Jan. 23, 1934. C. E. HIGBEE 1,944,176

SLIP SHEETING ATTACHMENT FOR MIMEOGRAPH OR SIMILAR APPARATUS

Filed March 23, 1931 3 Sheets-Sheet 1

FIG. 1.

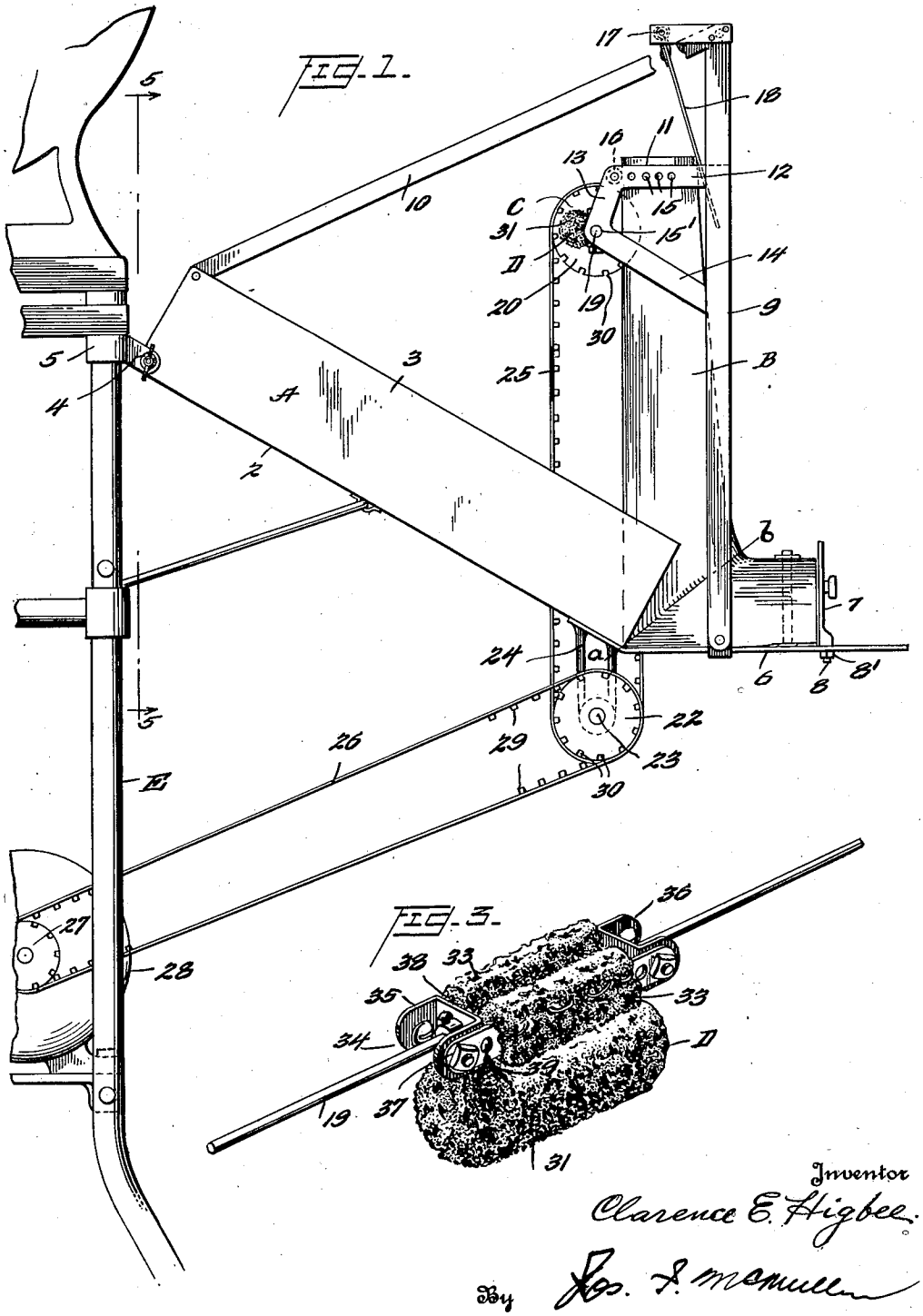


FIG. 3.

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SLIP SHEETING ATTACHMENT FOR MIMEOGRAPH OR SIMILAR APPARATUS

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FIG. 2.

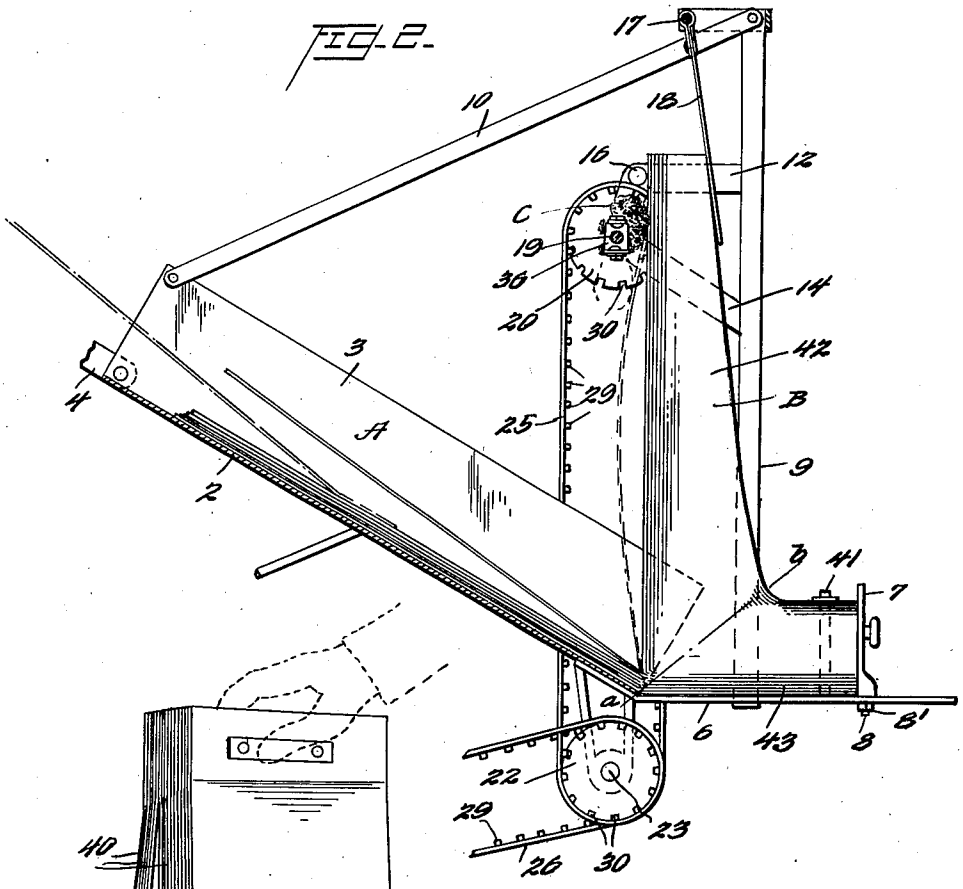
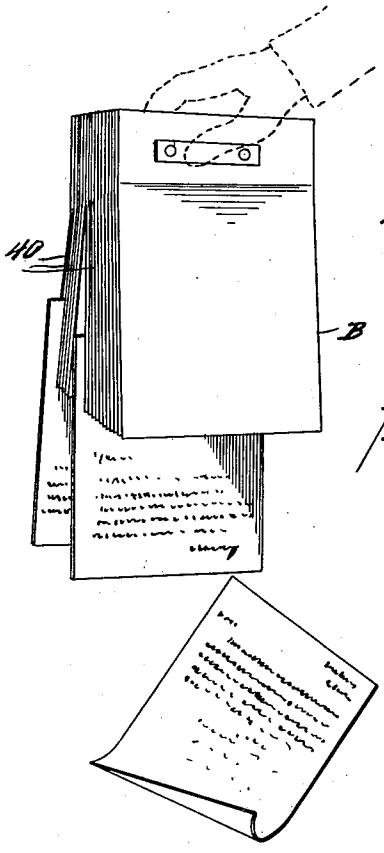


FIG. 4.



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SLIP SHEETING ATTACHMENT FOR MIMEOGRAPH OR SIMILAR APPARATUS

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FIG. 5.

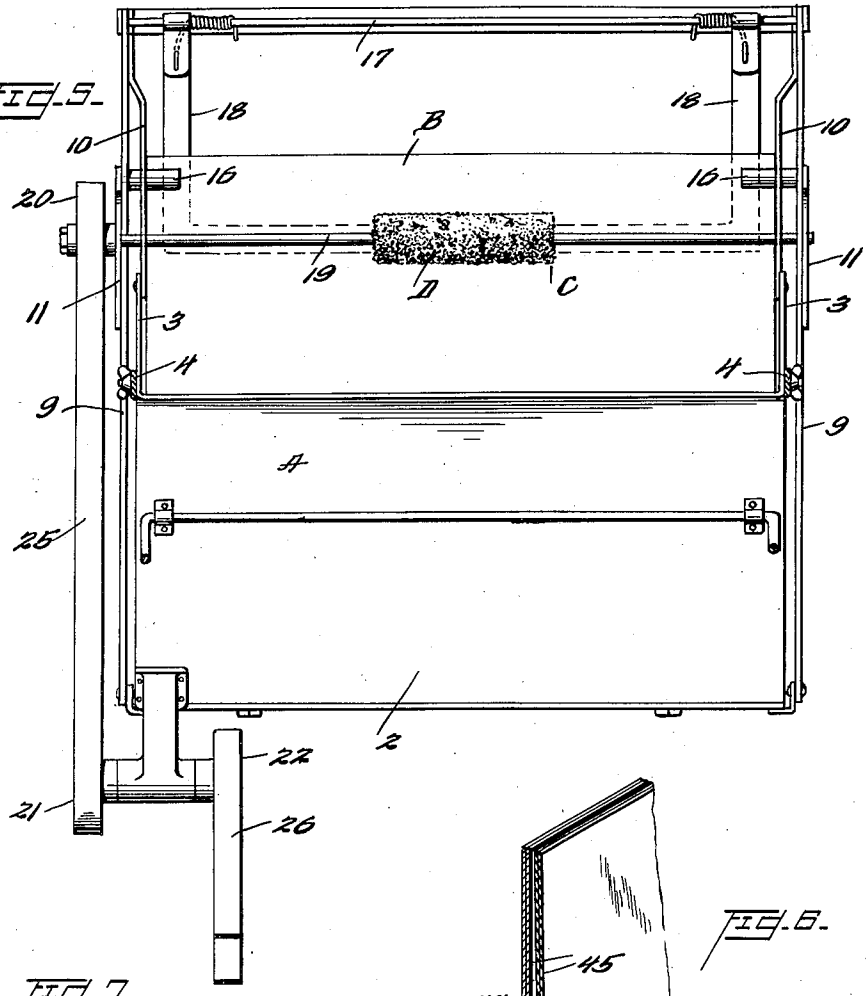


FIG. 6.

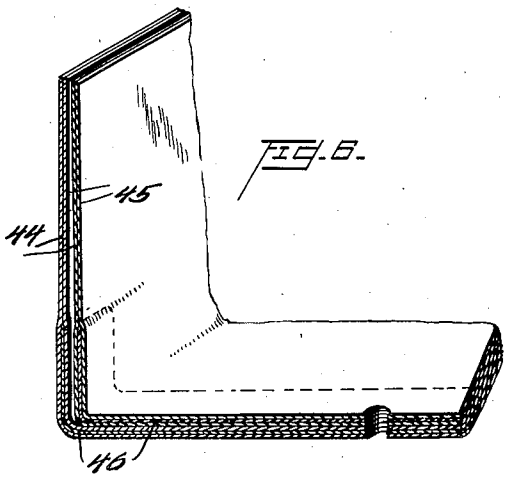
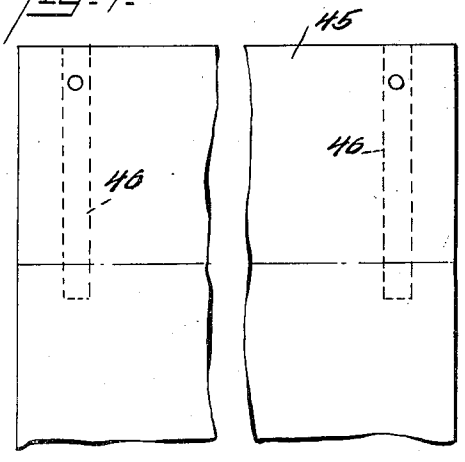


FIG. 7.



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UNITED STATES PATENT OFFICE

1,944,176

SLIP-SHEETING ATTACHMENT FOR MIMEOGRAPH OR SIMILAR APPARATUS

Clarence E. Higbee, Brooklyn, N. Y.

Application March 23, 1931. Serial No. 524,647

12 Claims. (Cl. 34—1)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

This invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention generically relates to mimeograph and similar printing apparatus, more particularly it is directed to a slip sheeting attachment having facilities for drying and protecting the impression surface of each sheet of printed matter as it leaves the press.

One object of this invention is to provide a slip sheeting attachment by means of which each sheet of printed matter upon leaving the mimeograph or like machine is caused to be inserted between the leaves of a sheaf of absorbent or non-absorbent material for the purpose of separating and at the same time quickly drying the impression surfaces.

Another object of this invention is to afford a slip sheeting device having means for assembling the completed run of printed matter between the leaves of a single sheaf of absorbent or non-absorbent material whereby the sheaf, interleaved with the printed matter, may be withdrawn from the slip sheeting device, shaken to remove its contents and the latter collected in a dried and unblurred condition.

Another object of this invention is to produce a slip sheeting arrangement including a feeding mechanism operable in synchronism with the driving means of the printing apparatus and cooperating with the leaves of the sheaf to cause one leaf of the latter to precede each sheet of printed matter to the bottom of the receiver, regardless of the speed at which the run is being made.

Another object of this invention resides in the provision of a slip sheeting attachment including a sheaf composed of a plurality of superimposed sheets of absorbent or non-absorbent material, the leaves of the sheaf being adapted to be successively disposed in a position to cover each sheet of printed matter as the latter is delivered to the receiver of the printing apparatus, whereby when the final impression has been made the entire run will be dry and in a condition to permit another impression to be immediately taken on the opposite surface of each printed sheet, thus eliminating the drying interval ordinarily required.

Another object of this invention is to provide a slip sheeting assembly having in a single sheaf a sufficient number of leaves of absorbent or non-absorbent material to slip sheet the average run of printed matter thereby dispensing with the need of an attendant to replenish the device as the slip sheets become exhausted.

Other objects of this invention are to materially increase the output of printed matter during a given time interval; to provide an attachment which when not required may be folded to an inoperative position underlying the receiver of the printing apparatus and finally to produce a slip sheeting arrangement using a sheaf of absorbent or non-absorbent material in which the leaves of the sheaf are arranged to permit the interleaved printed matter to be readily and conveniently removed at the termination of the run.

With these and other objects in view this invention consists in certain novel details of construction, combination and arrangement of parts to be more particularly hereinafter set forth and claimed.

Briefly stated, this invention comprises a receiver adapted to be attached at a suitable angle to the output end of a mimeograph or similar printing apparatus, a sheaf composed of a plurality of superimposed leaves of absorbent or non-absorbent material conforming in dimensions to substantially those of the receiver, said leaves being bound at one end and hinged adjacent their binding, means for mounting the sheaf with its leaves perpendicularly disposed with respect to the bound portion, a feeding mechanism coacting with the leaves of the sheaf adjacent their free transverse edges to effect successive discharge thereof toward the bottom of the receiver in advance of the oncoming sheet of printed matter, whereupon at the end of the run the sheaf will be completely interleaved with the printed matter and means for operating the feeding mechanism in synchronism with driving means of the printing apparatus.

Referring more particularly to the accompanying drawings in which corresponding parts are indicated by similar reference characters:

Fig. 1 is a fragmentary side elevation illustrating the entire slip sheeting assembly operatively associated with the output end of a conventional type mimeograph machine;

Fig. 2 is a fragmentary sectioned view partly in elevation of the slip sheeting attachment illustrating in section and in dotted outline the position of two of the leaves of the sheaf as they would appear in the course of their slip sheeting action;

Fig. 3 is a perspective view of the yieldable cam and its mounting constituting that part of the feeding mechanism adapted to coact with the leaves of the sheaf.

Fig. 4 is a perspective view of the bound assembly of absorbent or non-absorbent leaves constituting the sheaf and illustrating said sheaf grasped at its bound end, its printed contents being removed;

Fig. 5 is a fragmentary section partly in elevation taken on the line 5—5 of Fig. 1;

Fig. 6 is a fragmentary sectionized perspective of a portion of the sheaf in open position illustrating the location of the resilient members between the stock of which each leaf of the sheaf is formed, and

Fig. 7 is a fragmentary top plan view of a portion of the sheaf illustrating the location of the resilient members in dotted outline.

Among the various constructions designed for slip sheeting purposes there is one which has met with more or less commercial success because of its adoption by one of the outstanding mimeograph manufacturing concerns. It essentially consists of a receiver for the printed matter as it leaves the mimeograph, a slip sheet holder affixed to the receiver to vertically support a given number of slip sheets, said sheets being in the nature of card-board-like elements and a feeding mechanism cooperating with the slip sheets and adapted to actuate the latter to slip sheeting position with respect to the printed matter as it leaves the mimeograph machine.

This form of construction although satisfactory to some extent, has certain defects which are highly objectionable, namely—

(*a*) When the nature of the work to be mimeographed involves the taking of an impression on both sides of the sheet, a drying interval of from one to three hours is necessary before the second impression can be made;

(*b*) The normal operating speed and consequently the output of the mimeographing machine must be reduced to a considerable extent otherwise the slip sheets will not be disposed in their operative position relative to the impression surface of the printed matter;

(*c*) The number of slip sheeting cards constituting what may be termed a "single charge" are limited to a definite number per charge;

(*d*) An attendant is necessary for the purpose of replenishing each charge of slip sheets with another throughout the period of the run.

As each and every one of the preceding defects serve to increase the time required to take the necessary impressions on a predetermined number of sheets thereby adding to the cost, it is therefore the aim and purpose of this invention to eliminate these highly objectionable features and provide a slip sheeting arrangement which will dry the impression surface of each sheet of printed matter as the latter is disposed in the receiver, permit the mimeograph machine to be operated at maximum capacity, avoid the necessity of an attendant by providing an adequate number of slip sheets for the average run and to obviate the time required in disassociating slip sheets and printed matter preliminary to further use by collecting the entire run in a single sheaf of absorbent or non-absorbent material from which the printed matter may be quickly removed by merely grasping the sheaf at its bound end and imparting an agitating movement to it.

In order to facilitate the description of this invention, it will be hereinafter considered in the order of its components, namely, receiver or depository for the printed matter; mounting for feeding mechanism and sheaf; feeding mechanism; sheaf; operation and conclusion.

Receiver

To collect the printed matter as it leaves the output end of the mimeograph or similar machine, there is provided a receiver or depository A which is connected to the mimeograph machine at a suitable angle to cause the sheets of printed matter entering the receiver to descend to its lowermost end. Receiver A in its present form comprises a bottom (2) and parallel side pieces (3) and is attached to the legs or other convenient part of the mimeographing machine by means of clamps (4) and brackets (5), as clearly shown in Fig. 1 of the drawings.

Mounting for feeding mechanism and sheaf

To properly position the sheaf B of absorbent or nonabsorbent material at the lowermost end of receiver A with its leaves in operative position relative to the feeding mechanism, bottom (2) of the receiver is formed with a horizontally disposed extension (6) upon which is positioned a vertical abutment plate (7). To permit adjustment of this plate it is formed with a projection (8), the latter having its free end extending through a slot in extension (6) and threaded to receive clamping screw (8'), as clearly shown in Fig. 1 of the drawings.

Extending upwardly from and pivotally connected to the opposite edges of extension (6) are parallel supports (9). The free ends of these supports are pivotally connected to parallelly extending braces (10) which in turn are detachably secured at their free extremities to the sides of receiver A adjacent its upper end. Each of the parallel supports (9) are provided at a suitable point in the length thereof with a bracket (11) having horizontally and angularly disposed portions (12), (13) and (14) respectively.

The horizontal portions (12) of the respective brackets (11) are each formed with an aligning series of openings (15) to accommodate roller stops (16) which project inwardly from portions (12) for a purpose to be hereinafter set forth. The portions (13) and (14) of the respective brackets (11) are formed at their juncture with aligning openings (15') to rotatably journal the extremities of the cam shaft of the feeding mechanism C as clearly shown in Fig. 5 of the drawings.

The upper extremities of parallel supports (9) are bridged by a connecting rod (17), which serves to swivelly support a pair of spring pressed fingers (18) adapted to engage the rear leaf of sheaf B adjacent its upper edge for the purpose of pressing the outermost leaf of the sheaf against stops (16) as will be readily understood without further discussion.

With the above construction sheaf B may be positioned at the lower end of receiver A with its bound portion resting on extension (6) and abutting plate (7) and its hinged portion vertically supported adjacent the upper end thereof between stops (16) and spring pressed fingers (18) as clearly shown in Figs. 1 and 5 of the drawings.

Feeding mechanism

After the sheaf B has been mounted as aforesaid its leaves are successively disengaged at their upper ends and propelled to slip sheeting position with respect to the printed sheets, by means of a mechanism C synchronously operated in accordance with the driving means of the mimeograph or similar printing apparatus.

This feeding mechanism comprises a shaft (19)

journalled at its extremities in the aligning openings (15') of brackets (11) and having arranged central thereof a compressible cam D adapated to coact with the slip sheets as will hereinafter appear. Shaft (19) is operated by a driving means including pulley (20) keyed to one end of the shaft (19), pulleys (21) and (22) keyed to the extremities of shaft (23) which latter is journalled in bearing bracket (24) suitably affixed to receiver A as clearly shown in Fig. 5 of the drawings. Pulleys (20) and (21) are connected by belt (25). The remaining pulley (22) is connected by a belt (26) with pulley (27) keyed to shaft of driving motor (28) mounted on mimeograph or similar printing apparatus E.

As it is highly important to the successful operation of this invention that the feeding mechanism be in absolute synchronism with the driving means of the mimeograph the belts (25) and (26) are formed of moulded rubber having a series of aligning projections (29) adapted to extend through the openings (30) formed in the fellies of the pulleys, as clearly shown in Fig. 1 of the drawings.

This belting construction not only assures the operation of the feeding mechanism in synchronism with the driving means of the printing machine but likewise prevents damage to the assembly in the event the feeding mechanism should be suddenly stopped with the motor of the mimeograph in operation, as will be understood without further discussion.

Coming now to the means for withdrawing and projecting the slip sheets to receiver A, this comprises a cam D formed of sponge rubber or other similarly compressible material. This cam in the present form consists of a cylindrical body portion (31) of sponge rubber having flap like portions (33) integral therewith and extending longitudinal thereof, as clearly shown in Fig. 3 of the drawings.

Compressible cam D is affixed to shaft (19) by a mounting (34) embodying end plates (35) and (36) fixed to the shaft and arranged in laterally spaced relation thereon. These plates (35) and (36) are interconnected by side bars (37) and (38) having therein a series of aligning openings (39) adapted to register with a similar series of openings formed in the flaps (33) of the cam.

To attach cam D to its mounting on the shaft, the flaps (33) of the cam are extended upwardly to the rear of side bars (37), (38) and over the upper edge and down the front face thereof until the openings in the flaps register with those in the bars, whereupon suitable fastening elements are passed through the respective openings in the bars and flaps to securely retain said flaps in operative position.

Constructing the cam D of the material and in the manner stated insures a firm engagement of each slip sheet and its retention until the slip sheet has been completely withdrawn from the holding means at its upper end and projected to receiver A.

Although sponge rubber has been referred to as the material forming cam D, it is to be understood any other substance capable of functioning in the same manner may be resorted to if desirable.

Sheaf

In order to permit the entire run of printed matter constituting a given piece of work, to be collected in a single instrumentality affording slip sheeting and drying facilities, this invention utilizes a sheaf B adapted to be positioned at the lower end of receiver A, with its leaves and bound portion arranged in a predetermined manner as will hereinafter appear.

Sheaf B is composed of a plurality of superimposed sheets (40) formed of absorbent or a combination of absorbent or non-absorbent material dimensioned to conform substantially to the length and breadth of receiver A. These leaves are united at one extremity by binding elements (41) and hinged adjacent their bound extremities along an inclined plane as indicated by the line *a—b*, to divide the sheaf into a hinged portion (42) and a base portion (43), as clearly shown in Figs. 1 and 2. The leaves at the bound portion of the sheaf are thicker than at the hinged portion, in order to provide a space between each leaf so that when the sheaf has been fully interleaved with the printed matter it will be of uniform thickness. This spacing also will permit the contents of the sheaf to be more readily ejected.

The leaves of the sheaf may be composed entirely of absorbent material or as shown in Fig. 6, of two suitably united stocks (44) and (45), one being absorbent the other non-absorbent. The exposed surface of the non-absorbent stock is preferably glazed for a purpose hereinafter set forth. Constructing each leaf of the sheaf in this manner is advantageous for the reason that the blotting surface exposed to the cam action affords a firm engagement between said cam and surface, while the smooth glazed surface of the non-absorbent not only facilitates withdrawal of the slip sheet preliminary to its propulsion to the receiver, but also increases the resiliency of the leaf for the purpose of expediting its discharge to said receiver, as will be readily understood without further discussion.

In order to accelerate movement of the slip sheets to the receiver each leaf is provided between its absorbent and non-absorbent stocks with an extremely thin strip of resilient material (46). These strips (46) when the hinged and base portions of the sheaf B are arranged at right angles, assume the position shown in Fig. 6 of the drawings, but as soon as the upper ends of the respective leaves of the sheaf are released by the cam, said strips return to their normal position and in doing so greatly increase the rate of travel of the leaves to the bottom of the receiver A.

Having described the structural details of this invention and manner of assembling, its operation is as follows:

Operation

Assuming the motor of the mimeograph or similar printing apparatus in operation, sheaf B positioned at the lower end of receiver A, with its base portion resting on the extension of said receiver and its hinged portion secured at right angles to the base portion and likewise assuming the initial sheet of the run in position to receive an impression; as the printing drum of the mimeograph machine rotates to produce the impression, cam D of the feeding mechanism is simultaneously brought into engagement with the innermost leaf of the sheaf, and then as contact is made, momentarily stopped while the cam-shaft continues to rotate to a predetermined angle.

This partial rotation of the cam shaft with the cam stationary twists its flap portions and imbeds the side bars of its mounting in the soft rubber material of which the cam is composed (as shown in Fig. 2), thus compressing said cam and establishing a friction and suction action between its effective surface and that of the

leaf to be actuated. Further movement of the cam shaft rotates the cam to withdraw the leaf from its position between the stops and the upper end of the succeeding leaf.

After withdrawing the leaf, the cam, still in engagement with the surface of said leaf directs its movement to the point of separation whereupon it imparts a final impetus thereto to project it to the bottom of the receiver.

During the time interval required for the feeding mechanism to withdraw the first leaf of the sheaf and discharge it to the position shown in Fig. 2 the initial sheet to be printed has received its impression and entered the receiver so that as both the slip and printed sheet reach the limit of their movement the slip sheet will be disposed in overlying relation with respect to the printed sheet on the bottom of the receiver. This operation is repeated until the required number of sheets have been printed.

At the termination of the printing operation sheaf B is removed, grasped at its bound end and shaken to eject its contents. After removal, the sheets may be immediately assembled, arranged on the mimeograph machine and additional impressions taken on their opposite surfaces.

Conclusion

In conclusion from the above it will be manifest this invention provides a slip sheeting assembly which enables all the printed matter to be collected between the leaves of a sheaf, so that at the completion of the printing operation each printed sheet will be clean, dry and in a condition to immediately receive an impression on its opposite surface, thus effecting a saving in time, labor and material.

Having described my invention, what I claim as new and wish to secure by Letters Patent is:

1. The combination with a printing apparatus including an impression producing device, its actuating means and an impression sheet receiver; of a sheaf positioned at one end of the receiver and composed of a plurality of highly flexible slip sheets united at one end, means for mounting a portion of said sheaf at a predetermined angle with respect to said receiver and a feeding mechanism operating in synchronism with said actuating means and coacting with the slip sheets to effect their discharge to the receiver into overlying relation with respect to the impression sheets as they leave the impression producing device, said actuating means prior to discharging each leaf imparting a flexure thereto intermediate its ends, so that after discharge, reflex action will accelerate its movement to the receiver.

2. The combination with a printing apparatus including an impression producing device, its actuating means and an angularly disposed impression sheet receiver, of a sheaf positioned at one end of the receiver and composed of a plurality of superimposed highly flexible leaves, means for mounting a portion of said sheaf at a predetermined angle with respect to the receiver, and a feeding mechanism operating in synchronism with said actuating means and coacting with the leaves of the sheaf adjacent their upper ends to successively discharge said leaves to the receiver in overlying relation with respect to the impression sheets as they leave the impression producing device, said feeding mechanism including means for flexing each slip sheet uniformly intermediate its ends prior to discharge so that after discharge, reflex action will accelerate movement of the sheet to the receiver.

3. The combination with a printing apparatus including an impression device, its actuating means and an impression sheet receiver, of a sheaf positioned at one end of the receiver and composed of a plurality of superimposed highly flexible leaves, means for uniting said leaves at one end, a hinged connection for each leaf located adjacent the united end thereof to divide the sheaf into a hinged leaf and a base portion, means for engaging the upper end of the hinged portion and securing the latter at right angles to the bound portion, and a feeding mechanism operating in synchronism with said actuating means and coacting with the upper ends of the leaves of said sheaf to withdraw said leaves and discharge them to an overlying position with respect to the impression sheets as they leave the impression producing device, said feeding mechanism including means for flexing each slip sheet uniformly intermediate its ends prior to discharge so that after discharge, reflex action will accelerate movement of the sheet to the receiver.

4. The combination with a printing apparatus including an impression producing device, its actuating means and an impression sheet receiver attached to the output end of the printing apparatus, of a sheaf associated with the receiver, said sheaf being composed of a plurality of highly flexible leaves united at one end and hinged intermediate their ends adjacent the united extremities to divide the sheaf into a hinge leaf portion and a base portion, means in connection with the receiver for horizontally mounting the base portion, additional means carried by the last mentioned means and said receiver to engage the upper end of the hinged leaf portion and support the latter at right angles to the bound portion, a feeding mechanism operating in synchronism with said actuating means and coacting with the leaves of the sheaf adjacent their upper extremities to successively withdraw the respective leaves and effect their propulsion to overlying position with respect to the impression sheets as the latter are delivered to the receiver from the impression producing device, said feeding mechanism including means for flexing each slip sheet uniformly intermediate its ends prior to discharge so that after discharge, reflex action will accelerate movement of the sheet to the receiver.

5. The combination with a printing apparatus including an impression producing device, its actuating means and an impression sheet receiver attached to the output end of the printing apparatus, of a sheaf associated with the free end of the receiver, said sheaf being composed of a plurality of superimposed leaves, said leaves being united at one end and hinged intermediate their extremities adjacent the united ends to divide the sheaf into a base portion and a hinged leaf portion, means in connection with the receiver for horizontally mounting the bound portion, additional means carried by the last mentioned means and said receiver to engage the upper end of the hinged leaf portion and support the latter at right angles to the bound portion, a feeding mechanism operating in synchronism with said actuating means and coacting with the leaves of the sheaf adjacent their upper extremities to successively disengage the respective leaves and effect their discharge to an overlying position with respect to the impression sheets as the latter are delivered to the receiver from the impression producing device, said feeding mechanism including means for flexing each slip sheet uni-

formly intermediate its ends prior to discharge so that after discharge, reflex action will accelerate movement of the sheet to the receiver.

6. The combination with a printing apparatus including an impression producing device, its actuating means and an impression sheet receiver, of a sheaf associated with one end of the receiver and composed of a plurality of super-imposed leaves, said leaves being united at one end and hingedly connected adjacent their united extremities to divide the sheaf into a base portion and a hinged leaf portion, means to vertically support the hinged leaf portion with respect to the plane of the base portion, a feeding mechanism operating in synchronism with the actuating means and coacting with the leaves of the sheaf to successively effect their propulsion to the receiver, said feeding mechanism including a rotatable shaft, a cam mounting central thereof, and a compressible cam carried by the mounting and adapted to engage the leaves of said sheaf.

7. The combination with a printing apparatus including an impression producing device, its actuating means and an impression sheet receiver, of a sheaf located at one end of the receiver and composed of a plurality of superimposed leaves united at one end, means for mounting a portion of said sheaf at a predetermined angle with respect to said receiver and a feeding mechanism coacting with the leaves of the sheaf, said mechanism including a shaft, a driving connection between said shaft and said actuating means, a cam mounting disposed central of the shaft, a compressible cam carried by the mounting and adapted to be compressed by the latter into engagement with the leaves of said sheaf to effect their propulsion to the receiver in overlying relation with respect to the impression sheets as they are deposited in the receiver by the impression producing device.

8. The combination with a printing apparatus including an impression producing device, its actuating means and an impression sheet receiver, of a sheaf located at one end of the receiver and composed of a plurality of superimposed leaves, means for uniting said leaves at one end, means for mounting a portion of said sheaf at a predetermined angle with respect to said receiver, and a feeding mechanism coacting with the leaves of the sheaf, said mechanism including a shaft, a driving connection between said shaft and said actuating means, a cam mounting disposed central of the shaft, a compressible cam carried by the mounting and adapted to be compressed by the latter into engagement with the leaves of said sheaf to effect their propulsion to the receiver in overlying relation with respect to the impression sheets as they are deposited in the receiver by the impression producing device.

9. A slip sheeting attachment for mimeographing and similar machines, comprising a receiver, a sheaf mounted at one end of the receiver and composed of a plurality of superimposed highly flexible leaves, said leaves being united at one end and hinged adjacent their united extremities, to divide the sheaf into a hinged portion and a base portion means in connection with the receiver for supporting the respective portions of the sheaf at right angles to each other, and feeding means coacting with the hinged portion of said sheaf adjacent its upper end to successively discharge the leaves to the receiver, said feeding means including additional means for flexing each slip sheet uniformly intermediate its ends prior to discharge so that after discharge, reflex action will accelerate movement of the sheet to the receiver.

10. The combination with a printing apparatus including a device for producing impression sheets, its actuating means and a receiver; of a sheaf positioned at one end of the receiver and composed of a plurality of leaves each leaf consisting of a blotter face portion affixed to a base sheet of relatively great resiliency, means for mounting a portion of said sheaf at a predetermined angle with respect to the receiver, and a feeding mechanism operating in synchronism with said actuating means and coacting with the leaves of the sheaf adjacent their upper ends to successively discharge said leaves to the receiver in overlying relation with respect to the impression sheets as they leave the impression producing device, said feeding mechanism including means for flexing each sheet before its discharge to the receiver whereby after being released by the feeding mechanism reflex action will accelerate the movement of the leaf to the receiver.

11. The combination with a printing apparatus including a device for producing impression sheets, its actuating means and a receiver; of a sheaf positioned at one end of said receiver and composed of a plurality of super-imposed flexible leaves, bound at one end, means for mounting a portion of said sheaf at a predetermined angle with respect to the receiver, a feeding mechanism operating in synchronism with the actuating means and coacting with the leaves of the sheaf to successively effect their propulsion to the receiver, said feeding mechanism including a rotatable shaft, a cam mounting central thereof and a cam carried by the mounting and adapted to engage the leaves of said sheaf, said cam being compressible and susceptible of independent movement with respect to its mounting.

12. The combination with a printing apparatus including a device for producing impression sheets, its actuating means and a receiver; of a sheaf positioned at one end of said receiver and composed of a plurality of super-imposed flexible leaves bound at one end, means for mounting a portion of said sheaf at a predetermined angle with respect to the receiver, a feeding mechanism operating in synchronism with the actuating means and coacting with the leaves of the sheaf to successively effect their propulsion to the receiver, said feeding mechanism including a rotatable and a cam adapted to engage the leaves of said sheaf, said cam being compressible and susceptible of independent movement with respect to its mounting.

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