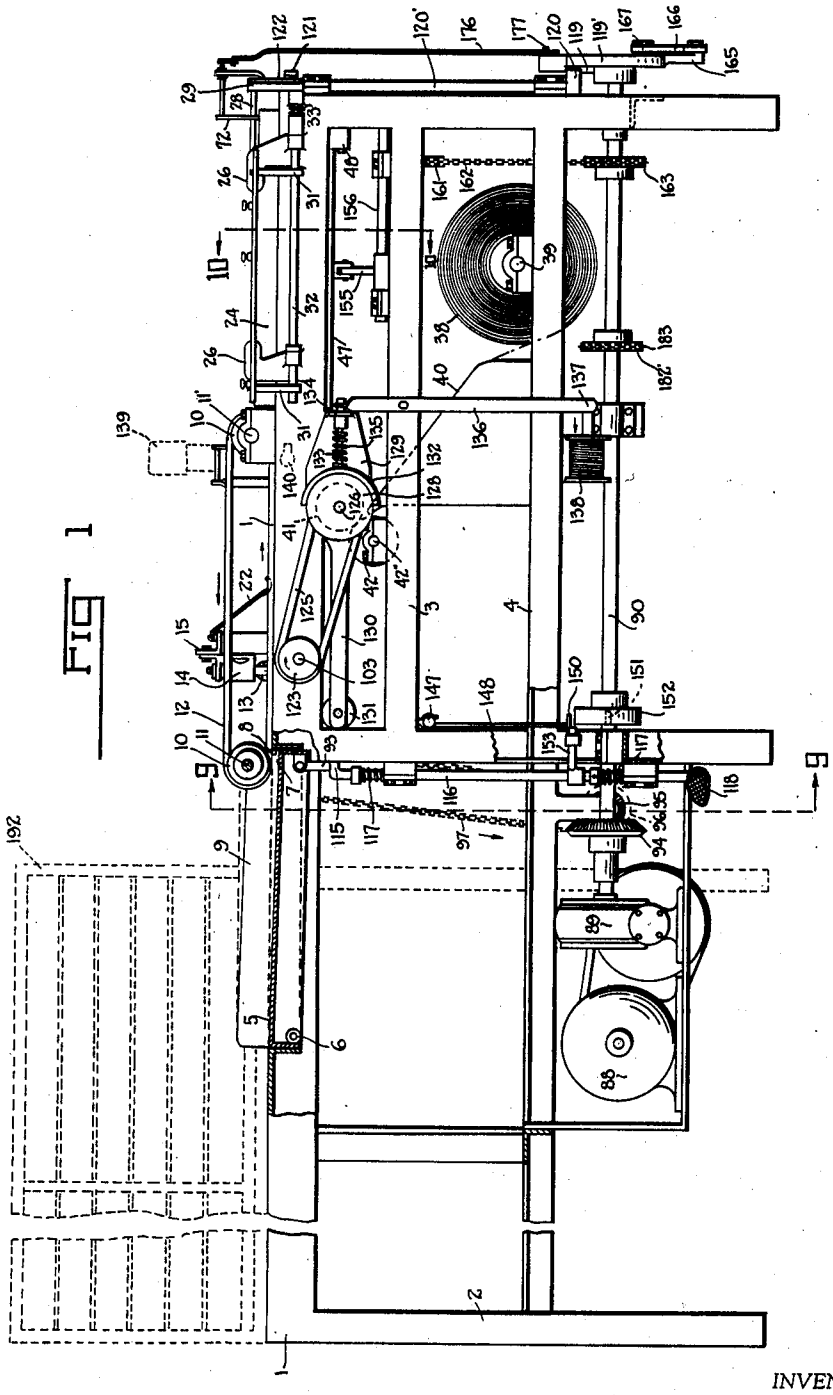
Dec. 24, 1940. L. L. WEST ET AL 2,226,397

SHEET ASSEMBLING MACHINE

Filed Feb. 6, 1940 4 Sheets-Sheet 1

FIG 1



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SHEET ASSEMBLING MACHINE

Filed Feb. 6, 1940 4 Sheets-Sheet 2

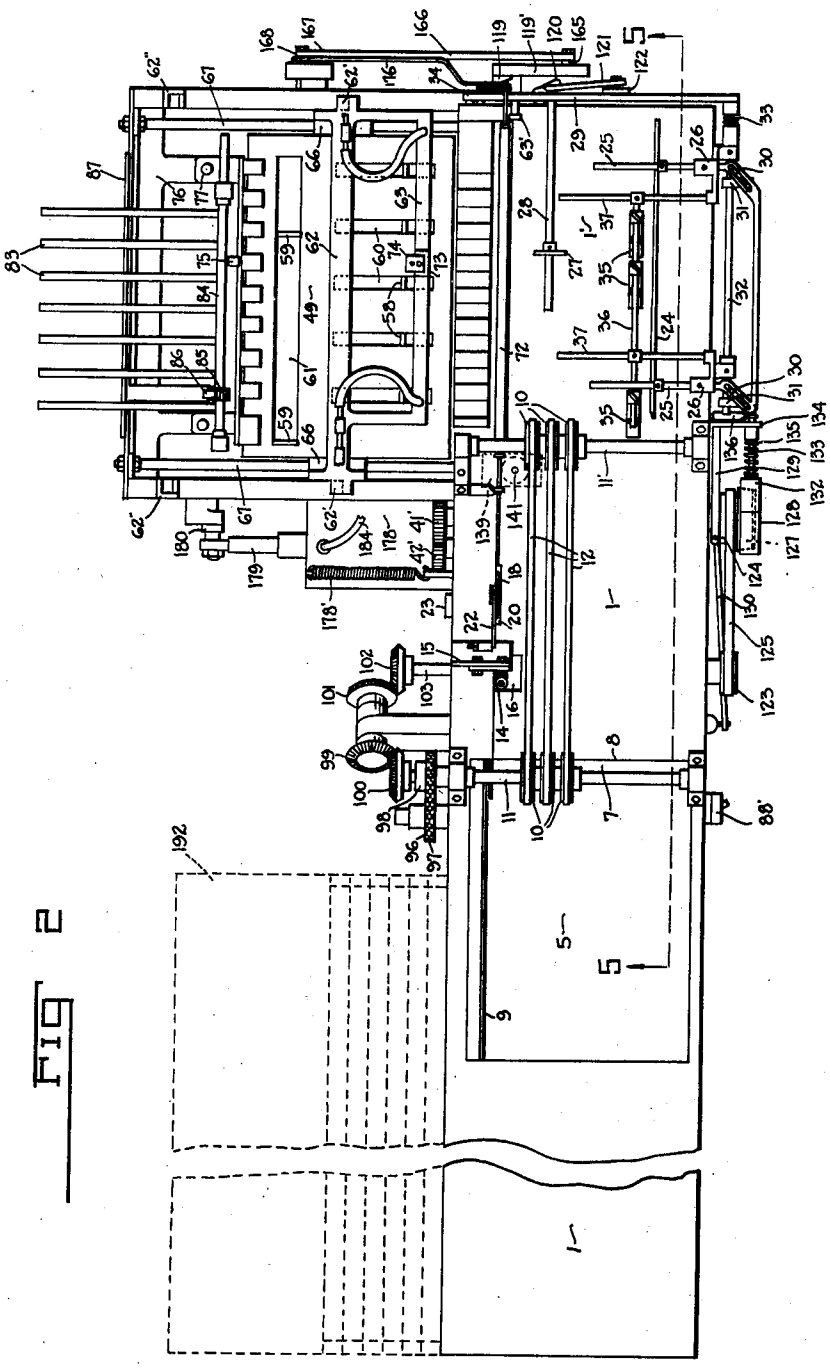


FIG 2

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SHEET ASSEMBLING MACHINE

Filed Feb. 6, 1940 4 Sheets-Sheet 3

Fig 3

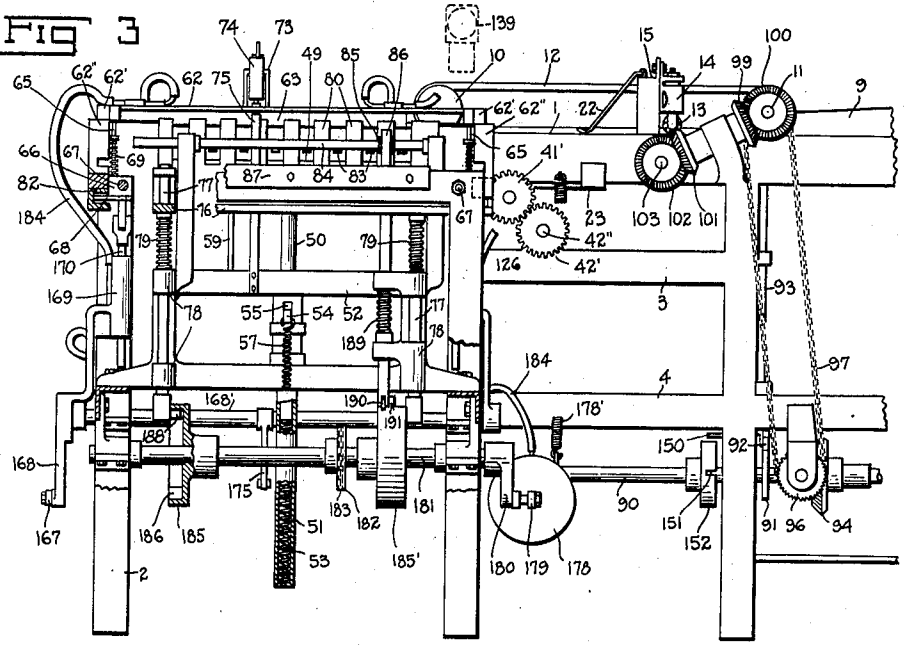
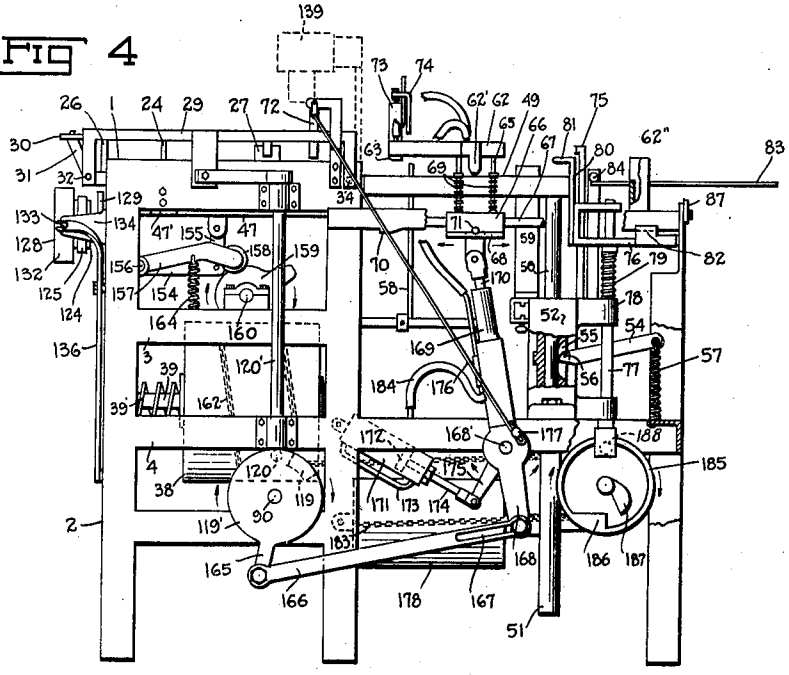


Fig 4



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SHEET ASSEMBLING MACHINE

Filed Feb. 6, 1940 4 Sheets-Sheet 4

Fig 5

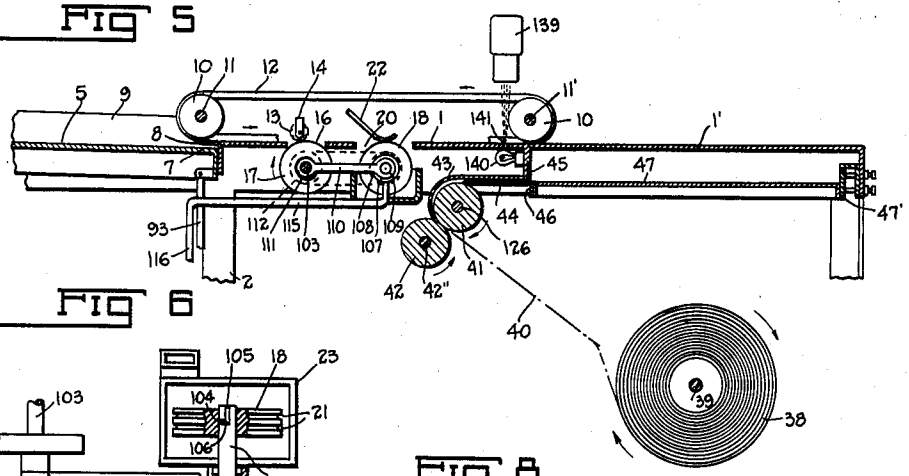



Fig 6

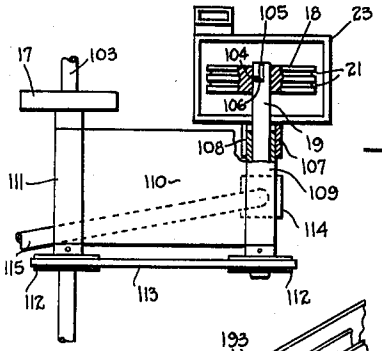



Fig 8

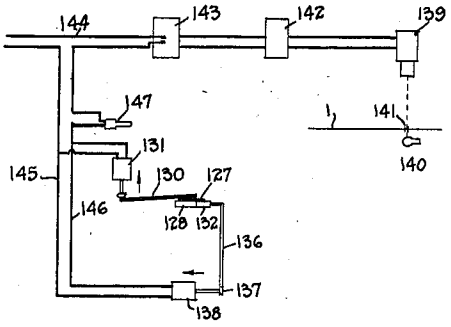



Fig 7

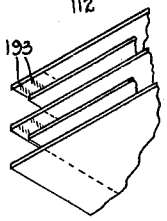
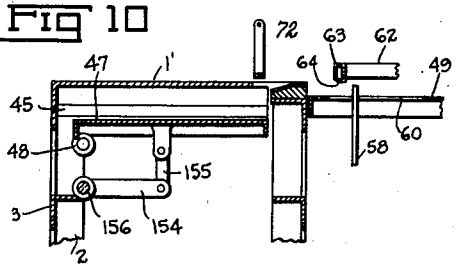



Fig 10



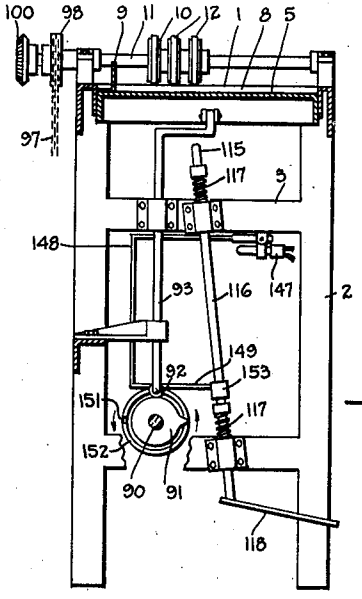




Fig 9

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Patented Dec. 24, 1940 2,226,397

# UNITED STATES PATENT OFFICE

2,226,397

## SHEET ASSEMBLING MACHINE

Lloyd L. West and Chester R. Walcher,
Wichita, Kans.

Application February 6, 1940, Serial No. 317,471

37 Claims. (Cl. 270—52)

This invention relates in general to sheet assembling machines and in particular to a device adapted to affix carbon paper from a roll to individual flat sheets and then to affix any desired number of flat sheets together to form a set.

In the commercial world, as well as in other fields, occasions necessitate the use of multiple copies of invoices, shipping blanks, orders, message forms and the like, wherein the copies may be of various colors, forms or bear consecutive numbers or other indicia to form a set, with a sheet of carbon paper between copies.

As far as we are aware sets of this nature have heretofore been assembled either by hand or by a device which feeds the printed forms and the carbon paper from rolls arranged vertically and obviously limited to the number of copies which may be assembled, since means must be provided for handling a separate roll for each sheet in the set, and for handling a separate roll of carbon paper for feeding between sheets of the set. In such a setup a roll of printed paper and a roll of carbon paper must be provided for every sheet in a set.

In our device, where individual flat sheets are employed, only one roll of carbon paper is needed since this roll provides a sheet of carbon paper for each individual flat sheet and sets may be formed with any desired number of flat sheets and interleaved carbon paper.

The objects of our invention are: first; to provide in a sheet assembling machine, flat-sheet feeding means, means for feeding carbon paper from a roll, means for securing the flat sheets and carbon paper together, and means for securing a plurality of flat sheets and carbons together to form a set.

Second; to provide in a sheet assembling machine employing flat sheets and a roll of carbon paper, means for applying adhesive to a portion of each flat sheet, means for applying a sheet of carbon paper to a portion of the adhesive on each sheet, and means for combining a plurality of flat sheets and carbons and forcing the adhesive bearing portions together to form a set.

Third; to provide in a sheet assembling machine, manual means for preventing adhesive application and carbon paper feeding during the feeding of the initial flat sheet for each set, and synchronous means in connection with the manual means for timing the moment of commencement and termination of carbon paper feeding.

Fourth; to provide in a sheet assembling machine of the class described, automatic means operable by the flat sheet being fed, to actuate the carbon paper feeding means, whereby a predetermined amount of carbon paper will be fed into applying position only when a flat sheet is being fed.

Fifth; to provide in a sheet assembling machine, means for bringing flat sheets and sheets of carbon paper into alignment, securing them together and transferring them to a binding means where any desired number of flat sheets and carbons are aligned and secured together to form a set.

Sixth; to provide in a sheet assembling machine, a pivoted carbon paper receiving table, knives associated with the table, and means for rocking the table to sever the carbon paper and bring the severed piece of carbon paper into engagement with a flat sheet for affixing thereto.

Seventh; to provide in a sheet assembling machine, a sheet receiving table arranged for vertical movement, means normally urging the table upward, and releasable stop means normally preventing upward movement of the table.

Eighth; to provide in a sheet assembling machine, a binding means in connection with a receiving table, said binding means being adapted to be forced down against the sheets at the moment of sheet deposit to secure the sheets together.

Ninth; to provide in a flat-sheet assembling machine, sheet feeding means and sheet introducing means adapted to supply a sheet to the feeding means at a predetermined moment.

Tenth; to provide in a flat-sheet assembling machine, a reciprocating transfer means for picking up, carrying and depositing sheets and carbon papers to a receiving means, suction means carried by the transfer means, and means adapted to release the suction at the moment of sheet deposit.

Eleventh; to provide in a flat-sheet assembling machine, an intermittently operated sheet striker adapted to strike the assembled sheets after deposit on a receiving means.

Other objects and advantages, as well as the construction and operation of our invention will be clearly understood by reference to the following specifications in connection with the accompanying drawings in which:

Fig. 1 is a front elevational view of our sheet assembling machine, parts being broken away to better illustrate certain other parts.

Fig. 2 is a top plan view of the assembled machine.

Fig. 3 is a rear elevational view of a portion of the machine with parts broken away and other parts shown in section for clearer illustration.

Fig. 4 is an end elevational view of our invention with parts shown in sectional detail.

Fig. 5 is a fragmentary sectional detail view on the line 5—5 of Fig. 2, parts being omitted for clarity, the figure showing the sheet feeding, perforating, adhesive applying, and carbon paper feeding and severing means.

Fig. 6 is a top plan detail view of the perforating and adhesive applying mechanism.

Fig. 7 is a fragmentary, disassembled perspective view of a set formed by our machine, showing flat sheets, carbon paper and adhesive portions on the flat sheets.

Fig. 8 is a diagrammatic view and circuit of carbon paper feed control means.

Fig. 9 is a vertical cross sectional view on the line 9—9 of Fig. 1 showing the flat-sheet introducing table and operating means therefor, and the manual control for the adhesive applying mechanism.

Fig. 10 is a fragmentary, vertical sectional view on the line 10—10 of Fig. 1 showing the carbon paper receiving table and a portion of the sheet receiving table and transfer carriage.

Referring now to the drawings by numerals of reference, 1 designates a table frame with legs or standards 2 and intermediate braces 3 and 4.

Sheet introducing means are provided by pivoted table 5 hinged at 6 and having one end 7 normally lower than the level of table 1 to provide shoulder 8 forming a guide against which the flat sheets may abut during introduction to the feeding means. Longitudinal guide 9 may also be provided on the introducing table.

Sheet feeding means include pulleys 10 on suitably journaled shafts 11 and 11' and belts 12 running on flat top surface of table frame 1 and extending partly over the introducing table 5.

Sheet perforating means include a notched disc 13 vertically adjustable in bracket 14 which in turn is horizontally slidable on support 15 of table 1. An opening 16 is provided in the table and a driven disc 17 projects therethrough and engages the notched disc 13.

Adhesive applying means include a wheel 18 rotatable with shaft 19 and extending through opening 20 in table top. The wheel may be provided with several grooves 21. A finger 22 carried by support 15 has one end thereof in alignment with one of the grooves and is adapted to ride the flat sheets and urge them against the wheel.

The adhesive applying wheel 18 rotates in a removable container 23 holding an adhesive fluid. Further detailed particulars regarding the adhesive applying means will be given hereinafter.

The sheet feeding means moves the flat sheets to the end 1' of the table where guides or aligners are provided to properly position each sheet. The longitudinal guide 24 is adjustably carried on rods 25 slidably supported in brackets 26, and transverse guide 27 is slidably carried on rod 28 fixed to cross bar 29.

For accurate alignment of the sheets, means for "jogging" or imparting an intermittent movement to the guides is provided—on the longitudinal guide—by diagonally slotted ends 30 on rods 25, arms 31 having pins working in said slots, the arms being secured to shaft 32 suitably carried by the table and supporting one end of the cross bar 29. Spring 33 normally urges the shaft 32 in one direction, and other means, hereinafter disclosed, are provided for urging the shaft in the opposite direction to actuate the arms 31 and cross bar 29 to "jog" the sheet at the guides for proper alignment. The other end of the cross bar 29 is resiliently mounted in the table 1 at 34.

Suitable sheet holddowns 35 may be adjustably carried on rods 36 which in turn are transversely adjustable on rods 37 carried in brackets 26.

In the carbon paper feeding means a roll of carbon paper 38 is carried on suitably journaled shaft 39, a spring 39' keeping the roll at proper tension and in proper feeding position. The carbon paper passes along guide 40 and between feed rollers 41 and 42. An arcuate guide 43 directs the carbon paper around the roller 41 and onto guide 44 from whence it passes between knives 45 and 46 onto a carbon paper receiving table 47. The knife 45 may be carried by the table frame 1 and the knife 46 by the table 47. The carbon paper receiving table 47 is suitably pivoted at 48 and is adapted to be intermittently rocked by mechanism hereinafter disclosed.

To maintain proper cutting relation between the knives, an adjustable friction plate 47', carried by the table frame 1, is adapted to bear against the end of the table 47 opposite the knives.

After the carbon paper is severed and secured to the flat sheets, the combined sheet and carbon is transferred to a vertically movable receiving table 49 carried on standard 50 sleeved in cylinder 51 of cross frame 52 and normally urged upward by spring 53. (See Figs. 3 and 4.)

To hold receiving table 49 locked against upward movement as it moves downwardly we have provided a lever or dog 54, operating in slot 55 of cylinder 51 and having offset pivot 56. The lever 54 is normally urged against the standard 50 by spring 57.

For assisting in the alignment of the sheets on the receiving table 49, adjustable guides 58 and 59 may be provided, said guides being positioned in slotted openings 60 and 61 of the receiving table, the binding means forming a guide for one edge of the sheets.

To transfer the flat sheets and carbon paper to the receiving table 49 we have provided a reciprocating carriage 62 having a sheet pickup or suction bar 63 with suction openings 64 in the bottom thereof. (See Fig. 10.) To the carriage are secured rods 65 vertically slidable in heads 66 horizontally movable on rods 67 carried by the table frame 1. The lower end of each rod 65 is secured to plates 68 and the plates and carriage are normally urged upward by springs 69. The reciprocating mechanism for the carriage will be described hereinafter. The carriage is depressed into sheet pickup position by the cams 70 contacting the roller 71 on plates 68 and forcing said plates and attached rods 65 downwardly.

As shown in Fig. 10, a swinging sheet guide 72 is provided and is adapted to be moved out of the path of the suction bar 63 by means hereinafter related. A suction bar holddown member 63' is also provided on the table frame for contacting the suction bar during sheet pickup. The suction bar 63 carries a suction relief valve 73 adapted to be operated during sheet deposit by slidable member 74 striking fixed stop 75.

Immediately upon alignment and during deposit of the transferred sheets, binding means are adapted to come into play. This binding means comprises a frame 76 carried by rods 77 arranged for vertical movement in bearings 78 and normally urged upwardly by springs 79. This frame has a plurality of vertical fingers 80 abutting one edge of the receiving table 49, the fingers having angular ends 81 adapted to bear against the sheets and carbon paper on the table 49 when the frame 76 is depressed.

The binding frame 76 is provided with offset hook portions 82 (see Figs. 3 and 4) in which plates 68 of carriage 62 are adapted to enter during sheet deposit, said plates and the attached carriage being adapted to be moved downwardly. Guide ears 62' on the carriage 62 are adapted to engage and move vertically in guides 62'' on the

table frame to positively guide the carriage 62 during vertical deposit movement.

It will be noted that the strain is taken by the binding means, the transfer carriage merely being carried downwardly with the frame 76 and not exerting any force against the sheets on the receiving table 49. Operating means for the binding means will be described hereinafter.

A "flopper" or sheet striker is provided by flexible fingers 83 carried on shaft 84, rotatable by pinion 85 and rack 86, the operating means for said rack being disclosed later. The fingers 83 are adapted to be rapidly swung arcuately between the binding fingers 80 to strike the assembled sheets after the reciprocating carriage has deposited each sheet and has left deposit position or at least has moved cleared of the path of the "flopper" fingers 83. A "flopper" strike bar 87 of suitable sound deadening material may be secured to the table frame 1.

The driving source for all the moving mechanism may be an electric motor 88 or any other suitable power unit, geared down through reduction unit 89 driving shaft 90 suitably journaled in the table frame 1. A switch 88' for controlling the current source to the motor is shown but any suitable switching means may be used, such as a foot control or the like.

The sheet introducing table 5 is actuated by cam 91 on shaft 90, said cam contacting roller 92 on upright connecting rod 93 pivotally secured to the table 5. (Fig. 9.)

The sheet feeding pulleys and belts 10 and 12 are driven by bevel gear 94 on shaft 90, driving gear 95, sprocket 96, chain 97, and sprocket 98 on shaft 11.

The sheet perforating means are driven by bevel gear 99 meshing with gear 100 on shaft 11 and gear 101 meshing with gear 102 on shaft 103 on which the perforating disc is mounted.

In the adhesive applying means it is necessary that the wheel 18 and container 23 be removable and it is also necessary that means be provided to render the adhesive applying means inoperative by moving the same out of the path of the sheets. It is to be understood that this is done ordinarily only during the feeding of the first sheet for the start of each set, which sheet obviously does not require any carbon paper and therefore no adhesive.

Toward this end we have provided on the hub of the wheel 18, a pin 104 adapted to engage groove 105 in shaft 19 and to enter leg 106 of said groove. The container 23 is provided with a collar 107 having slot 108, the collar 107 being adapted to sleeve over collar 109 of bracket 110, the shaft 19 bearing in said collar 109 and the slot 108 in collar 107 being adapted to engage the bracket 110. The bracket 110 is provided with a second collar 111 which is sleeved on shaft 103 of the perforating disc 17. Shaft 19 is driven by pulleys 112 and belt 113.

To retain the adhesive applying assembly in raised position we have provided a yoke 114 carried by offset arm 115 of rod 116, and bearing against the collar 107.

The rod 116 is suitably supported for vertical movement, is normally urged upward by springs 117, and terminates at its base with a suitable foot pedal 118. As shown in Figs. 1, 6 and 9, it will be noted that the offset arm may be swung clear of the bracket 110 to facilitate removal of the adhesive container and wheel.

The sheet "joggers" are motivated by cam 119 on disc 119' carried by shaft 90, said cam actuating a rocker arm 120 on shaft 120' suitably journaled to the table frame and extending upwardly to terminate in an arm 121 adapted to bear against depending leg 122 of cross bar 29. Movement of the cross bar will cause longitudinal movement of the shaft 32, causing pins on arms 31 to slide in slotted ends 30 of rods 25, forcing said rods inwardly, providing for an intermittent "jogging" of the guides 24 and 27.

In the carbon paper feeding mechanism the perforating disc shaft 103 extends transversely of the table frame 1 and carries pulley 123 driving pulley 124 through belt 125. The pulley 124 freely rotates on shaft 126 of feed roller 41, said shaft carrying gear 41' on the opposite side of the table in mesh with gear 42' on shaft 42'' of roller 42.

The pulley 124 carries a clutch cone 127 adapted to engage tapered recess in drum 128 which is secured to the shaft 126. A yoke bracket 129 carries clutch actuating lever 130, the other end of which is operatively engaged with solenoid 131. A brake shoe 132 is operatively related to the drum 128 and is carried on rod 133 slidably mounted in bracket 134, the shoe 132 being normally urged against the drum by spring 135, a pivoted lever 136 being adapted to slidably actuate the rod 133, the end 137 of said lever being operatively connected to a solenoid 138.

In connection with the solenoids and the related mechanism which they actuate, attention is invited to the circuit diagram in Fig. 8 as well as to the other views showing carbon paper feed control mechanism.

One of the novel features of our machine lies in the use of the flat sheet being fed to automatically start and stop the carbon paper feeding means.

Although other means may be employed with equal results we have preferred to illustrate an "electric eye" or photoelectric cell as a means for controlling the starting and stopping of the carbon paper feed.

As shown in the various views and particularly in Fig. 5, a photoelectric cell 139 is mounted above the table 1 and the rays from an incandescent bulb 140 are adapted to pass through opening 141 in the table, the cell 139 being focused to catch the rays.

As far as the photoelectric cell is concerned, the circuit used to convey the energy from said cell is standard and well known, a relay 142 and switch control 143 being connected in the circuit and energized by action of the photoelectric cell.

One conductor 144 of the current source line is connected to one side of the switch 143, the other conductor 145 being connected to each of the solenoids 131 and 138. Another conductor 146 connects the two solenoids and the switch 143.

Under normal conditions when there is no sheet in the feeding means the opening 141 is unobstructed and the rays from the incandescent bulb pass therethrough and actuate the photoelectric cell which, in turn, actuates the relay and switch to maintain an open circuit, whereby the solenoids will be inoperative and the clutch will remain disengaged and the brake engaged to prevent carbon paper feeding.

However, the moment the light ray is "broken" or obstructed so that it cannot reach the photoelectric cell, the relay and switch will operate to close the circuit and operate the solenoids for immediate engagement of the clutch and release of the brake.

The purpose for providing a brake is to insure

immediate stopping of the carbon feed rollers upon passage of a sheet beyond the light ray and upon release of the clutch.

As heretofore explained, when feeding the initial sheet for each set, it is not desired to apply an adhesive thereto or to supply carbon paper therefor. However, while the initial sheet is approaching the adhesive applying means, the preceding sheet is passing through the carbon paper feeding stage, and it is necessary to continue the carbon paper feeding operation for said preceding sheet. In other words, it is desired to operate a manual control for moving the adhesive applying means out of the path of the initial sheet without rendering the carbon paper feeding means inoperative while the preceding sheet is passing through the carbon paper feeding stage. But it is necessary to render and hold inoperative the carbon paper feeding means while the initial sheet is passing through the carbon paper feeding stage.

Toward this end we have provided the mechanism heretofore described for raising and lowering the adhesive applying means, and in connection therewith we have provided, as a preferred method for accomplishing our purpose, a mercury switch 147 mounted for tiltable movement and incorporated in the circuit to the solenoids. A lever 148 is adapted to tilt the switch 147 and is secured to a resilient lever 149 having a detent 150 engageable in slot 151 of drum 152 on shaft 90. The resilient lever 149 is carried by arm 153 on rod 116.

In operation, when the foot pedal 118 is depressed the adhesive applying means will immediately be removed from the path of the sheet being fed. However, the carbon paper feeding mechanism will continue to be operative by the preceding sheet passing below the photoelectric cell, until the detent 150 riding the outer periphery of drum 152, upon depressing of the pedal, enters the slot 151 permitting downward movement of lever 148 and subsequent tilting of the mercury switch 147 for opening of the circuit in which the clutch and brake operating solenoids are connected. The slot 151 and drum 152 are so arranged and timed as to prevent entrance of the detent 150 until the preceding sheet has passed through the carbon paper feeding stage. Conversely, upon release of the foot pedal for return of adhesive applying means to operating position for the sheet following the initial sheet, the carbon paper feeding means will be retained in inoperative position during passage of the initial sheet through said carbon paper feeding stage, the detent 150 being urged against the inner periphery of the drum 152 until in alignment with and released through the slot 151, said release occurring after the initial sheet has passed through the carbon paper feeding stage and before the following sheet has reached the carbon paper feeding stage. Release of the detent 150 will cause the mercury switch 147 to close the circuit between the solenoids and the switch 143, permitting normal opening and closing of the circuit by operation of the photoelectric cell.

The pivoted carbon paper receiving table 47 is rocked or actuated by lever 154 and link 155 pivotally secured to table 47, the lever 154 being carried on shaft 156 having rocker arm 157 and roller 158 contacting and rockable by cam wheel 159 on shaft 160 rotatable by sprocket 161, and chain 162 on sprocket 163 of shaft 90. A spring 164 normally urges rocker arm 151 downwardly to retain roller 158 against the cam wheel 159.

The transfer carriage 62 is adapted to be reciprocated by lever extension 165 on disc 119', said extension pivotally carrying lever 166 having a slotted end 167 slidably connected to lever 168. Said lever 168 is carried on a shaft 168' and sleeve arms 169 are carried at both ends of shaft 168'. Rods 170 are slidably positioned in the arms 169 and have forked ends in pivotal connection with heads 66 of the carriage 62.

The slotted connection between lever 166 and lever 168 provides for a slight time delay in carriage reciprocation at the moment of sheet pickup and sheet deposit, and to prevent sudden jars and strains when the ends of the slot 167 are reached we have provided a fluid containing cylinder 171, having one end thereof pivoted to the table frame 1, a piston 172 movable within the cylinder, a fluid bypass 173, and a piston rod 174 pivotally secured to lever 175 on shaft 168'.

The swinging sheet guide 72 is actuated by rod 176 having a slotted end pivotally carried by offset pin 177 on lever 168.

Air suction means are provided by cylinder pump 178 pivotally mounted at one end to the table frame, the piston rod 179 being pivotally secured to lever 180 on shaft 181. Said shaft is driven by sprocket 182, chain 183, and a second sprocket 182' on shaft 90. Suitable flexible conduits 184 are connected to the cylinder pump 178 and to the suction bar 63, provision being made for movement of the conduits during reciprocation of the carriage 62. A spring 178' may be secured to the pump and to the table frame to assist in raising the pump during rotation of lever 180.

The binding means is actuated by cam wheels 185 and 185' secured to shaft 181, the cams 186 and 187 being adapted to contact cam roller 188 on rods 77 to urge said rods and the binding frame 76 gradually downward and to accelerate the upward return thereof.

The rack 86 of the "flopper" mechanism is suitably mounted for vertical movement and is normally urged downwardly by spring 189. A cam roller 190 is provided on the lower end of the rack and rides cam wheel 185' to be contacted by cam 191 for raising the rack and rotating the "flopper" shaft 84, in one direction, the spring 189 causing rotation in the reverse direction.

Obviously, all the moving parts are so arranged and synchronized that they will perform their functions at the proper time and in the proper sequence. We have shown in dotted lines a rack 192 on which the various flat sheets may be placed prior to feeding into the machine. It is understood that any suitable rack or other means may be provided for this purpose and we do not intend to be limited to what we have illustrated.

In operating the machine, the operator takes a position in front of the introducing table 5 and places single sheets on the table positioning the sheet against the shoulder 8 and the guide 9. With the motor operating the feed belts 12 are continuously moving and at the proper moment the introducing table will be raised and the belts which extend over a portion of the introducing table 5 will contact the sheet and move it along the table. In feeding the initial sheet for each set it is not desired to apply an adhesive or carbon paper and therefore as soon as the operator places this initial sheet on the introducing table he presses down on the foot pedal 118 to remove the adhesive applying means from the path of the

sheet. The foot pedal will also actuate a control for preventing carbon paper feed and the initial sheet will pass through the feeding means, be perforated between discs 13 and 17 and be transferred to and aligned on the receiving table 49. After this first sheet has passed the adhesive applying means and as the following sheet is introduced, the operator releases the foot pedal and the carbon paper feed means will remain inoperative until detent 150 is released from the drum 152 by passing out through slot 151. This will close the mercury switch 147 but will not necessarily start the carbon paper feeding means since positive actuation of such means is also dependent on a sheet passing over the light ray from the incandescent bulb 140.

Upon release of the foot pedal and insertion of additional individual flat sheets on the introducing table the device will operate in a normal manner, that is, the sheets will be perforated, adhesive applied and when passing between the photoelectric cell and the incandescent bulb, a predetermined amount of carbon paper will be fed to the carbon paper receiving table the amount of carbon paper fed depending on the length of the flat sheet and consequently on the length of time that the light ray is interrupted.

The moment the light ray is unobstructed the carbon paper feed will stop and the table 47 will be quickly rocked to cut the carbon paper and raise the cut portion to close proximity with the flat sheet which is in alignment therewith. At the same moment the sheet pickup or suction bar 63 on the reciprocating carriage 62, having moved to a position over the adhesive bearing edge of the flat sheet is quickly depressed at that point by cam 70 to cause the suction bar to firmly press the sheet and carbon together against the table 47, the carbon paper adhering to the flat sheet.

In Fig. 7 is shown a preferred method of adhesive application, two stripes 193 of adhesive being applied to the flat sheets, the carbon paper being affixed to the inner stripe.

The flat sheet with carbon paper attached will adhere to the suction bar which is moved across the receiving table 49, the sheets being aligned by guides 58 and 59 and binding fingers 80, and the binding frame 76 is depressed carrying with it the reciprocating carriage 62, the hooked portions 82 of the fingers 80 bearing firmly against the sheets, and the suction being broken to permit deposit of the sheets.

As additional sheets are deposited on the receiving table the outer stripe of adhesive is pressed firmly against preceding sheets and a set of any desired number of sheets and carbons may be formed.

As sheets accumulate on the receiving table 49 said table lowers automatically and is restrained against upward movement by dog 54 which may be manually released to permit return of the table 49 to raised position when the sheets have been removed.

Between each set, the initial operation, that of depressing the foot pedal to prevent adhesive applying and carbon paper feeding, is repeated.

It is clearly obvious that we have provided a device in which any number of flat sheets and carbons may be assembled into sets, in which feeding of a flat sheet into the machine will insure positive and automatic feeding of a predetermined quantity of carbon paper unless the operator desires to manually prevent such feeding, that as long as sheets are not introduced no carbon is being fed and there is nothing wasted.

It should also be clear that in devices adapted to perform the general function of our machine we have provided a relatively simple and economical structure.

We reserve all rights to such changes in form, proportion and details of construction as come within the scope of these specifications and the following claims.

What we claim as new and desire to secure by Letters Patent is:

1. A sheet assembling machine comprising flat sheet feeding means, carbon paper roll feeding means, means for severing and affixing a sheet of carbon paper from the roll to the flat sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, and means for binding the aligned sheets.

2. A sheet assembling machine comprising flat sheet feeding means, carbon paper feeding means, automatic means operable by the sheet passing through the sheet feeding means for actuating the carbon paper feeding means, means for affixing the carbon paper to the flat sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, and means for binding the aligned sheets.

3. A sheet assembling machine comprising flat sheet feeding means, carbon paper feeding means, automatic means operable by the sheet passing through the sheet feeding means for actuating the carbon paper feeding means, manual means for rendering the carbon paper feeding means inoperative, means for affixing the carbon paper to the flat sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, and means for binding the aligned sheets.

4. A sheet assembling machine comprising flat sheet feeding means, carbon paper feeding means, automatic means operable by the sheet passing through the sheet feeding means for actuating the carbon paper feeding means, manual means for rendering the carbon paper feeding means inoperative, said manual means including means synchronized with the sheet feeding means whereby the carbon paper feeding means will be rendered inoperative at a predetermined moment, means for affixing the carbon paper to the flat sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, and means for binding the aligned sheets.

5. A sheet assembling machine comprising flat sheet introducing means, sheet feeding means normally disengaged from the sheet feeding means and intermittently movable into engagement therewith, means for transferring the sheets from the introducing means to the sheet feeding means at a predetermined moment, carbon paper roll feeding means, means for severing and affixing a sheet of carbon paper from the roll to the flat sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, and means for binding the aligned sheets.

6. A sheet assembling machine comprising flat sheet introducing means, a sheet feeding means, said introducing means including a pivoted table normally disengaged from the sheet feeding means, means for moving the table into engage-

ment with the sheet feeding means at a predetermined moment, carbon paper feeding means, means for affixing the carbon paper to the flat sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, and means for binding the aligned sheets.

7. A sheet assembling machine comprising a sheet feeding table, a sheet feeding means on said table, a flat-sheet introducing table adjacent the feeding table, one end of the introducing table being pivoted, the other end of the introducing table abutting and normally lower than the feeding table, the feeding table forming a guide stop for the sheets, the sheet feeding means extending above a portion of the sheet introducing table, means for rocking the introducing table at a predetermined moment to move the sheet thereon into engagement with the sheet feeding means, carbon paper feeding means, means for affixing the carbon paper to the sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, and means for binding the aligned sheets.

8. A sheet assembling machine comprising flat sheet feeding means, means for applying adhesive to a portion of each sheet, carbon paper feeding means, means for applying a sheet of carbon paper to the adhesive portion on each sheet, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, means for binding the aligned sheets, and manual means for rendering said adhesive applying means and said carbon paper feeding means inoperative.

9. A sheet assembling machine comprising flat sheet feeding means, means for applying adhesive to a portion of each sheet, carbon paper feeding means, means for applying a sheet of carbon paper to the adhesive portion on each sheet, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, means for binding the aligned sheets, and manual means for rendering said adhesive applying means and said carbon paper feeding means inoperative, said last named means including means synchronized with the sheet feeding means whereby the carbon paper feeding means will be rendered inoperative at a predetermined moment.

10. A sheet assembling machine comprising flat sheet feeding means, means for applying adhesive to a portion of each sheet, said adhesive applying means being movable and normally in the path of sheets carried by the sheet feeding means, manual means for moving the adhesive applying means out of the path of the sheets, carbon paper feeding means, means for applying a sheet of carbon paper to the adhesive portion on each sheet, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, and means for binding the aligned sheets.

11. A sheet assembling machine comprising flat-sheet feeding means, carbon paper feeding means, a clutch and a brake in said carbon paper feeding means, said clutch being normally disengaged and the carbon paper feeding means inoperative, said brake being normally engaged, automatic means operable by the sheet passing through the sheet feeding means adapted to cause simultaneous engagement of the clutch and release of the brake to actuate the carbon paper feeding means, means for affixing the carbon paper to the flat sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, and means for binding the aligned sheets.

12. A sheet assembling machine comprising flat-sheet feeding means, carbon paper feeding means, a clutch and a brake in said carbon paper feeding means, said clutch being normally disengaged and said brake being normally engaged, actuating means for said clutch and for said brake, said actuating means including solenoids, a circuit connected to a current source and to the solenoids, a circuit closing device in the circuit normally open and adapted to be closed by passage of a sheet through the sheet feeding device, whereby the solenoids will be actuated to operate the clutch and brake for actuation of the carbon paper feeding means, means for affixing the carbon paper to the flat sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, and means for binding the aligned sheets.

13. A sheet assembling machine comprising flat-sheet feeding means, carbon paper feeding means, carbon paper severing means, means for affixing the severed carbon paper to the flat sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, and means for binding the aligned sheets.

14. A sheet assembling machine comprising flat-sheet feeding means, carbon paper feeding means, a carbon paper receiving table, means for severing the carbon paper after a predetermined quantity of carbon paper is on the table, means for affixing the severed carbon paper to the sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, and means for binding the aligned sheets.

15. A sheet assembling machine comprising flat-sheet feeding means, carbon paper feeding means, a carbon paper receiving table, means including said receiving table for severing the carbon paper after a predetermined quantity of carbon paper is on the table, means for affixing the severed carbon paper to the sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, and means for binding the aligned sheets.

16, A sheet assembling machine comprising flat-sheet feeding means, carbon paper feeding means, a pivoted carbon paper receiving table, a knife carried by the table, a second knife fixed in cutting relation to the knife on the table, said carbon paper feeding means being adapted to pass a predetermined quantity of carbon paper between the knives and onto the table, means for rocking the table to sever the carbon paper and bring the severed carbon paper into engagement with the sheets fed by the feeding means, means for affixing the carbon paper to the sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets

on the receiving means, and means for binding the aligned sheets.

17. In a sheet assembling machine of the class described, a sheet introducing station, sheet feeding means, means for applying adhesive along one edge of the sheets, carbon paper feeding means, a carbon paper applying station, means at the carbon paper applying station for forcing the carbon paper against a portion of the adhesive on the sheets, a sheet receiving station, means for transferring the sheets and carbon paper to the receiving station, means for aligning the sheets in the receiving station, and means at the receiving station for forcing the remainder of the adhesive portion on the sheets against preceding sheets.

18. In a sheet assembling device of the class described employing individual flat sheets and a roll of carbon paper, means for feeding the flat sheets along a table, means for stopping the sheets at a predetermined point, means for feeding carbon paper from the roll into alignment with the sheets at the sheet stopping point, means for severing a predetermined quantity of carbon paper, means for affixing the severed carbon paper and the flat sheet together, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, and means for binding the aligned sheets.

19. In a sheet assembling device of the class described employing individual flat sheets and a roll of carbon paper, means for feeding the flat sheets along a table, means for applying adhesive to a portion of the sheet, means for stopping the sheets at a predetermined point, means for feeding carbon paper from the roll into alignment with the sheets at the sheet stopping point, means for applying a predetermined quantity of carbon paper to the adhesive portion of the sheet, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, and means for forcing the adjacent sheets together whereby the adhesive portions will adhere to preceding sheets.

20. A sheet assembling machine comprising flat-sheet feeding means, carbon paper feeding means, means for affixing the carbon paper to the flat sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, and means for binding the aligned sheets, said sheet receiving means including a vertically movable table, said sheet binding means including a binding member movable downwardly against sheets on the table.

21. A sheet assembling machine comprising flat-sheet feeding means, carbon paper feeding means, means for affixing the carbon paper to the flat sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, and means for binding the aligned sheets, said sheets receiving means including a vertically movable table, said sheet binding means including a binding member movable downwardly against sheets on the table, said transferring means being movable downwardly simultaneously with the binding member.

22. A sheet assembling machine comprising flat-sheet feeding means, carbon paper feeding means, means for affixing the carbon paper to the flat sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, and means for binding the aligned sheets, said sheet receiving means including a vertically movable table, means normally urging the table upward, and releasable means locking the table against upward movement.

23. A sheet assembling machine comprising flat-sheet feeding means, carbon paper feeding means, means for affixing the carbon paper to the flat sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, and means for binding the aligned sheets, said transfer means including a reciprocating carriage for picking up, carrying and depositing sheets, suction means carried by the carriage, means for depressing the carriage at the moment of sheet pickup and sheet deposit, and means for stopping the suction at the moment of sheet deposit.

24. A sheet assembling machine comprising flat-sheet feeding means, carbon paper feeding means, means for affixing the carbon paper to the flat sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, and means for binding the aligned sheets, said transfer means including a reciprocating carriage for picking up, carrying and depositing the sheets, means including the binding means for depressing the carriage at the moment of sheet deposit.

25. A sheet assembling machine comprising flat-sheet feeding means, carbon paper feeding means, means for affixing the carbon paper to the flat sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, and means for binding the aligned sheets, said transfer means including a reciprocating carriage for picking up, carrying and depositing the sheets, means operable simultaneously with the binding means for depressing the carriage during sheet deposit.

26. A sheet assembling machine comprising flat-sheet feeding means, carbon paper feeding means, means for affixing the carbon paper to the flat-sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, and means for binding the aligned sheets, said binding means including a vertically movable binding frame, said transfer means including a reciprocating carriage for picking up, carrying and depositing the sheets, said carriage being adapted to engage the binding frame and move downwardly therewith during sheet deposit and binding.

27. A sheet assembling machine comprising flat-sheet feeding means, carbon paper feeding means, means for affixing the carbon paper to the flat sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, means for binding the aligned sheets, and an intermittently operated sheet striker operable after sheet transfer.

28. A sheet assembling machine comprising flat-sheet feeding means, carbon paper feeding means, means for perforating the flat sheets, means for affixing the carbon paper to the flat sheets, sheet receiving means, means for transferring the sheets and carbon paper to the re-

ceiving means, means for aligning the sheets on the receiving means, and means for binding the aligned sheets.

29. In a sheet assembling machine of the class described employing a roll of carbon paper, an assembly station, means for feeding flat sheets to the assembly station, means for feeding a predetermined quantity of carbon paper from the roll to the assembly station, means for affixing the flat sheets and carbon together at the assembly station, a sheet receiving station, means for transferring sheets and carbon from the assembly station to the receiving station, means for aligning the sheets in the receiving station, and means for binding the sheets in the receiving station.

30. In a sheet assembling machine of the class described employing a roll of carbon paper, an assembly station, means for feeding flat sheets to the assembly station, means including the flat sheets for feeding a predetermined quantity of carbon paper from the roll to the assembly station, means for aligning the carbon paper and the flat sheets at the assembly station, means for affixing the flat sheets and the carbon paper together at the assembly station, a sheet receiving station, means for transferring sheets and carbon from the assembly station to the receiving station, means for aligning the sheets in the receiving station, and means for binding the sheets in the receiving station.

31. A sheet assembling machine comprising flat-sheet feeding means, carbon paper feeding means, automatic means operable by the sheet passing through the sheet feeding means for actuating the carbon paper feeding means, manual means for rendering the carbon paper feeding means inoperative, said manual means including synchronized means operable at a predetermined moment after actuation of the manual means to render the carbon paper feeding means inoperative, said synchronized means also being operable at a predetermined moment after release of the manual means to render the carbon paper feeding means operative, means for affixing the carbon paper to the flat sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for alignment of the sheets on the receiving means, and means for binding the aligned sheets.

32. A sheet assembling machine comprising flat sheet feeding means, carbon paper feeding means, automatic means including a photoelectric cell and a light beam for actuating the carbon paper feeding means, said automatic means being operable upon interruption of the light beam by a sheet passing through the feeding means, manual means for rendering the carbon paper feeding means inoperative, means for affixing the carbon paper to the flat sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, and means for binding the aligned sheets.

33. A sheet assembling machine comprising flat-sheet feeding means, carbon paper feeding means, automatic means operable by the sheet passing through the sheet feeding means for actuating the carbon paper feeding means, manual means for rendering the carbon paper feeding means inoperative, means for synchronizing the manual means with the sheet feeding means, said synchronizing means including a driven drum, a peripheral slot in the drum, said manual means including a detent adapted to ride the drum and enter or leave the slot in the drum to render the carbon paper feeding means inoperative or operative at predetermined moments.

34. A sheet assembling machine comprising flat-sheet feeding means, means for applying adhesive to a portion of each sheet, carbon paper feeding means, means for applying a sheet of carbon paper to the adhesive portion on each sheet, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, means for binding the aligned sheets, and manual means for rendering said adhesive applying means inoperative.

35. A sheet assembling machine comprising flat-sheet feeding means, means for applying adhesive to a portion of each sheet, carbon paper feeding means, means for applying a sheet of carbon paper to the adhesive portion on each sheet, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, means for binding the aligned sheets, and manual means for rendering said adhesive applying means inoperative, said adhesive applying means including a pivoted container, said manual means including an arm normally urged upwardly and adapted to retain the container in operating position, said arm being depressible to permit the container to drop from adhesive applying position.

36. A sheet assembling machine comprising flat-sheet feeding means, means for applying adhesive to a portion of each sheet, carbon paper feeding means, means for applying a sheet of carbon paper to the adhesive portion on each sheet, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, means for binding the aligned sheets, and manual means for rendering said adhesive applying means inoperative, said adhesive applying means including a pivoted container, said manual means including an arm normally urged upwardly and adapted to retain the container in operating position, said arm being swingable out of container retaining position whereby the container may be removed from the machine.

37. A sheet assembling machine comprising flat-sheet feeding means, carbon paper feeding means, means for affixing the carbon paper to the flat sheets, sheet receiving means, means for transferring the sheets and carbon paper to the receiving means, means for aligning the sheets on the receiving means, means for binding the aligned sheets, said transfer means including a reciprocating carriage for picking up, carrying and depositing sheets, suction means carried by the carriage, means for depressing the carriage at the moment of sheet pickup and sheet deposit, and means for stopping the suction after the sheets are secured in the binding means.

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