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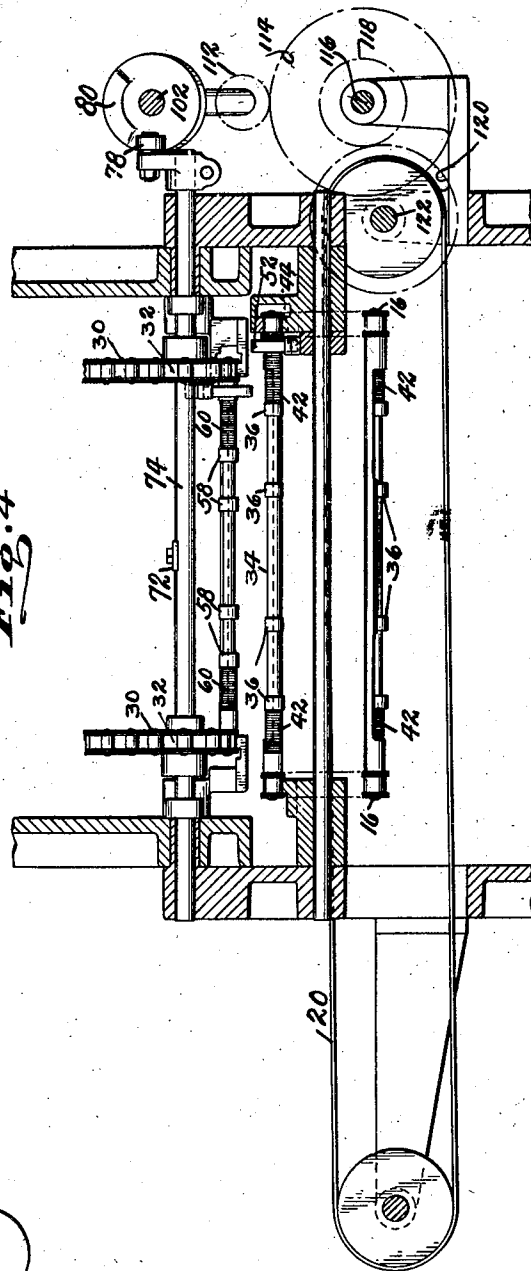
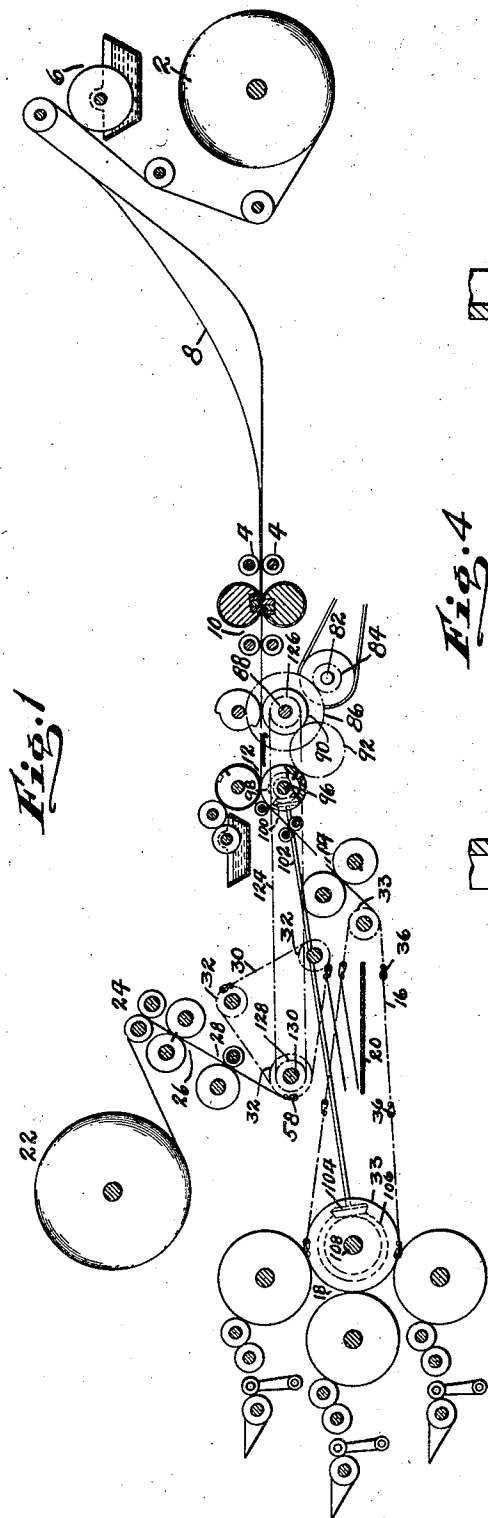
A. POTDEVIN

2,158,552

SLIP-SHEET APPARATUS

Filed March 9, 1937

5 Sheets-Sheet 1



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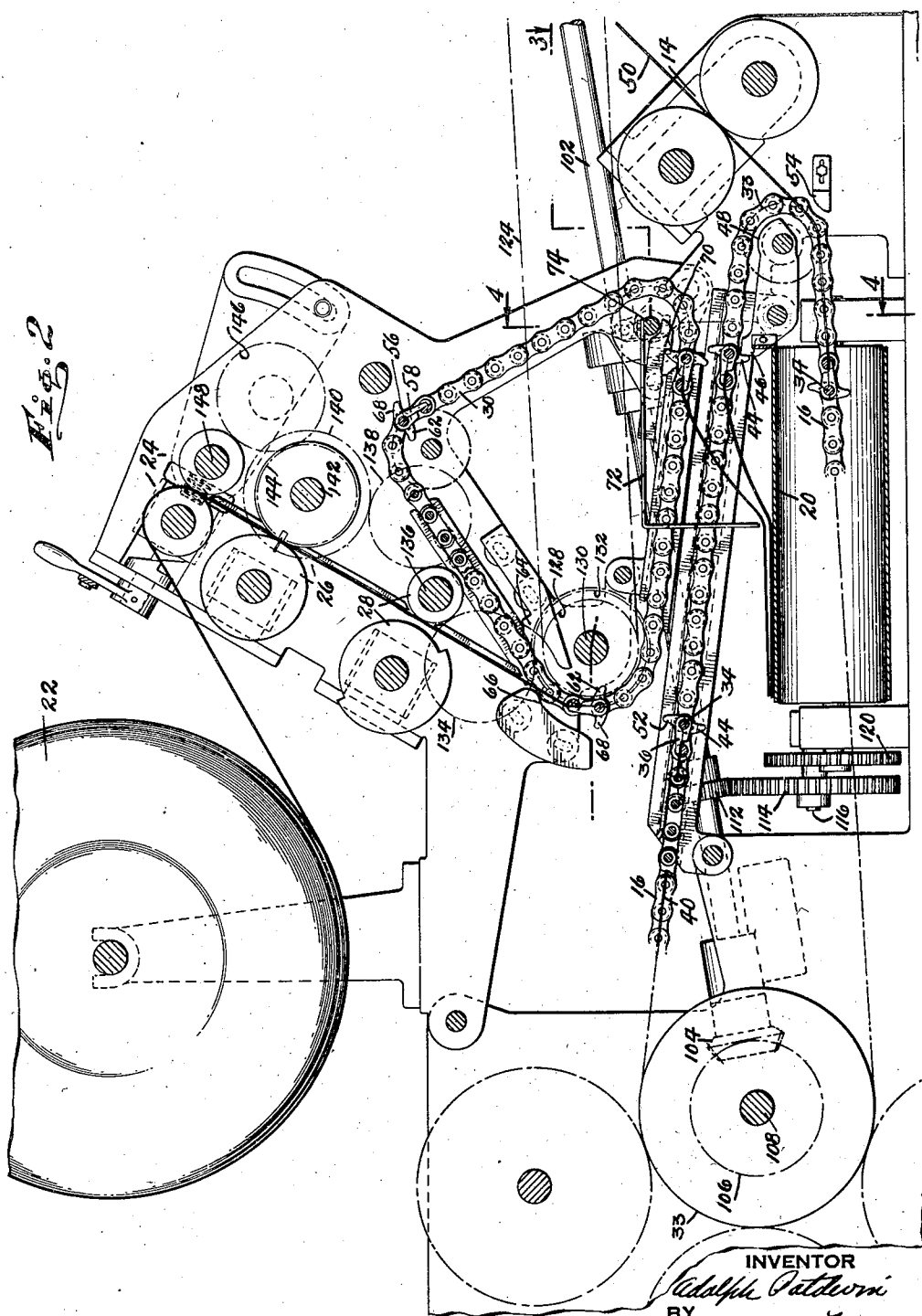
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SLIP-SHEET APPARATUS

Filed March 9, 1937

5 Sheets-Sheet 2



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A. POTDEVIN
SLIP-SHEET APPARATUS

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5 Sheets-Sheet 3

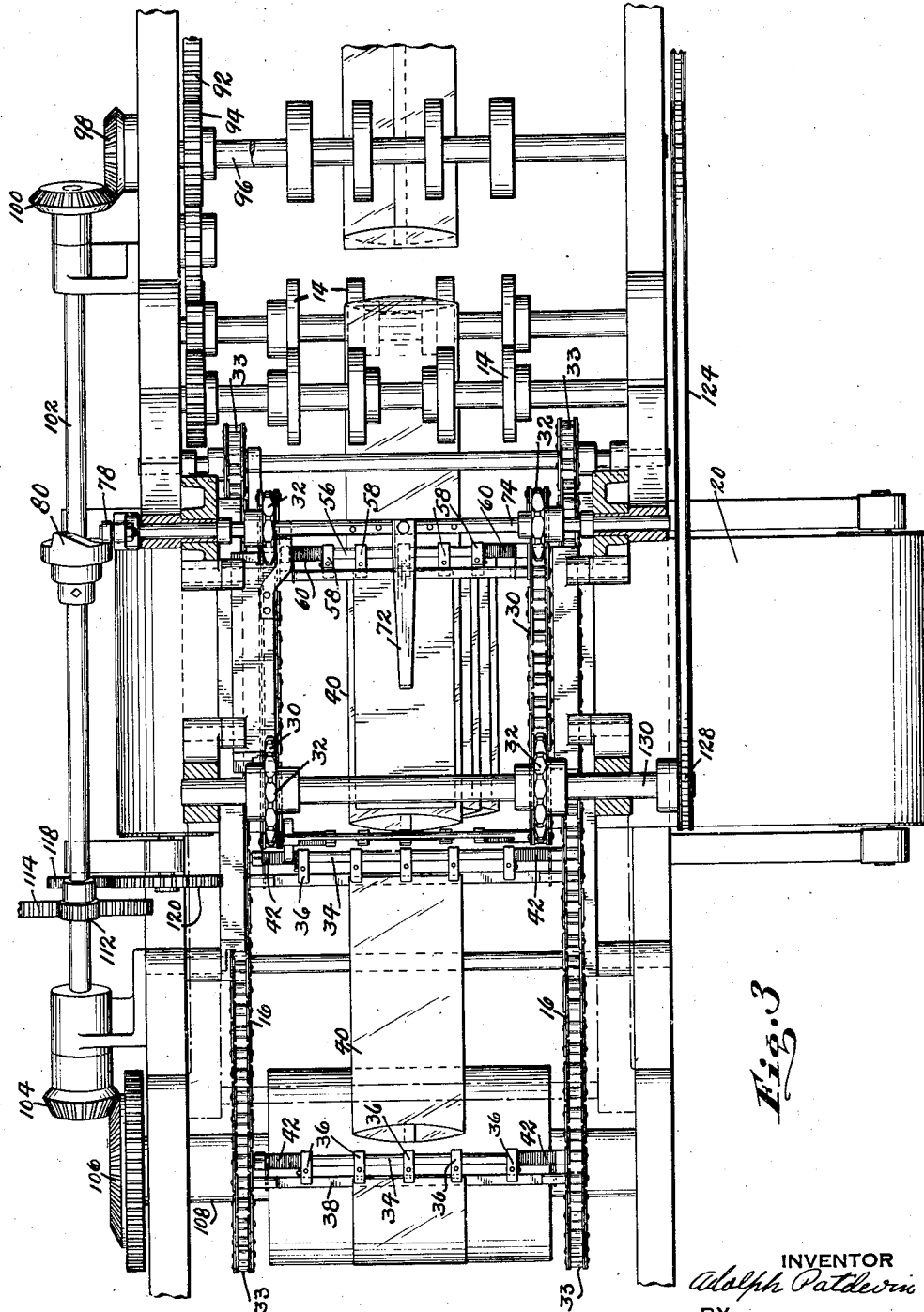


Fig. 3

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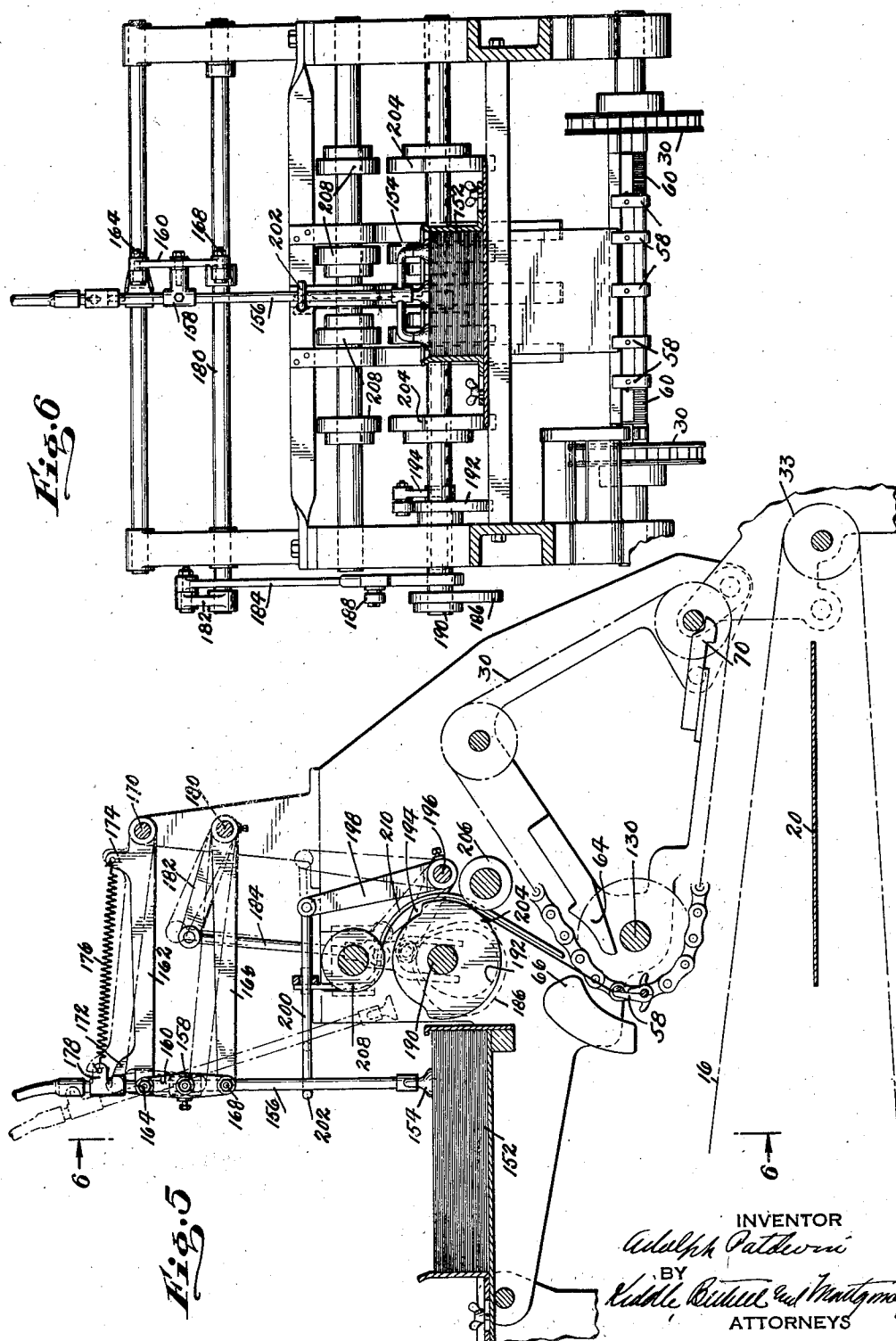
A. POTDEVIN

2,158,552

SLIP-SHEET APPARATUS

Filed March 9, 1937

5 Sheets-Sheet 4



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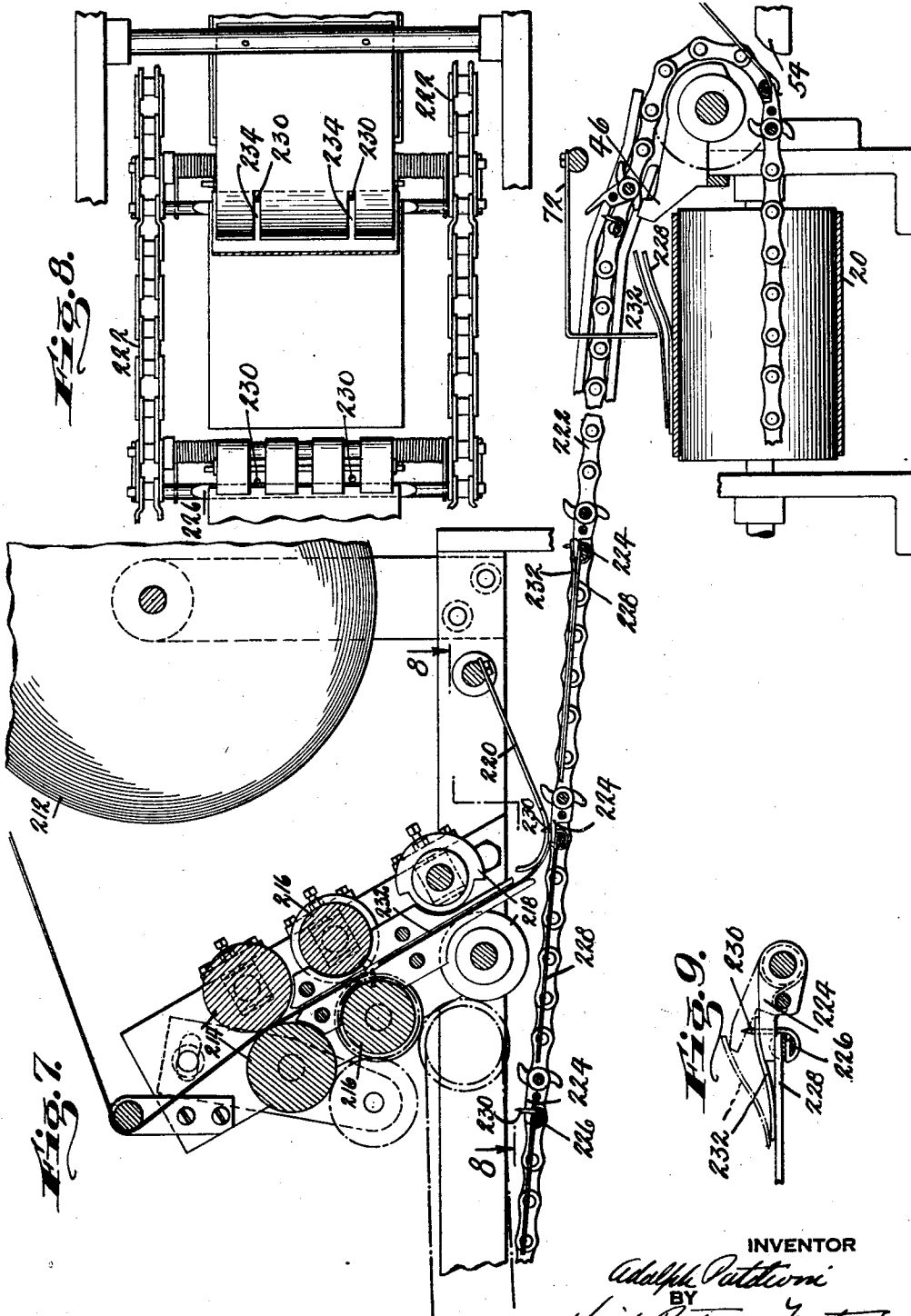
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SLIP-SHEET APPARATUS

Filed March 9, 1937

5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

2,158,552

SLIP-SHEET APPARATUS

Adolph Potdevin, Garden City, N. Y., assignor to
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Application March 9, 1937, Serial No. 129,787

9 Claims. (Cl. 34—1)

This invention relates to an improvement in machines for handling material such as paper, for example, which is fed in a continuous length into the machine, cut off, printed and then collected, the invention being particularly directed to a construction wherein a sheet of material known in the trade as a "slip-sheet" is inserted between adjacent lengths of printed material to prevent offset printing, that is to say, to prevent the ink on one piece of material being accidentally transferred to an adjacent superimposed length.

The machine of the present invention is full automatic in its operation and capable of operating at high rates of speed.

In the accompanying drawings:

Fig. 1 is a sectional elevational view somewhat diagrammatic of an embodiment of my invention;

Fig. 2 is an enlarged sectional elevational view of part of the apparatus of Fig. 1;

Fig. 3 is a section on the line 3—3 of Fig. 2;

Fig. 4 is a section on the line 4—4 of Fig. 2;

Fig. 5 is a fragmentary view of a modified form of slip-sheet feed;

Fig. 6 is a section on the line 6—6 of Fig. 5;

Fig. 7 is a further modified form of slip-sheet feed;

Fig. 8 is a section on the line 8—8 of Fig. 7; and

Fig. 9 is a detail view of a gripper and pin arrangement used in the modification of Fig. 7.

Referring to the drawings in detail and first of all to Figs. 1 to 4, inclusive. For purposes of illustration I have shown my invention applied to a bag making machine, it being understood, however, that the invention is equally applicable to other machines.

2 designates a roll of material, such as paper for example, which is to be tubed, divided into bag lengths and printed.

The paper may be drawn from the roll 2 by forwarding rollers 4, the paper passing from the roll past adhesive-applying mechanism 6 and from thence into tubing mechanism 8. This construction may be the usual well known construction employed in the paper bag machine art.

The paper, it is to be understood, is continuously moved forward and after it has been tubed it passes to a cut-off station 10 which, for example may be of the type shown in the copending joint application of myself and George Hampton Serial No. 746,082, filed September 29, 1934. The bag lengths then pass through bottoming mechanism 12 where the bag lengths are bottomed. This bottoming mechanism may be of any of the

usual and well known forms of bottoming mechanisms employed in the bag industry.

The completed bags are delivered successively to a pair of driven rollers 14 which advance the bags to a carrier chain 16. The chain 16 carries the bag through printing mechanism illustrated diagrammatically at 18 where the desired printing is applied to the face of the bag, the bag then being reversed in its travel and delivered to a conveyor 20 which, as will be seen from Fig. 3, for instance, travels transversely of the machine, this conveyor delivering the bags to a collecting station.

At the printing end of the machine is a roll 22 of "slip-sheet" material, paper for example, which is drawn continuously from the roll by forwarding rollers 24 and passed by them through perforating mechanism 26 where the material is perforated transversely at desired intervals, the perforated paper then passing between a pair of overspeeded rolls 28 where the paper is divided into lengths along the perforated area. These lengths are then automatically and successively attached to slip-sheet carrier chains 30 traveling about sprockets 32, the slip-sheet lengths being delivered by this chain to the conveyor 20. The mechanism is so timed that a slip sheet is delivered upon each bag so that at the collecting station to which the bags are delivered there will always be a slip-sheet between any two adjacent bags.

Referring now more particularly to Figs. 2, 3 and 4. It will be seen upon an inspection of these figures of the drawings that the bag carrier chains 16 are carried by a pair of sprockets 33. Spanning the chains 16 at intervals and pivoted therein are gripper-carrying rods 34, each of which carries a plurality of grippers 36 adapted to grip the leading end of a length of material, such as a bag, being fed through the machine, the material being gripped between the grippers and the flat face of a rod 38, a plurality of these rods spanning the chains 16 and lying parallel with the gripper-carrying rods 34. This construction is clearly shown in Fig. 3, wherein for clarity of description a gripped bag length has been designated 40. The grippers 36 are spring-closed by springs 42 carried by the rods 34.

The upper reach of the chains 16 is traveling from left to right, as viewed in Fig. 2 and it will be seen from an inspection of this figure and of Fig. 4 that each rod 34 carrying the grippers is provided with a depending opening-tail 44 adapted to engage a stop 46 when a set of grippers

has reached a position where the material being conveyed will overlie the conveyor 20. The engagement of the opening-tail with the stop 46 will of course effect an opening of the grippers and release of the material upon the face of the conveyor 20. After the opening-tail has passed the stop 46 the grippers close again until the tail 44 engages opening cam 48 which will open the grippers again and hold them open until the next length of material, designated 50, is advanced by the rollers 14 to pick-up position, the gripper then riding off the cam 48 to permit the grippers to close upon the material. The grippers are retarded in this closing movement by a projection 52 on the side of the rods 34 opposite to the opening-tails or projections 44 engaging cam 54.

It will be understood, of course, that the grippers are arranged at proper intervals along the chains 16 and that as each set of grippers moves to a position just above the side of the conveyor 20 they will open to release the material being conveyed to allow the same to fall upon the conveyor 20, as already explained.

As was pointed out at the beginning of this description, the present machine provides for depositing a slip-sheet upon each bag or length of material deposited on the conveyor 20.

Referring again to Fig. 2 of the drawings, 22 designates a roll of slip-sheet material, this material being drawn from the roll by forwarding rollers 24, the material being advanced continuously by these rollers to the perforating rolls 26 and from thence to the overspeeded rollers 28 which subjects material to a sudden longitudinal tension to divide the same into lengths along the line of the previously formed perforations. The leading end of each length finally reaches the slip-sheet carrier chains 30. These chains are provided at proper intervals with rods 56 carrying grippers 58. These rods and grippers are similar to the rods and grippers 34 and 36. The rods 56 are spring-actuated to close the grippers 58 by springs designated 60. Each gripper rod 56 is provided with an opening-tail 62 adapted as the chains advance to engage an opening cam 64. This cam is so located that the grippers are opened at the proper instant to receive the leading end of the slip-sheet being forwarded thereto. Closure of the slip-sheet grippers is retarded by a cam 66 and adapted to be engaged by a finger 68 on each of the gripper-carrying rods 56. This construction, therefore, provides for dividing the slip-sheet material 22 into lengths, advancing the lengths to the chains 30 and attaching the slip-sheets to these chains. The lower reach of the chains 30 is traveling from left to right, as viewed in Fig. 2, and from an inspection of this figure of the drawings it will be seen that each slip-sheet is moved or advanced forward by the chains 30 until one of the opening-tails 62 engages a cam or stop 70 in its path, this stop being similar to the stop 46 for the grippers of the bag carrier chain 16, so that the grippers on the bag carrying chain 16 will be opened to release a bag at the same instant that a set of grippers on the chain 30 will be opened to release a slip-sheet, to deposit a bag and a slip-sheet together in superimposed relation upon the conveyor 20.

These machines operate at high speed and in order that the bags and slip-sheets may be deposited properly on the conveyor 20 a kicker arm 72 is provided in position to be oscillated into engagement with each slip-sheet as the same is

brought above the conveyor 20 to kick the same together with the underlying bag downwardly upon the conveyor. The kicker 72 is mounted on a rod 74 which is mounted in suitable bearings in the machine and extends transversely of the machine, this rod also carrying a pair of the sprockets 32 for the chains 30. These sprockets are freely rotatable on the rod. The rod 74 projects beyond the machine frame and carries a cam follower 78 cooperating with a rotary cam 80 which is driven in proper timed relation with the operation of the machine as a whole so as to effect oscillation of the kicker 72 at proper intervals.

The main drive shaft for the machine is shown at 82 in Fig. 1 and on this shaft is a gear 84 meshing with a large gear 86 on shaft 88. This shaft 88 carries a gear 90 meshing with intermediate gear 92 which in turn meshes with a gear 94 on the shaft 96 carrying the bottoming drum. The shaft 96 carries a miter gear 98 meshing with gear 100 on shaft 102, the other end of this shaft being equipped with miter gear 104 meshing with gear 106 on the shaft 108 for the printing rolls 18.

The shaft 102 carries a pinion 112 meshing with gear 114 on a short stub shaft 116, this stub shaft also carrying a gear 118 meshing with gear 120 on one of the shafts 122 which supports the conveyor 20.

The drive for the slip-sheets is by means of a chain 124 on a sprocket 126 on the shaft 88 and sprocket 128 which is mounted on the shaft 130 carrying two of the supporting sprockets for the slip-sheet carrier chain 30.

The drive for the forwarding rollers 24, perforating rollers 26 and overspeeded rollers 28 for the slip-sheet material is taken off gear 132 fixed to the shaft 130, the drive for which has already been traced, and through intermediate gear 134 to the overspeeded rolls 28 which are geared together and from a gear on the shaft 136 of one of these rollers to intermediate gear 138 to gear 140 on the shaft 142 of one of the perforating rollers 26. These two rolls, it will be understood, are geared together. On this shaft 142 is change gear 144 meshing with intermediate gear 146 in turn meshing with a gear on the shaft 148 of one of the forwarding rollers 24. The gears employed in this train are such that the forwarding rollers 24 and the perforating mechanism 26 always travel at the same linear speed, while the rollers 28 are overspeeded so that a longitudinal tension will be placed upon the slip-sheet material after the same has been perforated to divide the same along the line of perforations into slip-sheet lengths.

It will be apparent that by changing the gear 144, which as above pointed out is a change gear, the lengths of the slip-sheets may be varied to suit any desired condition.

It will be apparent from all of the foregoing that the present invention provides a machine for handling material such as paper or paper bags and on continuous advance of the material the same is printed, successive lengths of the material after printing being deposited upon a conveyor traveling transversely of the machine.

It will be apparent also that at the same time slip-sheet material is taken from a roll, divided into slip-sheet lengths and then deposited upon the conveyor, a slip-sheet being deposited with each bag, if for example bags are being printed.

It will be apparent also that the machine of this invention is full automatic, that it can be operated at high speed and that it can be ad-

justed to accommodate the machine to materials of different lengths. In this connection, it is to be understood that the variation of the lengths of material to be printed is accomplished in the same fashion as is usual with bag making machines, the slip-sheet mechanism being adjusted at the same time in the manner hereinabove described so that the slip-sheets too will be varied in length.

In the embodiment of my invention as illustrated in Figs. 5 and 6, I have shown a modification of the slip-sheet handling mechanism. In this form of the invention the bags or other material being handled are conveyed by carrier chains 16 the same as in the form of the invention already described, these carrier chains depositing the material upon a conveyor 20.

With reference to the slip-sheets, it will be seen from an inspection of Fig. 5 that the same are pre-cut and are supplied to the carrier chains from a stack instead of, as in the case of Fig. 1, taking paper from a roll, cutting it into lengths and delivering the lengths successively to the carrier chains. The stack of slip-sheets is designated 152. The chains for carrying the slip-sheets to the conveyor 20 are the same as in Fig. 1 and designated 30. The grippers carried by the chains 30 are also similar to those in Fig. 1 and designated 58, the grippers being opened to receive the slip-sheets by a cam 64, the closing of the grippers being retarded by cam 66, and opened by a cam 70 for release of the slip-sheets upon the conveyor 20.

The stack of slip-sheets 152 is disposed to one side and slightly above the grippers and chains and the slip-sheets are picked off the stack individually by suction nozzles 154. These nozzles are carried in a suction head at the lower end of a vertically extending tube 156 connected to a suitable exhaust. The tube 156 is provided with a laterally extending bracket 150, this bracket pivotally mounting a short arm 160, the arm being pivoted intermediate its ends on the bracket 150. The upper end of the lever 160 is pivotally attached to the free end of an arm 162, as shown at 160, and the lower end of the lever 160 is pivoted to the free end of an arm 166, as shown at 168. The arm 162 is pivoted on the machine frame, as shown at 170, and its free end is in line with the tube 156 and provided with a stop 172 which limits the swinging of the upper part of the tube 156 to the right, as viewed in Fig. 5, the parts being so designed that with the tube 156 against the stop 172 the tube will be standing vertically, as illustrated in Fig. 5.

The arm 162 is provided with an offset, lug or ear 174 and one end of a spring 176 is attached thereto, the other end of this spring being attached to an ear 176 carried by the tube 156. The spring 176 lies above the arm 162.

The arm 166 is pivoted to the machine frame on a rock shaft 180, this shaft carrying also a short lever 182 adapted to be actuated by a cam-controlled rod 184. It will be apparent from an inspection of the drawings that if the rod 184 and arm 182 be actuated to the position shown in dotted lines on Fig. 5 the tube 156 carrying the suction head, as well as the arms 166 and 162, will be raised, as shown in dotted lines on Fig. 5.

The actuating rod 184 for the lever 182 is actuated by a cam 186 which is adapted to cooperate with cam follower roller 188 affixed to the rod 184. The cam 186 is carried by driven shaft 190.

This same shaft 190 carries a cam 192 for actu-

ating the arm 194 on a rock shaft 196, a lever 198 also being mounted on this rock shaft. Pivoted to the upper end of the lever 198 is a rod 200 extending over to the suction tube 156, the end of the rod 200 being bent round to the back side of the suction tube 156, as shown at 202. It will be quite apparent that upon rotation of the shaft 190 to drive the cams 186 and 192 that the actuating rod 184 will be raised vertically and the rod 200 moved to the right, as viewed in Fig. 1, to move the suction tube 156 upwardly and swing the bottom of the same, that is, the nozzle end, to the right, as viewed in Fig. 5, and as shown in dotted lines on the same figure.

The shaft 190 carries segmental roller 204 co-operating with roller 206 and above the roller 204, as viewed in Fig. 5, is another forwarding roller 208. The rollers 204, 206 and 208 may be driven by any suitable gear train.

In operation, as the suction head 154 is raised by the lifting of the tube 156 a slip-sheet will be removed from the top of the pile 152 and carried to the right, as viewed in Fig. 5, so that the leading end thereof will enter between the forwarding roller 208 and segmental forwarding roller 204 and these rollers are so timed that at this instant the active surface of the segmental roller 204 will be swung into position so that the sheet will be gripped between the faces of the rollers 208 and 204 and the sheet will be advanced along the inside face of the curved guide 210 which will guide the sheet into position to be picked up by a gripper 58. The machine is running continuously and it will be appreciated, of course, that the parts are all properly timed so that a gripper 58 will be in position to receive a slip-sheet as the slip sheet is advanced to the chains 30, the bags or other materials being printed having been carried along by the chains 16 in the manner described in connection with Fig. 1 so that as a bag and slip-sheet are advanced above the conveyor 20 they will be at that instant released so as to fall upon the face of the conveyor with the slip sheet upon the bag and be carried by the conveyor out of the machine.

Referring now to the modification of my invention as illustrated in Figs. 7, 8 and 9. The construction there illustrated eliminates the carrier chains 30 and the grippers thereof which have been referred to in connection with the two embodiments of my invention so far described.

In this construction the material for the slip sheets is in a roll and cut off into lengths in the machine. The roll of slip-sheet material is designated 212 and material is drawn off this roll continuously by driven forwarding rollers 214 and advanced by these rollers to a pair of driven perforating rollers 216 where the material is perforated in a manner similar to that already described in connection with Fig. 1. The division of the slip-sheet material into slip-sheet lengths is completed by the action of a pair of over-speeded rollers 218, one of which is a segmental roller, these rollers being adapted to exert a longitudinal strain on the material at the proper instant to rupture the web along the line of perforations therein. The rollers 218 advance the forward end of the slip-sheet beneath a curved guide 220.

222 designates a pair of chains, corresponding to the chains 16 of Fig. 1, which convey the bags or other materials being handled. These chains are equipped with grippers 224, similar to the grippers 58 of Fig. 1, coating with flat faced

rods 226 to grip the leading end of the bags 228 or other material being conveyed. The rods 226 which are carried by the chains 222 are provided with pins 230 standing vertically with respect to the plane of the chains 222 and beyond the outer faces of the chains, and as the chains advance from left to right, as viewed in Fig. 7, with the bags or sheets 228 held thereto by the grippers the leading end of each bag or sheet will finally reach a position beneath the plate 220 and at that same instant the leading end of the slip-sheet 232 will have been fed to the rollers 218 to beneath the plate 220 and as the advance of the slip-sheet and the chain 222 continues the leading end of the slip-sheet will be impaled upon the pins 230 so that a bag and a superimposed slip-sheet are attached to the chains 222 with the end of the slip-sheet lying upon the jaw of the gripper. This is shown in full lines in Fig. 9. As the chains advance to a position where the grippers are opened by the stop 46, corresponding to the stop 46 of Fig. 2, the slip-sheet will be pushed off the pins 230 by the raising of the gripper jaws to open position. This is illustrated in broken lines in Fig. 9. At that instant, therefore, the bag or other material 228 and the slip-sheet 232 have both been released from the carrier chains 222 and are free to fall upon the conveyor 20 with the slip-sheet superimposed upon the bag 228. The kicker bar 72 may be used in this embodiment of my invention, if desired, as will be understood.

Reverting to the plate 220, I direct attention to the fact that the free end of the same is slotted, as shown at 234, so as to accommodate the pins 230 as they move to position beneath this plate. This is illustrated in Fig. 8.

It will be seen from the foregoing that the modification of Fig. 5 involves a construction in which the slip-sheets are pre-cut before entering the machine at all, while the modification of Fig. 7 eliminates the slip-sheet carrier chain 30 which was employed in the construction illustrated in Fig. 1.

It is to be understood that changes may be made in the details of construction and arrangement of parts without departing from the spirit and scope of this invention.

What I claim is:

1. In a machine of the class described, the combination of a receiving station, a carrier for delivering freshly printed lengths of sheet material to said receiving station, a supply of slip-sheet material in the web, means for advancing the web continuously, cut-off mechanism for dividing the advancing web into slip-sheets, a second carrier for receiving the slip-sheets individually and delivering the same individually to said receiving station, said carriers being so timed that for each printed sheet deposited at the receiving station a slip-sheet is deposited in superimposed relation thereto.

2. In a machine of the class described, the combination of a receiving station, a carrier for carrying freshly printed lengths of sheet material to a point above said receiving station, means for releasing the printed lengths from said carrier individually as each length arrives at the receiving station, slip-sheet forming mechanism, a second carrier above the first mentioned carrier for carrying said slip-sheets as they are formed to a point above said receiving station, and means for releasing the slip-sheets from said carrier individually as the slip-sheet is brought up to the receiving station and alternately with respect to

the release of the printed lengths thereby to deposit the slip-sheet upon each printed length.

3. In a machine of the class described, the combination of a receiving station, a carrier traveling across said receiving station, grippers on the carrier for attaching lengths of freshly printed material to said carriers for transport to the receiving station, gripper-releasing means automatically operable to open the carrier grippers as a printed length is brought into position at the receiving station, a second carrier, grippers therefor to attach slip-sheets thereto for transport to the receiving station, and releasing means for the slip-sheet grippers operable automatically to release a slip-sheet from its carrier as the slip-sheet is brought into position at the receiving station above a printed length.

4. In a machine of the class described, the combination of a receiving station, a carrier for carrying printed lengths of sheet material to said receiving station, grippers on the carrier, a stop adjacent the receiving station adapted to function as a printed sheet is brought to the receiving station to open the grippers and release the sheet, a second carrier, grippers on the second carrier for attaching slip-sheets individually thereto, for transport to the receiving station above the printed sheets, a stop adjacent the receiving station adapted to function as a slip-sheet is brought to the receiving station, said stops being so disposed relatively to each other that a slip-sheet is released for each printed sheet released for deposit at the receiving station in superimposed relation to the printed sheet.

5. In a machine of the class described, the combination of a continuously moving conveyor, carriers moving continuously transversely to said conveyor, means for supplying freshly printed sheets to one of said carriers, means for supplying slip-sheets to the other carrier, grippers for attaching the printed sheets and the slip-sheets to their respective carriers, and opening means for said grippers adapted to open the same as a printed sheet and slip-sheet are carried across the conveyor to deposit a printed sheet and a slip-sheet in superimposed relation upon the conveyor.

6. In a machine of the class described, the combination of a continuously moving conveyor, carriers moving continuously transversely to said conveyor, means for supplying freshly printed sheets to one of said carriers, a supply of slip-sheet material, means for continuously advancing the slip-sheet material, means for dividing it into slip-sheet lengths and means for feeding the slip-sheets to the other of said carriers, grippers for attaching the printed sheets and the slip-sheets individually to their respective carriers, and releasing means for opening the grippers of the two carriers simultaneously to allow a printed sheet and a slip-sheet to drop in superimposed relation upon the conveyor.

7. In a machine of the class described, the combination of a continuously traveling conveyor, a pair of continuously traveling carriers moving in superimposed relation above said conveyor and transversely thereto, grippers for each carrier, means for supplying freshly printed sheets to the grippers of one carrier and slip-sheets to the grippers of the other carrier, stops for opening said grippers operative each time a printed sheet and a slip-sheet are carried into position above the conveyor, and a kicker plate adapted to strike the slip-sheets and printed sheets as the same

are being released to kick the same downwardly toward the conveyor.

5 8. In a machine of the class described, the combination of forwarding rolls for continuously advancing a web of slip-sheet material, perforating means for perforating the material at slip-sheet intervals, a carrier, means for dividing the perforated web into slip-sheets and advancing the same to said carrier, self-closing grippers for receiving each slip-sheet and attaching the same
10 to the carrier, and means for retarding the closure of said grippers upon the slip-sheets.

9. In a machine of the class described, the

combination of a continuously traveling conveyor, a pair of continuously traveling carriers moving in superimposed relation above said conveyor and transversely thereof, grippers for each carrier, means for supplying freshly printed
5 sheets to the grippers of one carrier and slip-sheets to the grippers of the other carrier, and stops for opening said grippers operative each time a printed sheet and a slip-sheet are carried into position above the conveyor, to drop the
10 printed sheets and slip sheets alternately disposed in superimposed relation upon the conveyor.

ADOLPH POTDEVIN.