Jan. 1, 1946. S. GARASSINO 2,391,892

SHEET MATERIAL FEEDER CONTROL MECHANISM

Filed Feb. 15, 1943 4 Sheets-Sheet 1

Fig. 2.

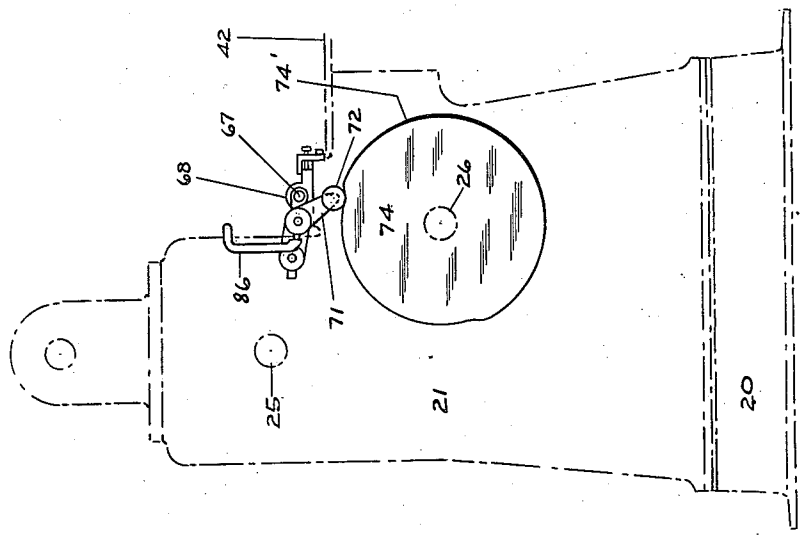
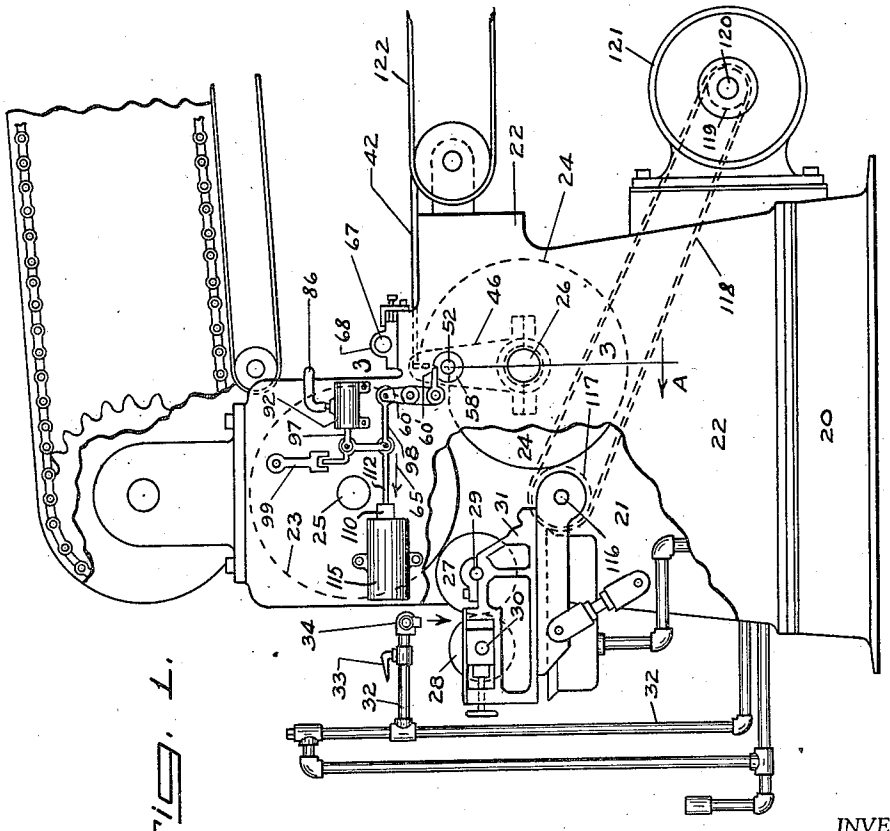


Fig. 1.



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SHEET MATERIAL FEEDER CONTROL MECHANISM

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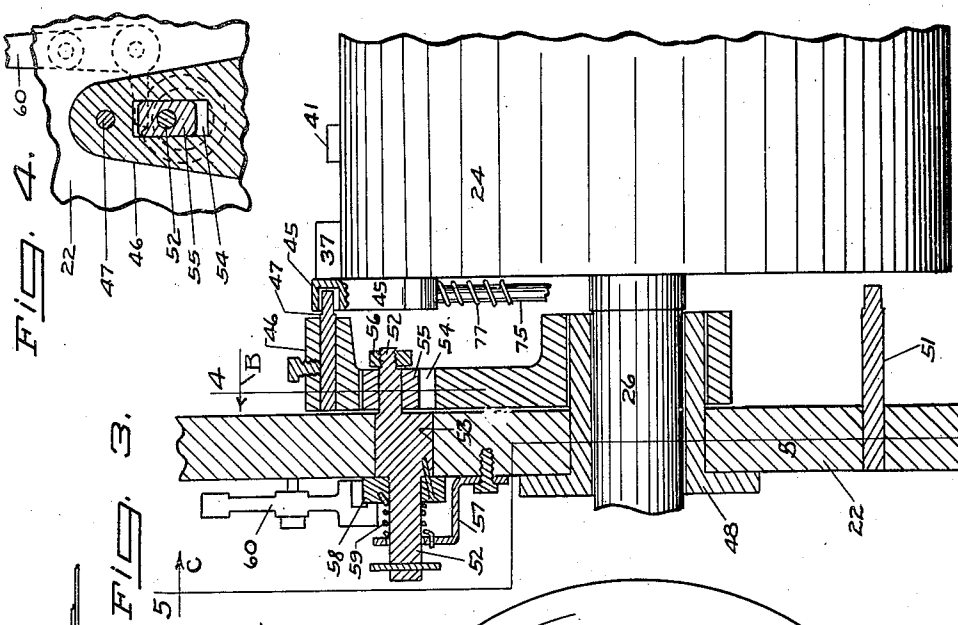


Fig. 4.

Fig. 3.

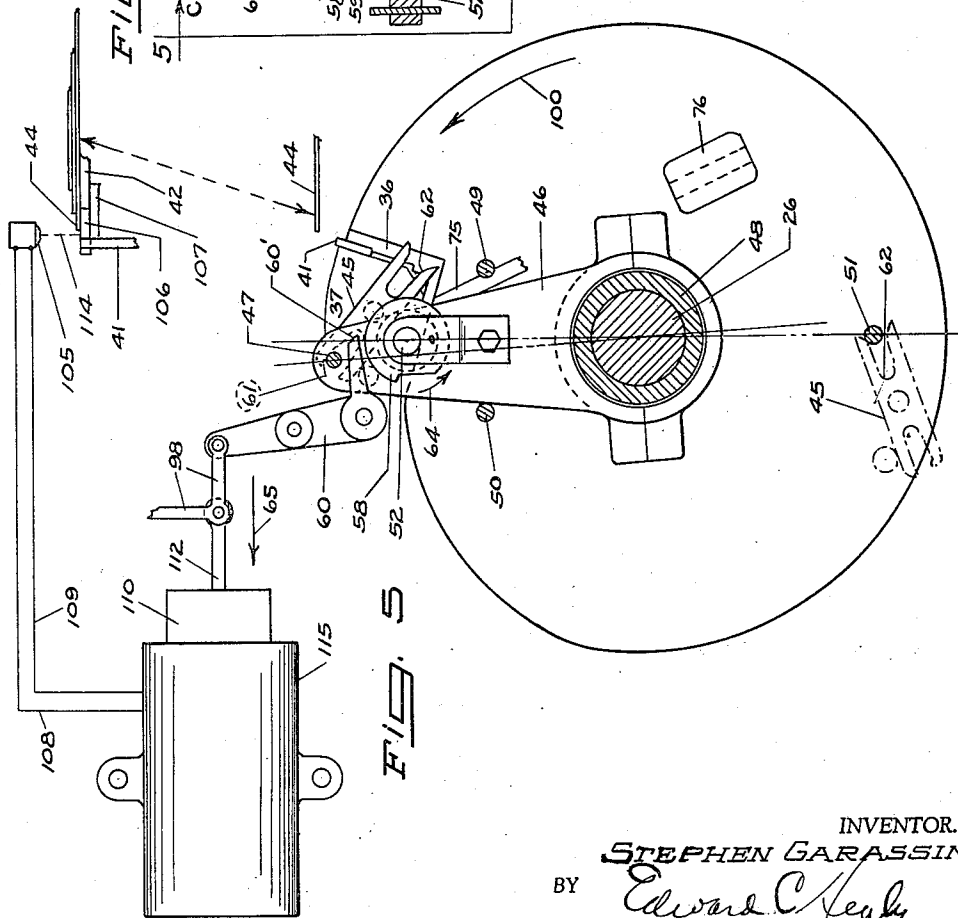


Fig. 5

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SHEET MATERIAL FEEDER CONTROL MECHANISM

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Fig. 7.

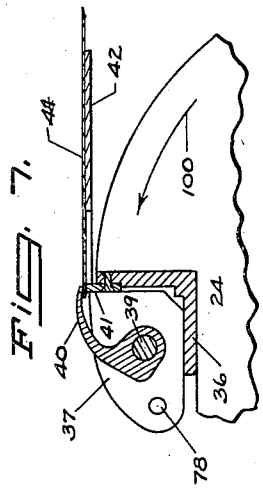


Fig. 8.

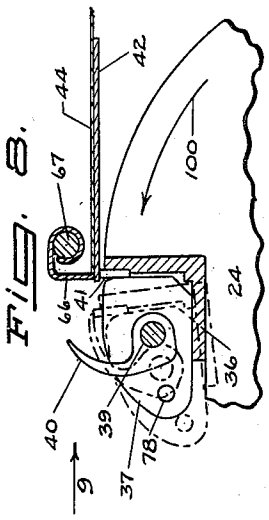


Fig. 9.

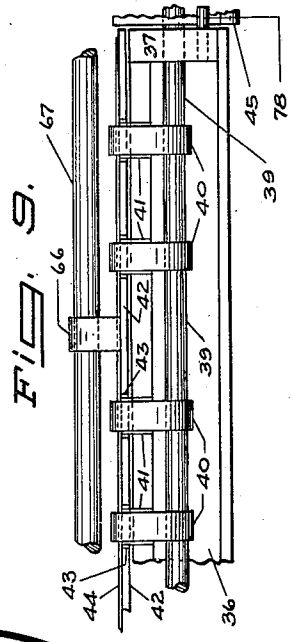


Fig. 6.

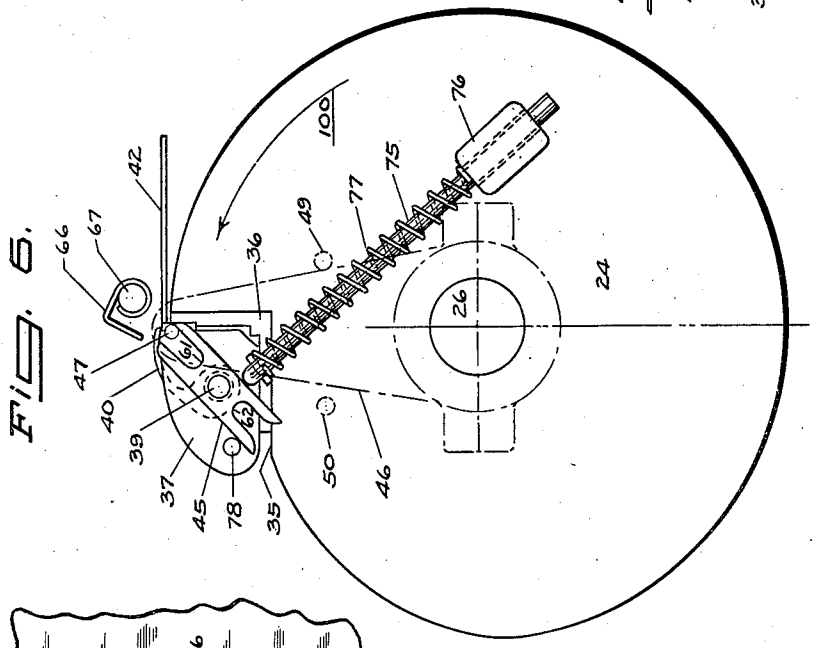
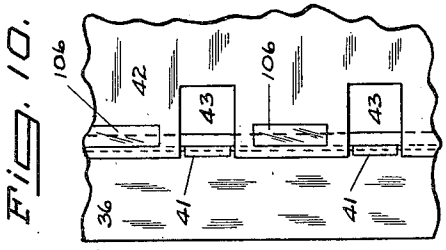


Fig. 10.



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SHEET MATERIAL FEEDER CONTROL MECHANISM

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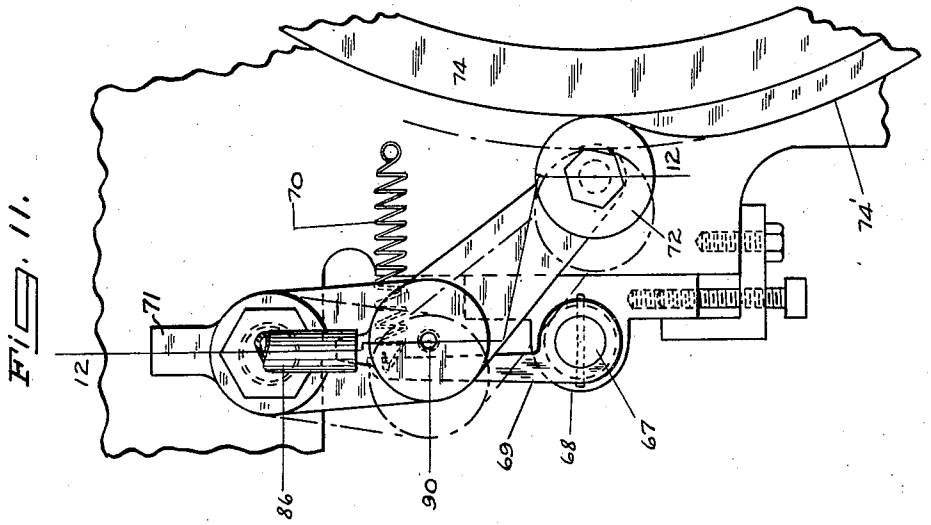


FIG. 11.

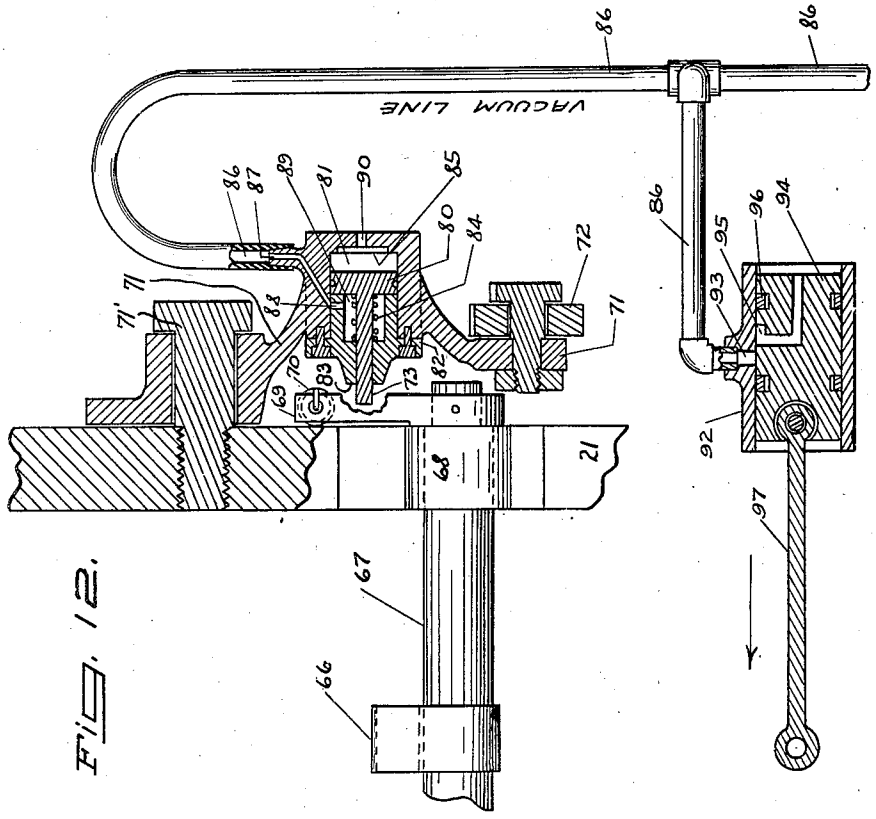


FIG. 12.

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Patented Jan. 1, 1946 2,391,892

UNITED STATES PATENT OFFICE

2,391,892

SHEET MATERIAL FEEDER CONTROL MECHANISM

Stephen Garassino, San Francisco, Calif.

Application February 15, 1943, Serial No. 475,875

3 Claims. (Cl. 271—60)

This invention relates to a new and useful improvement in sheet material feeder control mechanisms, and especially relates to an especially constructed device for use in connection with lithograph varnishing machines and the like for the purpose of controlling the paper sheets being conveyed to the machines.

A general object of the present invention is to improve the mechanisms for feeding the paper sheets to machines of the character described whereby the sheets will be individually controlled and prevented from entering the machine in the event they become torn or get out of alignment during their course of travel to the machine.

Another object of the present invention is to provide an automatically controlled and a vacuum operative device that will instantly stop both the travelling movement of the sheets and the operation of the machine into which they are being fed whenever the sheets get out of alignment and to prevent thereby a large number of the sheets from getting damaged.

Another object of the invention is to provide a revolving cylinder for receiving the sheets being fed to the machine and to provide the cylinder with a plurality of uniformly timed oscillating grippers that are capable of gripping the sheets to move the same into the machine and to provide further means for automatically delaying the timing of the grippers when the travelling sheets get out of alignment, whereby the grippers will be caused to miss the sheet and thus are prevented from bringing the same into the machine.

A further object of the invention is to provide an automatically timed controlled means for stopping the travelling movement of the sheets when they get out of alignment and to associate said stopping means with the timing of the grippers whereby the sheets are automatically stopped and the closing of the grippers automatically delayed simultaneously.

A further object of the invention is to provide an especially constructed vacuum control device for controlling the sheet stopping means and to connect the vacuum control device to the mechanism that controls the timing of the grippers.

A still further object of the invention is to associate the control mechanisms hereinbefore mentioned to a means that is capable of indicating when a sheet or a plurality of sheets being fed to the machine get out of alignment; the said means can be an electric eye device or any other suitable device capable of serving the purpose intended, whereby the proper controlling of the sheets being fed to the machine will be obtained in the most efficient manner.

Other objects and features of advantage will be apparent during the course of the following description.

In the accompanying drawings forming part of the specification, wherein for the purpose of illustration like numerals designate like parts throughout the various views:

Fig. 1 is a side elevational view of a paper varnishing machine, looking at the left side thereof and showing a portion of the feeder control, for the purpose of clarity a part of the left side frame being broken away;

Fig. 2 is a side elevational view, looking the same direction toward the right side frame of the machine, the said side frame being indicated in dot and dash outline, and the machine's assembly between the frames being removed to illustrate clearly the sheet guide control cam and guide raising lever mounted on the outside of the frame.

Fig. 3 is a vertical sectional fragmentary view taken through line 3—3 (Fig. 1) at the left side of the machine, looking in direction of the arrow A, for the purpose of clarity the transfer cylinder being shown in elevation;

Fig. 4 is a vertical fragmentary sectional view taken on line 4 of Fig. 3 looking in direction of the arrow B;

Fig. 5 is vertical sectional view taken on lines 5—5 of Figure 3, looking direction of the arrow C, the frame being removed in order to illustrate clearly the gripper timing control arm and the elements allocated therewith, including the revolving transfer cylinder, the same arm being shown in its adjusted position;

Fig. 6 is an end elevational view looking at the transfer cylinder in the same direction as shown in Fig. 5 and illustrates the relative positions of the cylinder and gripper tumbler at the closing of the gripper and also shows the normal position of the gripper timing control arm and the gripper closing pin thereon;

Fig. 7 is a fragmentary and sectional view of the portion of the cylinder carrying the grippers, the said cylinder being shown in its receiving position with respect to the feeder plate and the gripper being shown in its closed position on a sheet of paper to be transferred into the machine;

Fig. 8 is a view similar to Fig. 7, except that it shows the gripper in its delayed and partially open position, whereby the sheet is prevented from being engaged by the gripper when it is not

in the proper alignment, also showing in dotted outline how the gripper closes when it is moved by the cylinder beyond the end of the feeder plate;

Fig. 9 is a longitudinal elevational fragmentary view of the gripper shaft and the sheet stop member shaft assemblies, looking in the direction of the arrow 9 in Fig. 8;

Fig. 10 is a top plan fragmentary view of the feeder plate and the angle member that carries the gripper shaft;

Fig. 11 is an enlarged side elevational view of the sheet stop vacuum control lever and cam assembly;

Fig. 12 is a sectional view of the vacuum control-lever assembly taken on line 12—12 of Fig. 11 mainly in a horizontal plane and a longitudinal sectional view of the vacuum valve that is associated therewith on the right side of the machine; also further showing in elevation a portion of the vacuum line proceeding from the left side of the machine and a portion of the sheet stop shaft and associated parts.

Referring in detail to the drawings in Fig. 1, there is illustrated a lithograph varnishing machine including a hollow base member 20 supporting right and left side frames 21 and 22 respectively. The numeral 23 designates a cylinder hereinafter termed the impression cylinder and the numeral 24 the receiving or transfer cylinder, said cylinders being supported onto revolvable shafts 25 and 26 respectively. The cylinder 23 is in contiguous relationship with a roller 27 that is in contiguous relationship with an idler roller 28, the said rollers being fixed onto shafts 29 and 30 respectively, that are rotatably supported on a carriage 31. The varnish is conveyed to the rollers by being pumped through the pipe line 32, said pipe having a valve 33 therein and an outlet as at 34. The varnish is thus supplied to the rollers, and is applied to the sheet material while it is being conveyed through the machine on the impression cylinder 23. Suitable return lines are provided for returning the unused varnish. The specific construction of the various parts of the varnishing machine proper will not be described in detail, as the machine illustrated in the present application is the same type as the varnishing and liquid coating machine illustrated and described in my patent application Serial Number 475,876, filed February 15, 1943.

The feature embodied in the present invention pertains to the feeder control mechanism to be employed with any type of sheet material varnishing machine or other machine to which it can be adapted. It is to be particularly noted that the controlling mechanisms in the present invention are directly associated with the transfer cylinder 24 and the shaft 26 thereof. The said cylinder 24 is formed with a recessed portion 35, as shown in Fig. 6, into which there is provided an elongated angle member 36 that extends across the full length of the cylinder and has fixed end members 37 as shown in Fig. 9 capable of supporting the gripper shaft 39, the end portions of the shaft being rotatably supported in suitable holes provided in said end members. A pluraity of grippers 40, preferably formed as illustrated in Fig. 7, are provided and fixed onto the said shaft 39, and are positioned thereon so as to close properly on the sheet 44, as shown in Fig. 7, when the shaft is turned to the closing position. Suitable spaced rectangular gripper pads 41 are fixed to the angle member 36 for receiving the closing end portions of the grippers. The numeral 42 designates the feeder plate over which the sheets are conveyed to the machine. The top surface of the plate is flush with the upper ends of the members 41 and the end of the plate is notched as indicated at 43 in Figs. 9 and 10, whereby the outer end portions of the feeder plate extend in between the members 41 forming an even surface therewith for the sheets to pass onto the upper ends of said members 41 and be held by the grippers.

Means for operating the grippers consists in providing an especially shaped recessed tumbler 45 as shown in Figures 5 and 6, and fixing the same onto an outer end portion of the gripper shaft 39, as shown in Figures 5 and 9, and in further providing an automatically adjustable arm 46, having a pin 47 that is adapted to engage the said tumbler and cause the same to turn the gripper shaft and close the grippers onto the sheet 44 as shown in Figures 5, 6 and 7, during the revolvable movement of the cylinder. The said arm 46 is rotatably mounted on the bearing 48 of the transfer cylinder shaft 26 and when in its normal position rests against the pin 49, as shown in Figures 1 and 6, and when in its adjusted position rests against the pin 50, as shown in Fig. 5, the said pins being fixed into the left side frame 22. A pin 51 is also fixed into the side frame to return the tumbler to its normal position during the revolvable movement of the cylinder. It will thus be seen that when the cylinder is revolved in the direction of the arrow 100, the recessed portion 61 of the tumbler will engage the stationary pin 47 as shown in Fig. 5, turning the tumbler as shown in Fig. 6, thus closing the grippers, and a continued revolving of the cylinder will cause the recessed portion 62 of the tumbler to engage the pin 51 for returning the tumbler to its normal position. A rod 75 slidably mounted in a bearing member 76, that is fixed to the end face of the transfer cylinder is provided and resiliently urged against the tumbler by a coil spring 77, as shown in Fig. 6, whereby the movement of the tumbler is controlled, a stop pin 78 being fixed in the end member 37 for limiting the movements of the tumbler.

An eccentric stud 52 is provided for controlling the positioning of the arm 46. The inner portion of the said stud rotatably extends through a hole 53 provided in the side frame 22 and projects through the slot 54 of the arm and carries a slide block 55 this is held thereon by the nut 56 as shown in Fig. 3. The outer portion of the eccentric stud ends through a bracket 57 that is fixed to the frame 22, and a latch cam 58 is mounted on the eccentric stud and is resiliently held thereto by the coil spring 59 as shown in Fig. 3. A latch arm 60 is pivotally supported on the side frame 22, and is formed with a latch 60', which engages the latch cam 58 and functions to retain the eccentric in its normal position. The coil spring is adapted to turn the cam in the direction of the arrow 64 to adjust automatically the arm 46 for delaying the closing time of the grippers when the latch arm 60 is pulled in the direction of the arrow 65 and releases the cam. The provision for automatically pulling the said latch arm will be described later in the specification.

Means for automatically stopping the sheets on the feeder plate includes a plurality of angular shaped stop memebrs 66 fixed onto a shaft 67 that is positioned above, and in parallelism with the gripper shaft 39 as shown in Figs. 6, 8 and 9,

and is rotatably supported in suitable bearings 68, provided on the side frames 21 and 22. The numeral 69, shown in Fig. 11, designates a trip lever fixed to an outer end portion of the shaft 67, a coil spring 70 pulling the lever downwardly, whereby the bottom ends of the stop members are resiliently held on the feeder plate. A control lever 71 preferably shaped as shown in Figure 11, having a roller 72 and a plunger trip pin 73, is pivotably secured as at 71' to the side frames 21 and is adapted to be operated by a cam wheel 74 that is fixed to the transfer cylinder shaft 26, said cam wheel being positioned on said shaft beyond the side frame 21. The radius of the outer larger portion of the cam's periphery 74, shown in Figures 2 and 11, is the same as the cylinder, and the circular length thereof is substantially equal to the length of sheet to be conveyed through the machine and the said cam wheel is so positioned with respect to the cylinder as will cause the control lever 71 to be raised in timed relation with the closing of the grippers, whereby the trip lever 69 is lifted by the pin 73 and the stop members 66 are raised above the feeder plate 42 for individually releasing each sheet for enabling the same to pass to the cylinder and be engaged by the grippers. The movement of each sheet across the feeder plate is thus positively controlled for causing the front edge portion of each sheet to be positioned on the receiving members 41 of the cylinder at the exact time required to be engaged by the grippers.

As hereinbefore stated one of the objects of the present invention is to provide an improved mechanism for preventing the sheets from entering the machine in the event they become torn or get out of alignment during their course of travel to the machine. The fundamental principle embodied in the mechanism is to stop automatically the movement of the sheet on the feeder plate and to simultaneously delay the closing of the grippers until after the members 41 are carried past the end of the feeder plate by the revolvable movement of the cylinder, whereby the grippers are caused to miss the sheet.

It will be obvious that the bottom ends of the stop members 66 are held against the top face of the feeder plate 42 by the coil spring 70 pulling on the trip lever 69 as shown in Fig. 11, and will prevent the sheets from passing until the control lever pin 73 lifts the said trip lever 69, and that the said pin 73 must be retained in its outer position as shown in Fig. 12 in order to operate the lever 69, and raise the stop members 66. When the pin 73 is in its inner position, it will miss the trip lever 69, thus causing the stop members 66 to remain in their closed position. Means must therefore be provided for controlling the positioning of the pin 73, and a preferred type of such means is illustrated in Fig. 12, and comprises a vacuum control mechanism associated with the control lever 71. A plunger 80 is formed on the inner end of the pin 73, and a cylinder 81 is formed in the said control lever 71 for accommodating the said plunger. A cover 82 closes the inner end of the cylinder and a hole 83 in the cover provides a guide for the pin 73. A coil spring 84 urges the plunger against the inner face 85 of the cylinder. A vacuum line 86 communicating with ports 87 and 88 provides the necessary vacuum in the chamber 89 of the cover for compressing the coil spring 84 and drawing the vacuum plunger against the inner end of the cover 82, and thus retaining the pin 73 in its outer position to operate the trip lever 69 as shown in Fig. 12. A hole 90 leads into the cylinder 81 for enabling air to enter the cylinder and be applied against the end of the vacuum plunger. The vacuum line 86 leads to a suitable vacuum pump, not shown, and also to a control valve housing 92, and communicates with the valve port 93 provided therein; said housing 92 is preferably an elongated hollow cylindrical member for receiving a suitable piston 94 that is provided with a port 95, which is adapted to have communication with the housing valve port 94; conventional piston rings 96 are provided on the piston for assuring the proper vacuum seal, whereby a suitable vacuum can be maintained in the line. The housing 92 is secured to the side frame 22, as shown in Fig. 1, and the piston 94 is provided with an arm 97 that is connected to a connecting rod 98, which is pivotally secured to the latch arm 60 that functions to control the closing timing of the grippers 40. The numeral 99 designates an electric switch lever for automatically stopping the machine when the arm 98 is pulled in the direction of the arrow 65.

The numeral 105, illustrated to advantage in Fig. 5, designates conventional electric eyes which can be arranged in series and positioned over the end portion of the feeder plate in proximity to the location of the gripper pads 41, a plurality of slots being formed in said feeder plate, as shown in Fig. 10, for accommodating a plurality of mirrors 106, which can be cemented to the feeder plate or held supported by plates 107. The numerals 108 and 109 designate electric conductors that lead to a suitable relay and other conventional electric mechanism for energizing the solonoid 110 to pull the arm 112 in the direction of the arrow 65 when any portion of any one of the mirrors 106 becomes uncovered, by a sheet being out of line, and is exposed to its particular electric eye whereby a light beam 114 is made, closing the electric circuit for actuating the mechanism. The said circuit and relay and other details of the electric eye mechanism are not shown as they embody conventional construction well known in the art. A suitable housing 115 is fixed to the side frame 22 for supporting the solenoid and other mechanism.

In printing presses and varnishing machines of the present type, the sheets overlap and are conveyed to the machine in series with the lowest sheet extending slightly ahead of the next sheet above it as shown in Fig. 5. The mirrors are thus always covered unless one of the sheets gets out of line, which will expose a portion of one of the mirrors, causing the light beam 114 to be made.

The numeral 116 designates the drive shaft of the machine and is provided with a pulley 117 and a belt band 118 that has connection with a pulley 119 which is fixed to the shaft 120 of the driving motor 121. Suitable gears can be fixed on the shafts 116, 26 and 25 for enabling the machine to be operated properly. The numeral 122 is a conventional belt for conveying the sheets to the machine.

Having thus described my invention, I claim:

1. A sheet material feeder control mechanism for lithograph varnishing machines and the like, including means for conveying the sheets to the machine, a revolving member having a plurality of time controlled grippers adapted to close on revolving said member for bringing the sheets in the machine, a cam associated with said revolving member, a sheet stopping means adapted to be oscillitated by the movement of said cam,

whereby the sheets are controlled and enabled to pass to the grippers a vacuum operated mechanism for engaging the sheet stopping means with the cam, and means for automatically opening the vacuum for disengaging said mechanism in the event a sheet is out of alignment with the machine, whereby the sheet is prevented from passing to the grippers.

2. A sheet material feeder control mechanism for lithograph varnishing machines and the like, including means for conveying the sheets to the machine, a revolving cylindrical member carrying an oscillative shaft upon which a plurality of grippers are positioned and adapted to close on the cylindrical member for bringing the sheets in the machine, a tumbler fixed on an end portion of said shaft, an adjustable timing control arm having a pin adapted to oscillate said tumbler during the revolvable movement of said cylindrical member, whereby the grippers are automatically opened and closed with respect to the cylindrical member, a mechanism capable of stopping the sheets being conveyed to the machine, a cam revolving in synchronism with said cylindrical member for engaging said mechanism whereby the sheets are enabled to pass to the cylindrical member and grippers thereon, and means for automatically disengaging said mechanism and adjusting said timing control arm simultaneously, whereby the sheet nearest the grippers is stopped and the closing of the grippers delayed for missing the sheet in the event the sheet is not in the correct alignment to be received by the machine.

3. A sheet material feeder control mechanism for lithograph varnishing machines and the like, including means for conveying sheets to the machine, a revolvable cylindrical member carrying an oscillative shaft upon which a plurality of grippers are positioned and are adapted to close on the cylindrical member for bringing the sheets in the machine, a tumbler fixed on the end portion of said shaft, an adjustable timing control arm having a pin adapted to oscillate said tumbler during the revolvable movement of said cylindrical member whereby the grippers are automatically opened and closed with respect to the cylindrical member, a stationary feeder plate positioned in proximity to and in parallelism with the cylindrical member and adapted to receive sheets from the conveying means and guide them to the cylindrical member, an oscillative shaft positioned above the feeder plate and having sheet stop members fixed thereon and adapted to rest on the top face of the feeder plate, a resiliently held lever fixed to said shaft for resiliently urging the stop members against the feeder plate, a second lever having a vacuum controlled pin therein for engaging the first mentioned lever, a cam adapted to revolve in synchronism with said cylindrical member carrying the gripper shaft to operate said levers and stop members whereby the sheets are enabled to pass to the grippers, and means, including an electric eye, for automatically disengaging said levers and adjusting said timing control arm simultaneously, whereby the sheet nearest the grippers is stopped and the closing of the grippers is delayed for missing the sheet in the event the sheet is not in the correct alignment to be admitted into the machine.

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