamber the strippings from a plurality of carding engines simultaneously, so that the greater portions thereof shall become as-

sembled together and pass onward in a collective volume, and in a state of accumulated bulk land together in the receiver. This feature consists in the combination with the large volumetric capacity main or vacuum chamber having throughout the same a working degree of vacuum that is substantially uniform with that at the air-exhausting means, of a plurality of suction-stripper appliances by which a corresponding plurality of carding engines are stripped simultaneously, all of said appliances delivering their strippings at the same time into the vacuum chamber so as to become more or less assembled into somewhat collected volume passing onward in bulk, without the same tendency to become compacted into tufts and to form into strings as is the case when the relatively small supply of strippings from a single carding engine is progressively fed in. I am enabled to accomplish this simultaneous stripping of a plurality of carding engines by reason of the volumetric displacement of air within the vacuum chamber toward the receiver being sufficient to induce air-inflow through the inlets of a plurality of suction-appliances at one time with substantial uniformity in the suction at all of such suction-appliances, and having ample efficiency for stripping the said plurality of carding engines. It is customary in the employment of my invention in practice to strip either three or four carding engines simultaneously. Thus, in accordance with my invention, in stripping the series of carding engines in the card room of a mill, they usually are stripped in successive groups of three or four, although for special reasons a single carding engine may be stripped at a given time, or two might be. This is provided for through manipulation of the valves 42, 42, 42, of the suction-stripper appliances of the respective carding engines.

In the case of the main or vacuum chamber 7 of large volumetric capacity the air-movement ordinarily is much larger volumetrically than the capacity for inflow in the case of the inlet or inlets of the suction-stripper appliance of a single carding engine, and larger even than the latter capacity in the case of the suction-stripper appliances of two carding engines. It follows that if the stripping action should be discontinued in the case of one of the stripper-appliances of the three or four designed to be in operation at one time, as by closing the valve 42 of such appliance, the velocity of inflow of air through the inlets of the remaining stripper-appliances of such number, and through the associated hose-pipes, would be considerably increased, unless provision were made to effect compensation. By reason of the increase of velocity just mentioned, and resulting whipping, friction, etc., in passing through the working nozzles and their associated hose-pipes, the strippings as accumulated in the receiver would be in a more or less impaired condition. In order to obviate this, I provide compensating means, controlled by the degree of vacuum, acting automatically to maintain a predetermined working degree of vacuum within the main or vacuum chamber. The compensation may be effected in different ways. In one case I make provision for equalizing the volumetric supply of air to the main or vacuum chamber in a manner which leaves the velocity of inflow through the still active stripper-appliances and their hose-pipes substantially undisturbed when the action of a stripper-appliance previously associated with them in operation is discontinued. For this purpose I provide in connection with the system an equalizing valve. One form of equalizing valve is shown at 10, Figs. 3 and 4. A second form is shown in Fig. 5. In Figs. 3 and 4 the valve is shown applied to an air-vent opening in connection with the pipe 91 extending from the receiver 8 to the air-pump 9, the sealing-member 101 being held normally against a seat at the inner side of the said opening through the conjoint action of an expanding spiral spring 105 and a weighted lever 102, both acting in connection with the spindle 103 of the said sealing-member. Adjustment of a weight 104 along the weight-carrying arm of the said lever will vary the degree of vacuum within the chamber at which the valve will open. The said equalizing valve substantially equalizes the degree of vacuum within the vacuum chamber at all times while the air-pump is in operation, and whether stripping is being effected in the case of one, two, three, or four carding engines. In addition it will obviate collapse or other injury in case all of the stripper-inlets should be closed at any given time. Fig. 5 shows an equalizing valve arrangement in which a movable valve-member 200 is held by means of a weight 201 down upon a valve-seat 202 within a tube 203 opening downwardly from a horizontal portion of the pipe 91 intermediate the receiver and the air-pump.

Fig. 6 shows an arrangement comprising means for controlling automatically the working of the air-pump so as to maintain a predetermined working degree of vacuum within the piping-system. In this arrangement the vertically movable valve-member 300 is connected by means of a rod 301 with the lever 302 of a rheostat controlling electrical driving mechanism for the air-pump. Movement of the valve due to increased rate of inflow of air through the downwardly-opening tube 303 will move lever 302 in one direction, to reduce the speed of the air-pump. A decreased rate of inflow will per-

mit the weight 304 to move the said lever oppositely so as to increase the speed of the air-pump.

As a further feature of invention, I combine with the main, 7, of a vacuum system having suction-stripper appliances cooperating with carding engines substantially as shown, intakes 11 and 12, Fig. 3. The intake 11 has a considerable length of flexible hose 111 connected therewith, for use as a means of cleaning various parts of the machinery, the floor, etc., and taking up the trash, hulls, and other refuse materials contained in the usual receptacles which are provided in the case of carding engines. A valve 112 in connection with such hose or with the intake connection 11 provides for permitting or discontinuing the flow of air through the said hose, etc. Intake 12 extends down to near the floor, its open end being supported at a short distance above the surface of the latter by means of legs 121, so that bulk or volume material such as flat-strippings, may be thrown under the said open end, within the influence of currents of air entering such end. The flow of air inward through the open end of intake 12 and through the latter into the main 7 may be permitted or discontinued, through opening or closing a valve 122 in connection with the said intake. The respective materials entering the main through the respective intakes 11 and 12 may be delivered from the latter through a connection 71, Fig. 3, into receiver 8 at a time when it is empty of other contents, or may be caused to pass on to one or more different receivers or delivery points, not shown, through an extension 72 of the main. The refuse matter, lint, etc., taken up by hose-pipe 111 will be kept from admixture with the cylinder and doffer-strippings, as well as from the flat-strippings which are taken up by the intake 12.

The use of compensating or equalizing means in connection with the vacuum system, besides equalizing the degree of vacuum whether a single carding engine is being stripped, or two, three, or four are being stripped simultaneously, makes possible the use of lighter pipe and receiver materials, thereby greatly reducing manufacturing costs, inasmuch as such means enables extremely high pressure to be avoided, thereby eliminating danger of collapse of the vacuum chamber or receiver.

What is claimed as the invention is:—

1. A suction-stripper system comprising, essentially, a plurality of suction-strippers operating concurrently at a plurality of machines to extract by suction waste, dirt, etc., from among the teeth of card-clothed surfaces of the said plurality of machines simultaneously, air-exhausting means, and a piping-system of dimensions giving volumetric displacement capacity at least equal to the combined displacement capacity of the inlets of said plurality of suction-strippers, and also providing as far as the confluence of the said suction-strippers with the said piping-system a working degree of vacuum substantially uniform with the degree of vacuum at the said air-exhausting means.

2. A suction-stripper system comprising, essentially, a plurality of suction-strippers operating concurrently at a plurality of machines to extract by suction waste, dirt, etc., from among the teeth of the card-clothed surfaces of the said plurality of machines, air-exhausting means, and a piping-system including a filtering receiver and having volumetric displacement capacity at least equal to the combined volumetric displacement capacity of the inlets of said plurality of suction-strippers, and also providing as far as the confluence of the said suction-strippers with the piping-system a working degree of vacuum that is substantially uniform with the degree of vacuum at the said air-exhausting means.

3. A suction-stripper system comprising, essentially, a suction-stripper operating to extract by suction waste, dirt, etc., from among the teeth of card-clothing, a vacuum pump, and a piping-system of dimensions giving volumetric displacement capacity providing as far as the confluence of the said suction-stripper with the said piping-system a working degree of vacuum that is substantially uniform with the degree of vacuum at the pump.

4. A suction-stripper system comprising, essentially, a suction-stripper operating to extract by suction waste, dirt, etc., from among the teeth of card-clothing, a vacuum pump, and a piping-system having volumetric displacement capacity providing as far as the stripping-inlet a working degree of vacuum that is substantially uniform with the degree of vacuum at the pump.

5. A suction-stripper system comprising, essentially, a suction-stripper operating to extract by suction waste, dirt, etc., directly from among the teeth of card-clothing, a vacuum pump, and a piping-system including a filtering receiver and having volumetric displacement capacity providing as far as the confluence of the said suction-stripper with the said piping-system a working degree of vacuum that is substantially uniform with the degree of vacuum at the pump.

6. A suction-stripper system comprising, essentially, a suction-stripper operating to extract by suction waste, dirt, etc., directly from among the teeth of card-clothing, a vacuum pump, and a piping-system including a filtering receiver and having volumetric displacement capacity providing as far as the stripper-inlet a working degree of vacuum

that is substantially uniform with the degree of vacuum at the pump.

7. In a suction-stripper system for card-clothed surfaces, the combination with a plurality of carding engines, of a plurality of suction-strippers operating simultaneously to extract by suction waste, dirt, etc., directly from among the teeth of the said plurality of carding engines, air-exhausting means having at a practical working speed volumetric displacement capacity suitable for production of effective stripping suction at the respective stripping inlets of the said simultaneously-operative plurality of suction-strippers, and a piping-system having volumetric displacement capacities at least equal to the combined volumetric displacement capacity of the inlets of said plurality of suction-strippers, and also providing in connection with the simultaneously-operative stripper-inlets a working degree of vacuum that is substantially uniform with the degree of vacuum at the said air-exhausting means.

8. In a suction-stripper system for card-clothed surfaces, the combination with a plurality of carding engines, of a plurality of suction-strippers operating simultaneously to extract by suction waste, dirt, etc., directly from among the teeth of the said plurality of carding engines, air-exhausting means having at a practical working speed volumetric displacement capacity suitable for production of effective stripping suction at the respective stripping inlets of the said simultaneously-operative plurality of suction-strippers, and a piping-system including a filtering receiver and having volumetric displacement capacities at least equal to the combined displacement capacity of the inlets of said plurality of suction-strippers and also providing in connection with the simultaneously-operative series of suction-stripper-inlets a working degree of vacuum that is substantially uniform with the degree of vacuum at the said air-exhausting means.

9. In a suction-stripper system for card-clothed surfaces, the combination with a plurality of carding engines, of a plurality of suction-strippers operating simultaneously to extract by suction waste, dirt, etc., through their inlets directly from among the teeth of the said plurality of carding engines, air-exhausting means having at a practical working speed volumetric displacement capacity suitable for production of effective stripping suction at the respective stripping inlets of the said simultaneously-operative plurality of suction-strippers, and a piping-system having volumetric displacement capacities at least equal to the combined volumetric displacement capacity of the inlets of said plurality of suction-strippers, and also providing as far as the confluence of the said plurality of suction-strippers with the piping-system a practical working degree of vacuum substantially equal to that adjacent the said air-exhausting means.

10. In a suction-stripper system for card-clothed surfaces, the combination with a plurality of carding engines, of a plurality of suction-strippers operating simultaneously to extract by suction waste, dirt, etc., through their inlets directly from among the teeth of the said plurality of carding engines, air-exhausting means having at a practical working speed volumetric displacement capacity suitable for production of effective stripping suction at the respective stripping inlets of the said simultaneously-operative plurality of suction-strippers, and a piping-system including a filtering receiver and having volumetric displacement capacities at least equal to the combined volumetric displacement capacity of the inlets of said plurality of suction-strippers, and also providing as far as the confluence of the said plurality of suction-strippers with the piping-system a practical working degree of vacuum substantially equal to that adjacent the air-exhausting means.

11. A suction-stripper system comprising, essentially, air-exhausting means, a plurality of suction-strippers adapted to operate simultaneously to extract by suction waste, dirt, etc., through their inlets directly from among the teeth of a plurality of card-clothed surfaces, and a piping-system with which the said suction-strippers respectively are combined through individual flexible connections, said piping-system having volumetric displacement capacity at least equal to the combined volumetric displacement capacity of the inlets of said plurality of suction-strippers, and also providing as far as the confluence of the said suction-strippers with the piping-system a working degree of vacuum that is substantially uniform with the degree of vacuum at the air-exhausting means and that is sufficient to effect the said extraction by means of the said plurality of suction-strippers when operating simultaneously.

12. In a suction-stripper equipment for card-clothed surfaces, the combination with a plurality of carding engines, of a plurality of suction-strippers operating simultaneously to extract by suction waste, dirt, etc., through their inlets directly from among the teeth of a plurality of card-clothed surfaces, a piping-system having air-exhausting means by which air is exhausted from the piping, the said air-exhausting means having at a practical working speed volumetric displacement capacity sufficient to substantially obviate the production of curl and for production of effective stripping suction at the respective stripping inlets, collectively, of the said simultaneously operative plurality of suction-strippers, and com-

pensating means controlled by the degree of vacuum, acting automatically to maintain a predetermined working degree of vacuum within the piping-system regardless of the number of suction-strippers in action at any one time.

13. In a suction-stripper equipment for card-clothed surfaces, the combination with a plurality of carding engines, of a piping-system having air-exhausting means by which air is exhausted from the piping, a plurality of suction-strippers in connection with the said piping-system, operating simultaneously to extract by suction waste, dirt, etc., directly from among the teeth of a plurality of card-clothed surfaces, the said air-exhausting means having at a practical working speed volumetric displacement capacity sufficient to substantially obviate the production of curl and for production of effective stripping suction at the respective stripping inlets, collectively, of the said simultaneously operative plurality of suction strippers, and a relief-valve controlled by the degree of vacuum and acting automatically to maintain a predetermined working degree of vacuum within the piping-system regardless of the number of suction-strippers in action at any one time.

14. The combination with a plurality of carding engines, a vacuum main, air-exhausting means by which flow of air through such vacuum main is produced and a working degree of vacuum is maintained therein, a plurality of suction-strippers providing for extraction of waste, dirt, etc., by suction from among the teeth of card-clothed surfaces of the respective carding engines, an intake connected with said vacuum main, adapted to induct volume-material requiring to be transported, and an intake having connected therewith a flexible suction-cleaning pipe, and valves by means of which flow of air through the individual intakes into the vacuum main may be established and disestablished at will.

15. A suction-stripper equipment comprising essentially, a piping-system of dimensions giving volumetric displacement capacity at least equal to the combined volumetric displacement capacity of a plurality of suction-strippers, and sufficiently large to obviate substantially the production of curl in the strippings, means for exhausting air from the said piping-system having under practical working conditions volumetric displacement capacity suitable for inducing effective stripping suction at the stripping inlets of the plurality of strippers collectively, and the said plurality of suction-strippers, functioning simultaneously in connection with a plurality of machines and operating to bulk within the said piping-system the strippings from the said plurality of machines so as to improve the condition of the fibrous material as delivered from the piping-system.

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