3 Sheets—Sheet 1.

J. B. TERRY.

Pin Sticking Machine.

No. 12,975.

Patented May 29. 1855.

FIG. 1.

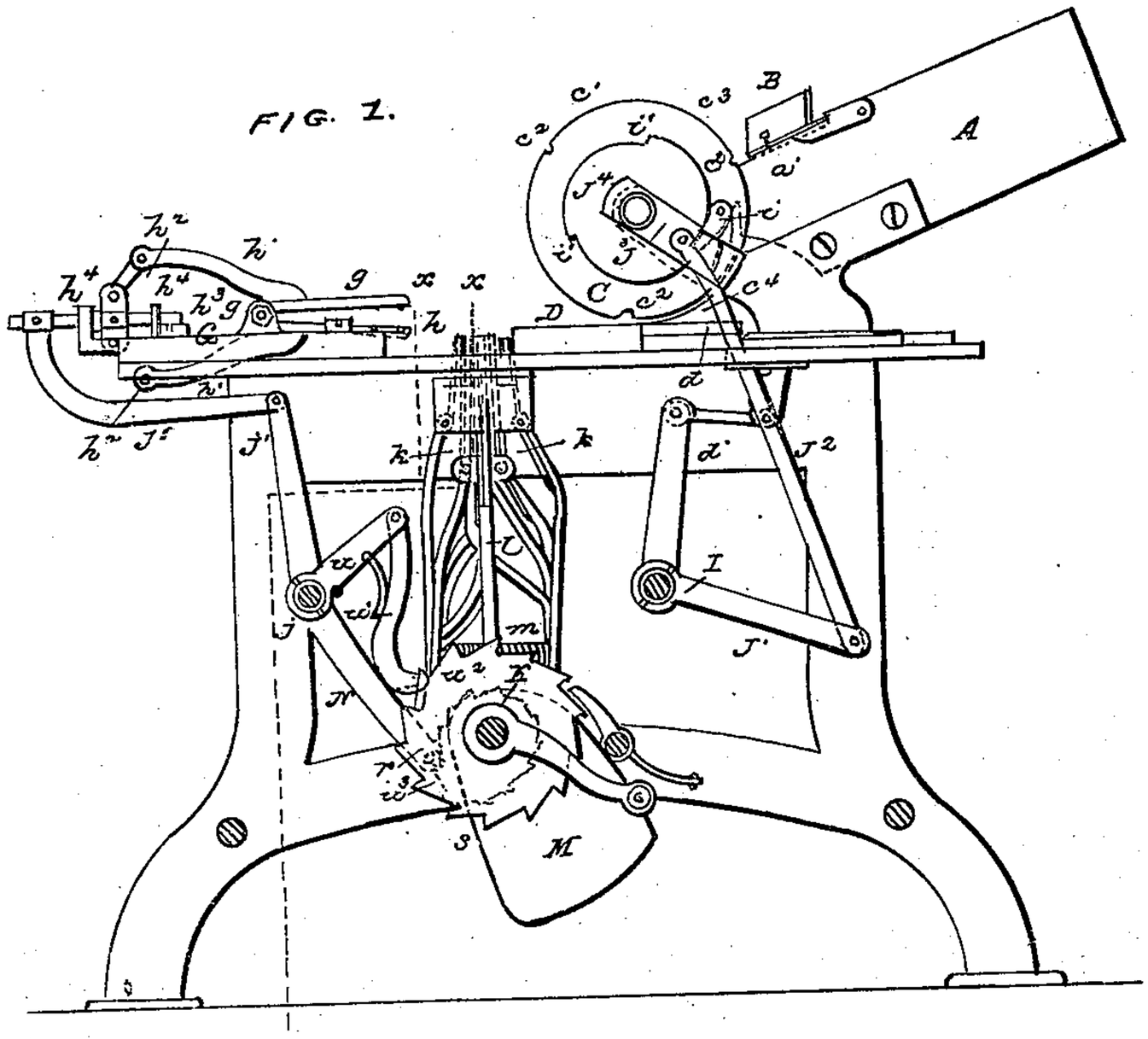
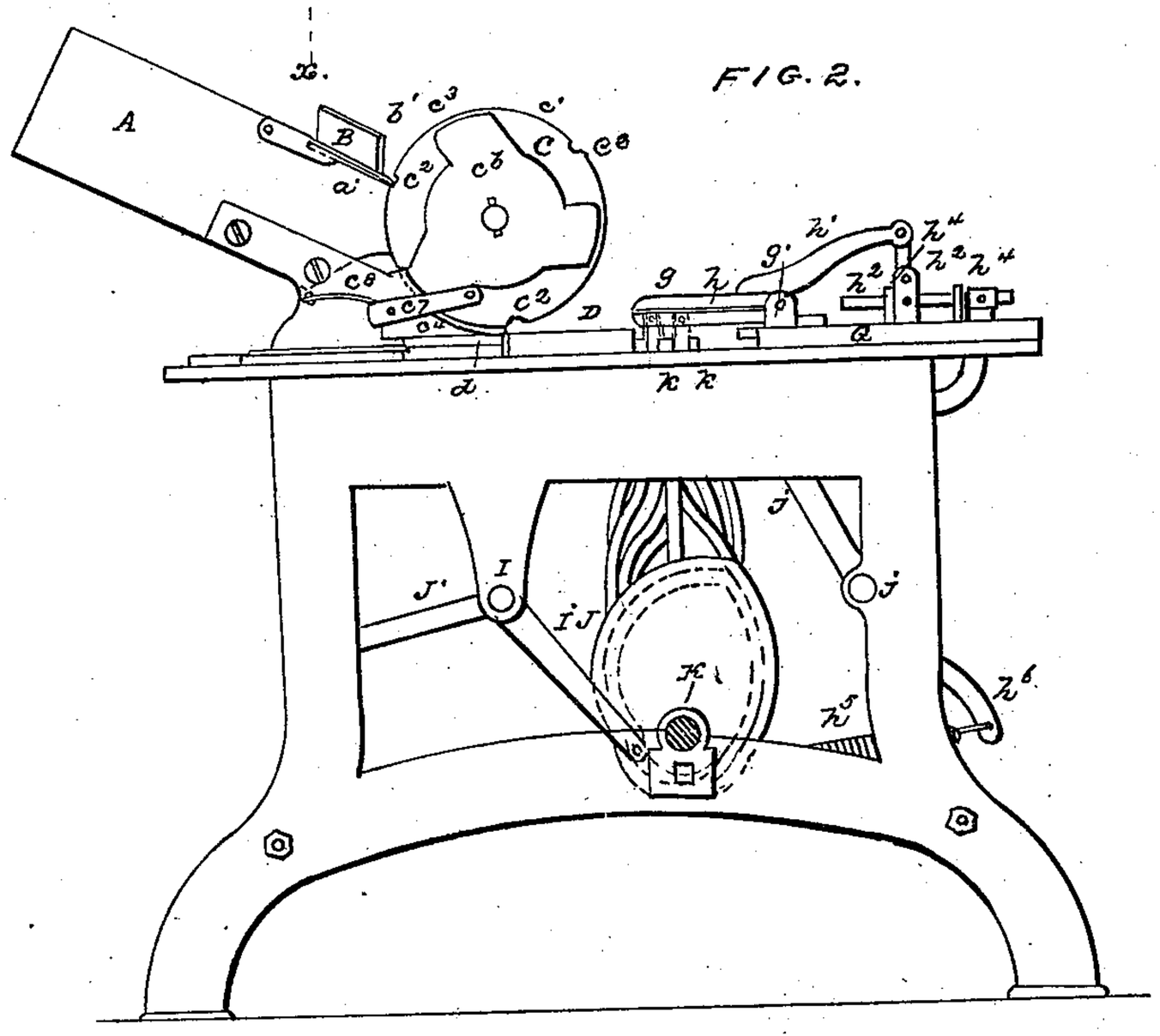


FIG. 2.



3 Sheets—Sheet 2.

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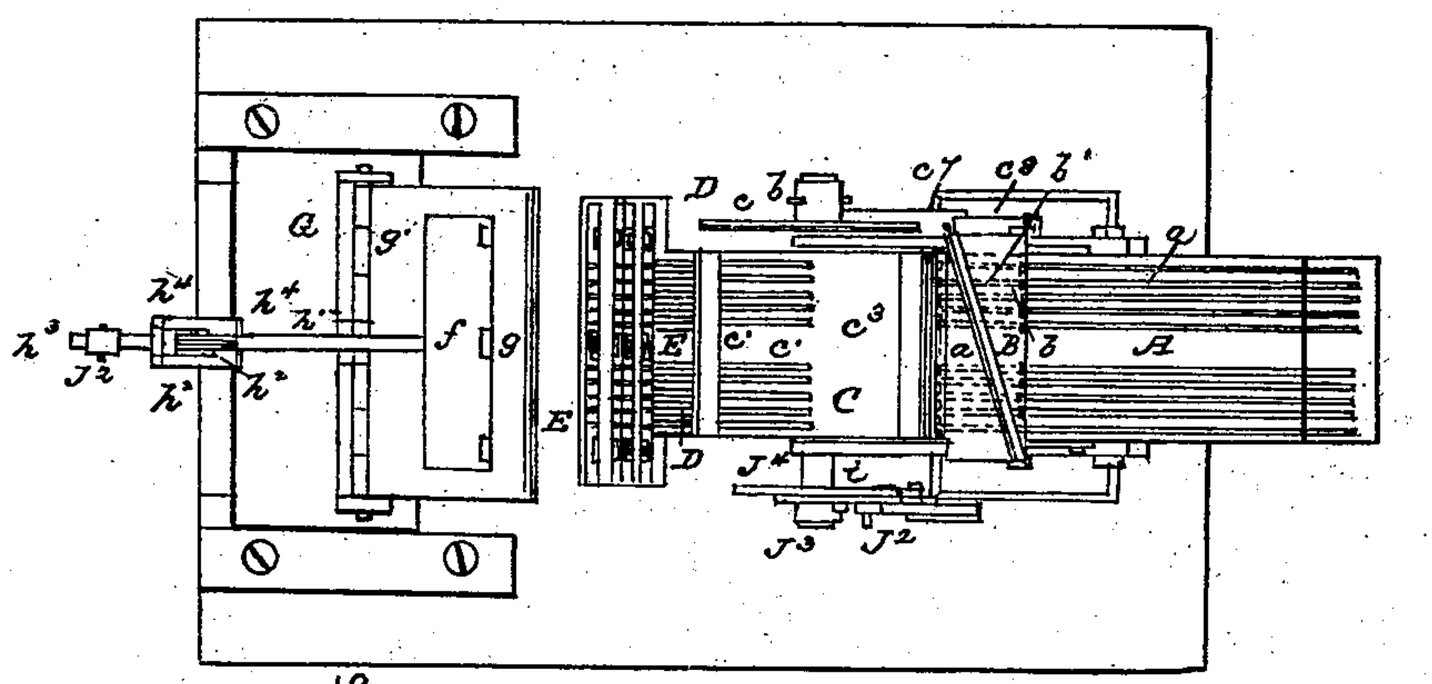
FIG. 3



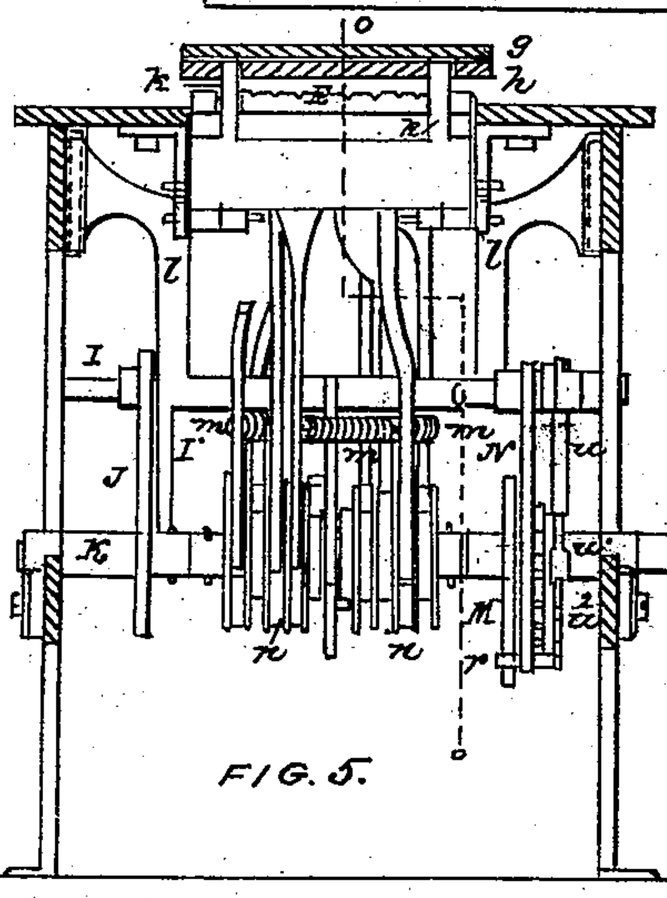


FIG. 5.

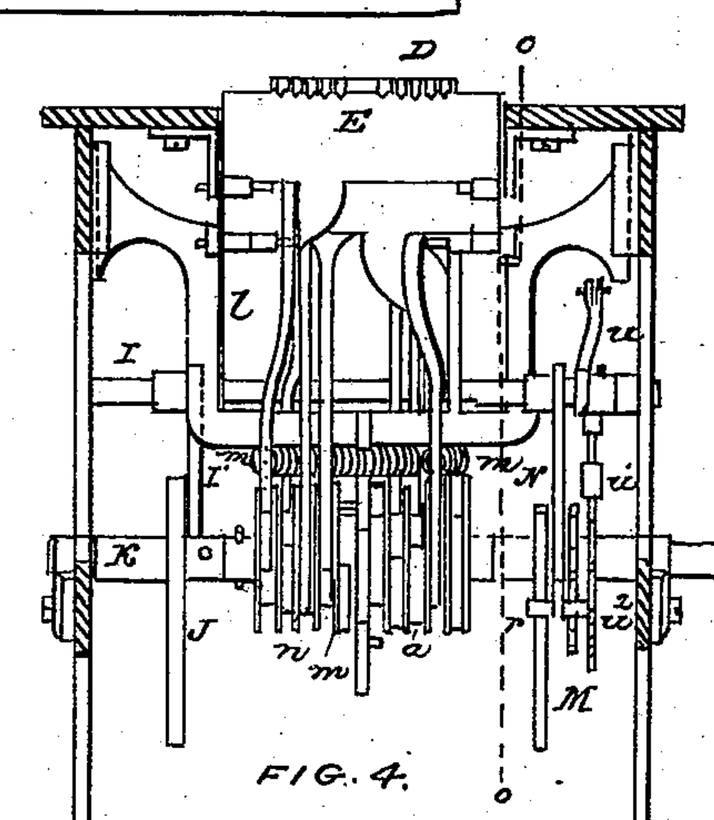
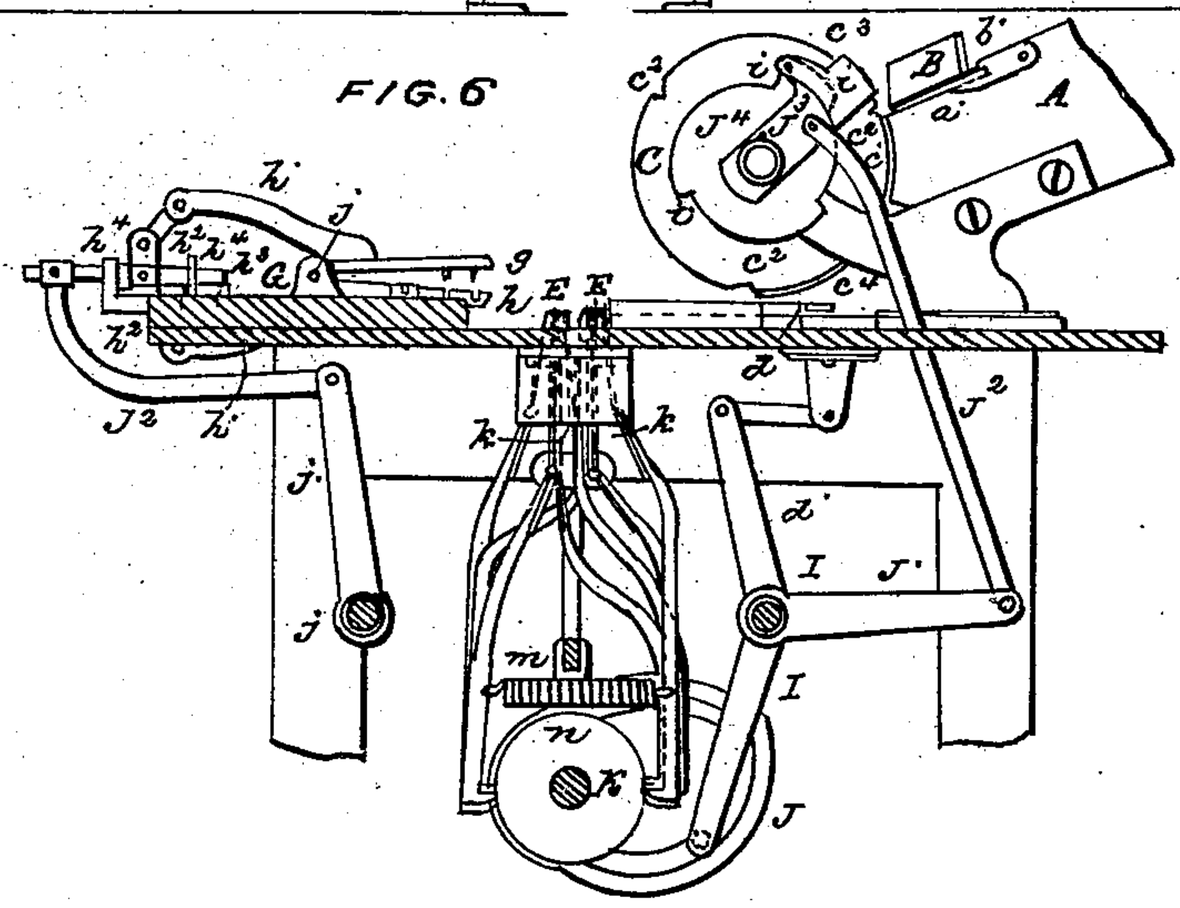


FIG. 4.

FIG. 6



3 Sheets—Sheet 3.

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FIG. 7.

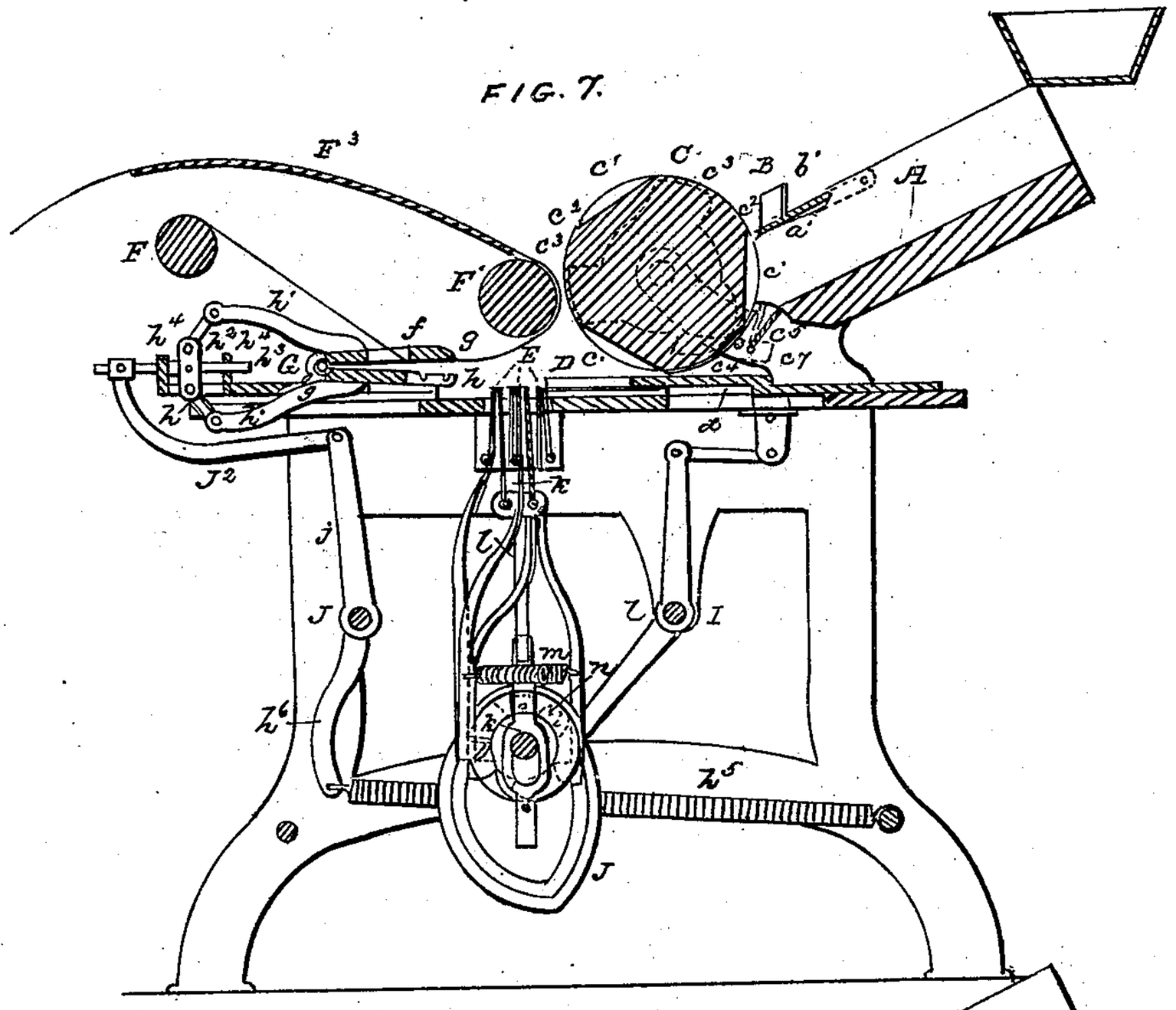
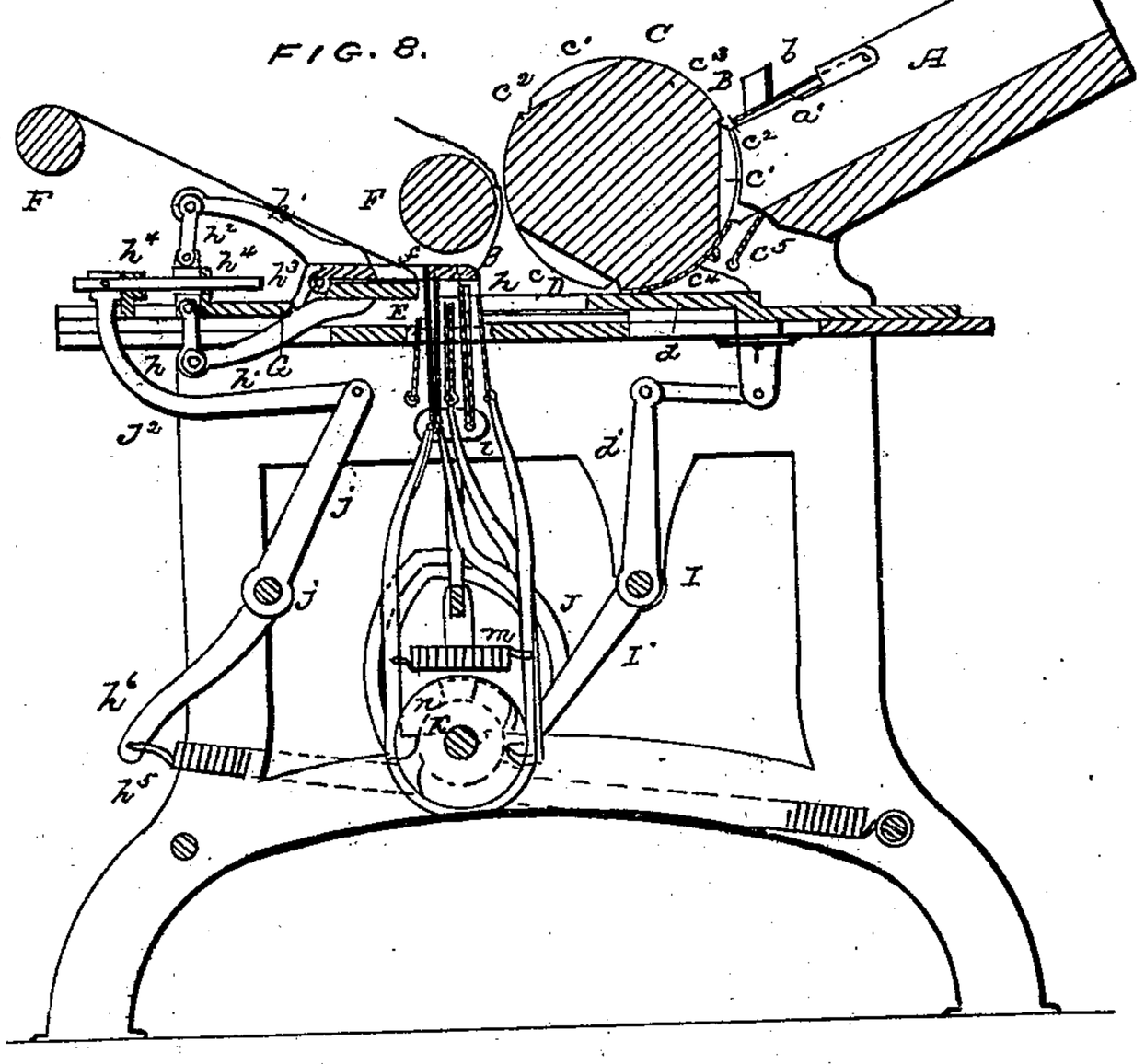


FIG. 8.



UNITED STATES PATENT OFFICE.

J. B. TERRY, OF HARTFORD, CONNECTICUT.

PIN-STICKING MACHINE.

Specification of Letters Patent No. 12,975, dated May 29, 1855.

To all whom it may concern:

Be it known that I, J. B. TERRY, of the city and county of Hartford, in the State of Connecticut, have invented a certain new and useful Improvement in Machinery for Sticking Pins in Paper, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form part of this specification, and in which—

Figure 1 represents a right side elevation or view of the machine in part (the side frame nearest the eye being removed); Fig. 2 a similar view of the left side of the machine; Fig. 3 a top view or plan; Fig. 4 a vertical transverse section taken at the line *x x* of Fig. 1; Fig. 5 a similar section at the line *x x* of Fig. 1; Fig. 6 a vertical longitudinal section at the line *o o* of Fig. 4; Fig. 7 a similar section taken centrally through the machine; and Fig. 8 a like section taken at the line *p p* of Fig. 5.

Machines of various kinds have been constructed for sticking pins in paper or sheets, in rows and otherwise.

Different dispositions or arrangements of the pins in relation to the fillet or sheet have been adopted, but the one in most general favor is that in which the pins are stuck longitudinally of the fillet or strip in rows running transversely across it at irregular and increasing distances each succeeding row to admit of the flat roll or wrap of the stuck sheet. To this disposition of the pins the machine represented in the accompanying drawings is adapted but, in some of the details of its improvements, not necessarily limited to.

In machines for thus sticking the pins, much of the general principle or action and many of the details illustrated in the machine herein described are the same or—of themselves and exclusive of the peculiar construction and arrangement with other details—old, such as crimping plates and clamps for creasing and holding the paper, plungers or pressers for sticking the pins through the paper, inclined feeding conductors and so forth.

In the machine represented in the accompanying drawings, the pins may be delivered on to the top of the inclined conductor (A) at one end of the machine from a hopper that by being jolted causes the pins to gradually pass on to the conductor which has parallel longitudinal slots (*a*) in or down it of such dimensions as to allow the body of the pin to drop while the pins are supported by their heads on the outer inclined surface of the conductor. The pins thus hanging slide down the conductor till they arrive at a hinged apron or plate (B) that is provided with openings (*b*) sufficiently large to admit of the heads of the pins and all dropping through or down on to an offset or lower continuation (*a'*) of the inclined slotted conductor, the said apron (B) covering or nearly so the lower offset continuation of the conductor and being in line or thereabout on its top surface with the upper part of the conductor and provided with a cross inclined stop or guide (*b'*) that serves to carry off on one side the surplus pins that fail to pass into the slots of the conductor.

The pins continuing to slide down the lower or offset end of the conductor and still hanging by their heads are received at the foot of the conductor by a cylinder (C) that has, at suitable distances apart, around or on its periphery, rows (*c'*) of slots corresponding with the slots in the conductor, each row (*c'*) of such slots being crossed at their back ends by a longitudinal groove or notch (c^2) that serves to receive the heads of the pins while the slots themselves in the rows (*c'*) receive the bodies, each slot a pin, such slots being of about the length of the pins and separated from the next row of slots on the periphery of the cylinder by a smooth surface (c^3) of somewhat more than the length of a pin. The operation of this cylinder (C) is intermittent as will be presently described and its run or travel is so that the longitudinal notches (c^2) in it when traversing the top portion of the circle of the cylinder's rotation move toward the inclined conductor; though by a reversed or slightly different arrangement of details, its movement might be in the opposite direction.

During each interval of the cylinder's travel, a quantity of pins, according to the number the machine is made to count out, are carried by the slots and notches in the cylinder and deposited in horizontal channels (D) under the cylinder—one pin in each channel—where they lay ready to be struck by a forward movement of plungers (*d*), the pins pointing in direction of the jaws (E) which hold the crimped paper to be stuck situated in front of the horizontal receiving channels (D).

To prevent the pins dropping out of the slots in the cylinder (C) when being conveyed from the conductor to the horizontal channels (D), and the better to effect the change of the positions of the pins from the vertical one they occupy in the conductor to the horizontal one they assume in approaching their deposit by the cylinder, a curved shield (c^4) is arranged underneath a portion of the cylinder, and, between it and projecting into a recess at the bottom end of the conductor, a striker (c^5) is arranged to hit the pins at their points and hold them to their places in the cylinder as the latter commences and continues to move. This striker (c^5) is operated by a drop cam (c^6) on the cylinder shaft operating on an arm (c^7) attached to the fulcrum of the striker; the teeth or projections of the cam strike this arm (c^7) and abruptly throw and hold the striker (c^5) against the pins in the slots of the cylinder, and a spring (c^8) serves to throw back the arm and the striker after the cylinder has performed its delivery of the pins from the conductor fairly and sufficiently on to the shield (c^4) which conducts the pins carried by the cylinder to the horizontal channels (D).

The plain spaces or curved portions (c^3) of the periphery of the cylinder separating the several rows (c') of slots restrain the passage of pins from the conductor while the cylinder is in motion to convey a charge of pins in one of its rows (c') from the conductor to the horizontal channels (D), the cylinder each time it is in motion moving sufficiently far not only to cause the one row of slots in it to discharge their load as specified but in so doing to cause the blank intervening space (c^3) to pass the end of the conductor and another or the next row of slots in the cylinder to be brought into receiving position in relation to the conductor when the cylinder takes a pause which gives time for the slots that are in a receiving position to load, and during which rest, or rather at the latter end of it, the plungers (d) advance along the horizontal channels (D) to force the pins out therefrom and stick them in the paper, the plungers receding as the cylinder commences to move to deposit in the horizontal channels a further load or row of pins suitably separated from each other—each pin—but in the same transverse horizontal line or plane. The parallel and contiguous slots in the conductor, in the cylinder and the horizontal deposit channels, it should be observed, are all arranged in the same vertical planes, their numbers depending upon the number of pins desired to be stuck in a row, each forward action of the plungers sticking a row. The plungers (d) have their specified advance and receding strokes given them, in the horizontal channels (D), by a lever (d') linked to a sliding continuation of the plungers and radiating from or fast to a countershaft (I) that receives an intermittent rocking motion by means of a lever (I′) operated by a grooved cam (J) fast to the revolving main shaft (K). The same intermittent rocking shaft (I) carries a lever (J′) that is connected by rod (J^2) to an arm (J^3) hung loosely on the cylinder (C) shaft: This arm (J^3) is, by the rocking of the countershaft (I) when in motion, caused to vibrate and, during its back stroke, gives to the cylinder (C) its specified intermittent motion in the one direction only, by means of a spring catch (i) pivoted to the vibrating arm and biting into or against teeth (i') in a disk (J^4) fast to the cylinder shaft, during the one stroke of the vibrating arm, the spring catch not biting on the disk in the opposite travel of the arm: Figs. 1 and 6 of the drawings show different positions of this vibrating arm, and it may here be remarked that many of the details of the machine are shown in different operative positions in the several figures, the better to illustrate the action of the parts.

The paper to be stuck may be taken from a roller (F) at the other end of the machine, it then is passed, through an opening (f) in the upper crimping jaw (g), between the upper and lower crimping jaws (g and h) which are hung by hinge (g') to a sliding frame (G) that has a reciprocating intermittent action as will be presently explained. The upper and lower crimping jaws (g and h) are united in their rear by levers or arms (h') and joint braces (h^2) to a rod (h^3) that is hung so as to slide in bearings (h^4) attached to the sliding frame (G) in direction of the travel of the sliding frame, that is longitudinally of the machine. The one (forward) movement of this sliding rod (h^3) closes the crimping jaws (g and h), and the other (back) movement of it opens them. The said jaws are kept open by a spring (h^5) that pulls on a lever (h^6) attached to a countershaft (j) which has an arm (j') that connects with the sliding rod (h^3) by an arm or rod (j^2), and by this means the spring (h^5) is made to draw back the sliding rod, which opens the crimping jaws.

The closing of the crimping jaws to crimp, and hold the paper when being carried forward, is effected by the same devices which move the crimping jaws and their sliding frame (G) forward, but the closing is effected prior to the advance movement of the crimping jaws, after which the closed crimping jaws with the crimped paper in them move forward to the "sticking" position or over it as shown in Fig. 8, when forceps (k) (attached to a vertical sliding frame (l) and made to rise and fall and open and close by springs (m) and

revolving drop cams (*n*) or by other suitable devices) rise into openings in the crimping jaws (*g* and *h*) and take hold of the crimped portions of the paper and bring the crimped paper down into or between double clamps or jaws (E) which then close and hold the paper while the pins are being stuck through the two crimps in the paper by the plungers (*d*): The double clamps or jaws (E) then open and the stuck end of the paper passes upward away over a cylinder (F′) arranged to keep up the slack and over a chute (F^3) to the table or place of reception. In Fig. 1 of the drawing, the double jaws (E) and forceps (*k*) are both represented as open, the latter being in their down position in Fig. 2, the forceps are raised but open; in Fig. 6, the forceps down and closed also the double jaws closed; in Fig. 7, they occupy a like position to Fig. 1; and in Fig. 8 the forceps are raised and about taking hold of the crimped paper. The same or similar drop cams and springs (or other suitable devices), which operated the forceps, open and close the double jaws (E) at the several periods and as mentioned. The crimping jaws (*g* and *h*) open and move backward after the forceps (*k*) have taken hold of the crimped paper, the relative actions or positions of the crimping jaws to those of the forceps and double holding jaws (E) being distinctly represented in Figs. 6, 7 and 8 of the drawings.

As every advance movement of the crimping jaws brings forward a fresh feed of the strip of paper, it will be apparent from the foregoing description that the pins are stuck in successive parallel rows across the strip, but as stated at the commencement of this specification it is desirable that each of these rows should be, each successive one, at an increasing distance from the other; this should be effected for a certain number of rows, when a reverse graduation should commence, and so on in succession so that upon cutting the continuous strip of paper into lengths making up a stuck "sheet," each sheet will have its rows of pins at gradually increasing distances apart from either end to the center of the sheet to admit of the sheet being folded up into flat close wraps from both ends to meet in a book form at the center, the spaces between the rows being required to be greater as the wraps increase in size. The devices for accomplishing this may be arranged as follows.

On the main revolving shaft (K) is a leaf cam (M) which at a certain period of the shaft's rotation strikes a stud (*r*) projecting from a lever (N) attached to the counter shaft (*j*); upon this cam (M) striking and moving the lever (N), it first causes the said counter shaft by its arm (*j′*), before referred to, to close the crimping jaws (*g* and *h*) till the sliding rod (h^3) of the jaws finds a stop against the inner bearing (h^4) of the rod, when the continued pressure and action of the cam (M) causes the counter shaft (*j*) to drive the jaws forward to their place for the sticking process to be performed; in doing this, it is the straight side (*s*) of the cam (M) which bears against the stud (*r*) of the counter shaft lever, the end of the cam being of a curve struck from the main shaft center keeps the crimping jaws stationary for a time at the end of their advance stroke to allow of time for the forceps (*k*) to get their hold of the crimped paper, and the continued rotation of the main shaft brings the other side of the cam (M) around which is shaped to release it from driving action on the stud (*r*) of the operating lever (N) when the spring (h^5) before described as pulling on the counter shaft (*j*) draws back and opens the crimping jaws (*g* and *h*).

So far this description only shows a regular and uniform intermittent feed or measure of the paper to be stuck. To produce the required irregular feed specified or measurement of the paper out into crimped rows of gradually increasing distance apart for a certain number of rows and vice versa for a like number, the counter shaft (*j*), operating the crimping jaws, has an arm (*u*) which carries a ratchet (*u′*) that moves a ratchet wheel (u^2), loose on the main shaft, a tooth or so at a time; this ratchet wheel has a ratchet cam (u^3) attached to it (see Fig. 1), against which ratchet cam one end of the stud (*r*) of the operating lever (N) is brought to bear and according to the varying position or action of this ratchet cam in relation to the stud (*r*) is the operating lever (N) adjusted in or out for the constantly revolving cam (M) to strike or operate it gradually sooner or later each successive feed of the ratchet cam to give a gradually increasing or diminishing measuring feed of the crimping jaws, gradually increasing for a certain number of feeds and then gradually diminishing for a like number accordingly as the ratchet cam advances or recedes in its feed from the stud (*r*) of the operating lever (N) which closes and drives the crimping jaws, and adjusts them to their position by means of the ratchet cam (u^3) which in adjusting the position of the stud (*r*) of the operating lever (N) in or out for the revolving cam (M) to operate the jaws, of necessity effects a corresponding adjustment forward or backward of the crimping jaws so that they, after being closed by the early action of the revolving cam (M) as specified, have a shorter or longer distance to travel to the "sticking" position which travel regulates the feed of the crimped paper or measures

out the rows as specified; and as the ratchet cam (u^3) is of an "eccentric" contour, it is obvious that this measuring out into unequal distances, throughout one entire travel or rotation of the ratchet cam, is proportioned to increase the feed for a certain number of rows and to diminish it for a like number—the advance action of the ratchet cam (for the one half of its entire travel) toward the stud (r) producing the increasing feed, and the receding action of the cam in the other half of its travel effecting the diminishing measurement,—and this it is that measures out the stuck sheets into rows increasing in distance from each other from either end toward the center of the sheet.

I am aware that plates for crimping and clamps for holding the paper have before been used; such therefore I do not claim: But

I do claim as new and useful and desire to secure by Letters Patent.

1. Measuring off or gaging the paper to the required unequal distances between the rows of pins, and carrying it forward to be "stuck," by means of the feed adjusting ratchet cam (u^3) operating in connection with the crimping jaws (g and h) or the equivalents of such devices and their operative gear so that the crimping jaws have their reciprocating intermittent feed or travel regulated to gradually increase for a certain number of feeds and vice versa, that is the advance action of the crimping jaws made sooner or later and shorter or longer without varying their advance terminus substantially as specified, to measure out the paper into rows or crimps of gradually increasing distance from either end of the stuck sheet to secure the flat close wrap of the sheet from its ends toward the center as herein set forth.

2. I also claim, in connection with the forceps (k) or their equivalents for taking the crimped paper from the crimper, the double clamps or jaws (E) for holding the crimped paper while the pins are being stuck, as specified.

3. Further, I do not propose to employ or claim a slide wheel to connect the lower end of the inclined feeding pin-conductor with the upper end of vertical side guides to act as a conveyer and serving to change the position of the pins from vertical to horizontal, whether such wheel be made with or without countersinks on its periphery; nor do I claim a separating wheel to sustain the column of pins, separate them and deposit them separately during the revolution of the wheel in a grooved slide at the proper period, the wheel being made of disks, or with grooves or teeth cut across its periphery. But I do claim the employment for the purpose specified of the intermittent revolving cylinder (C) formed on or around its periphery with rows (c') of parallel grooves of the width of the body of the pin and corresponding with the grooves in the conductor and arranged in relation thereto as specified, and of the length of a pin or thereabout with a notch or recess at the back end for the head of the pin, each groove serving to count out and convey one pin at a time and the whole serving to count out and convey to their horizontal sticking position the several pins in a row as herein shown and described.

4. Likewise I claim the manner herein described of operating the distributing cylinder (C) by means of the vibrating arm (J^3) operated from an intermittent rocking shaft and having a spring ratchet biting into a toothed disk, or the equivalents of these devices, to give the cylinder its counting out and conveying action as set forth.

5. I also claim the employment of a striker (c^5) arranged at the foot of the conductor and operating to strike the pin at or near its joint as the pin leaves the conductor to change the position of the pin and hold it to its seat in the distributing cylinder substantially as specified.

6. Lastly I claim forming the inclined conductor at its lower end with an offset (a') covered by an apron (B) having recesses on its upper edge to allow of the heads of the pins passing therethrough and having a guide (b') on its outer face to carry off the surplus pins essentially as described.

In testimony whereof, I have hereunto subscribed my name.

J. B. TERRY.

Witnesses:
O. D. SEYMOUR,
JEREMY W. BLYS.