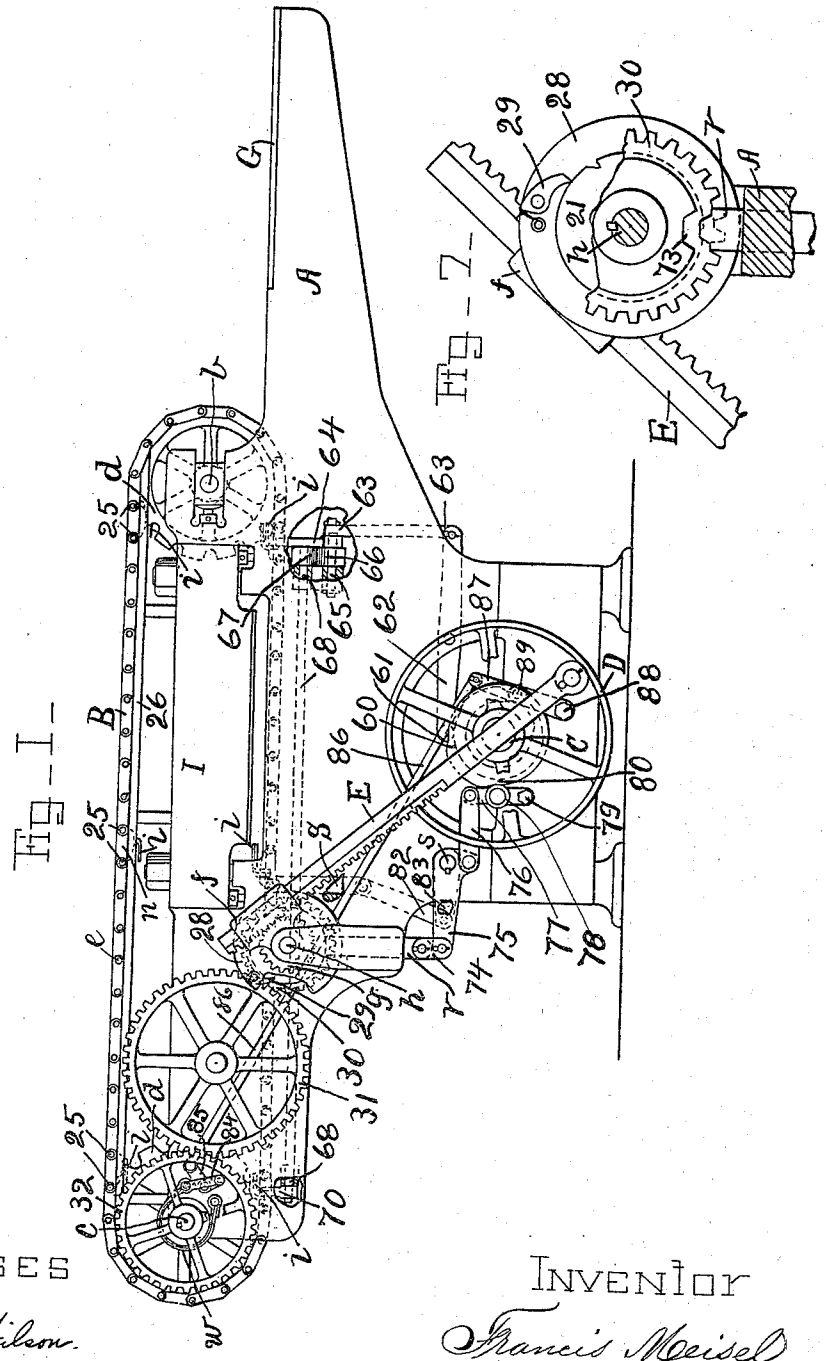
No. 641,215. Patented Jan. 9, 1900.

F. MEISEL.

MACHINE FOR CUTTING, SCORING, AND EMBOSSING PAPER FOR BOXES.

(Application filed Mar. 31, 1899.)

(No Model.) 4 Sheets—Sheet 1.



Witnesses

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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(No Model.) 4 Sheets—Sheet 2.

Fig. 2.

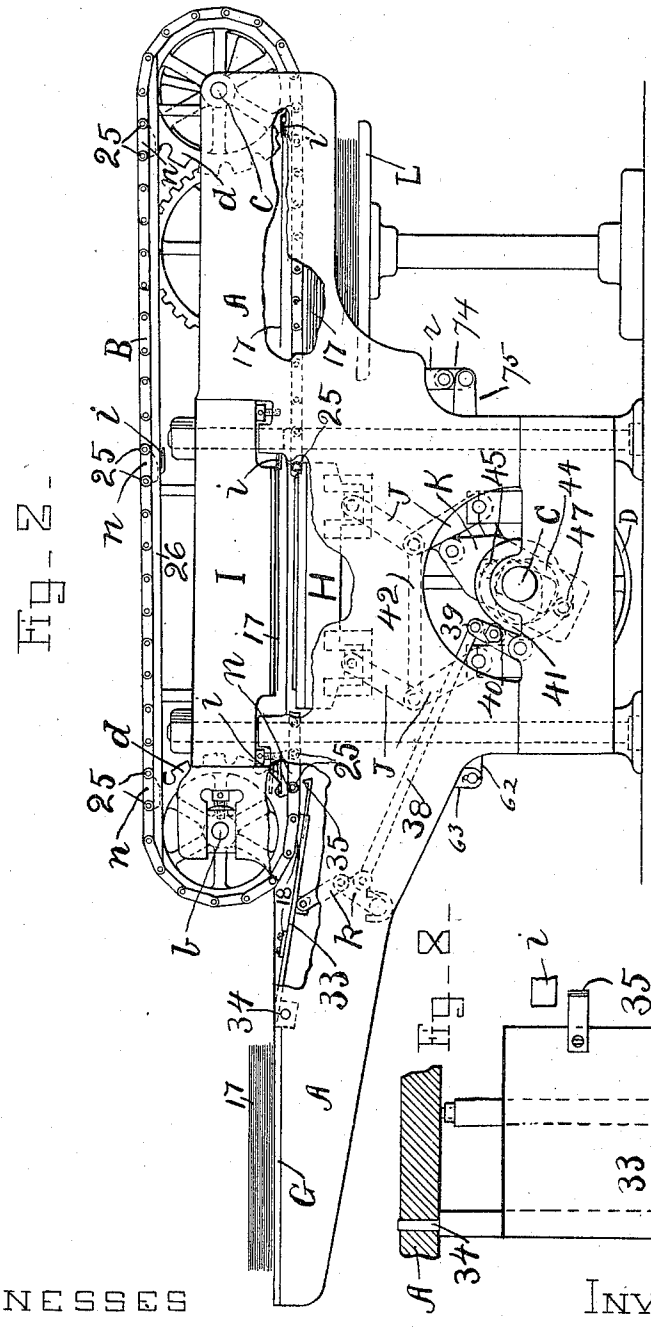


Fig. X.

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(No Model.) 4 Sheets—Sheet 3.

Fig. 3.

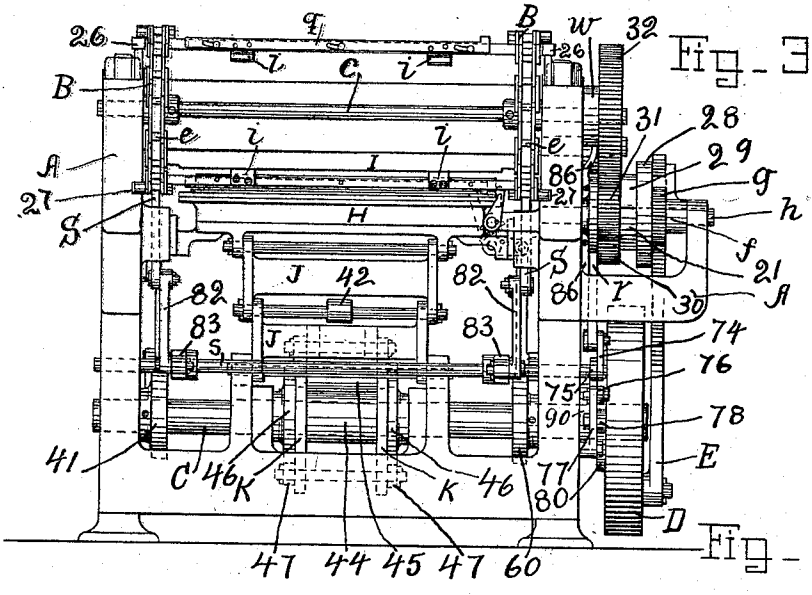


Fig. 6.

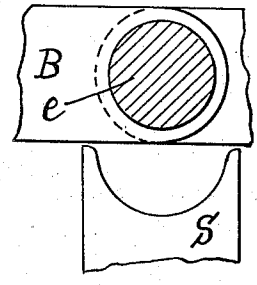
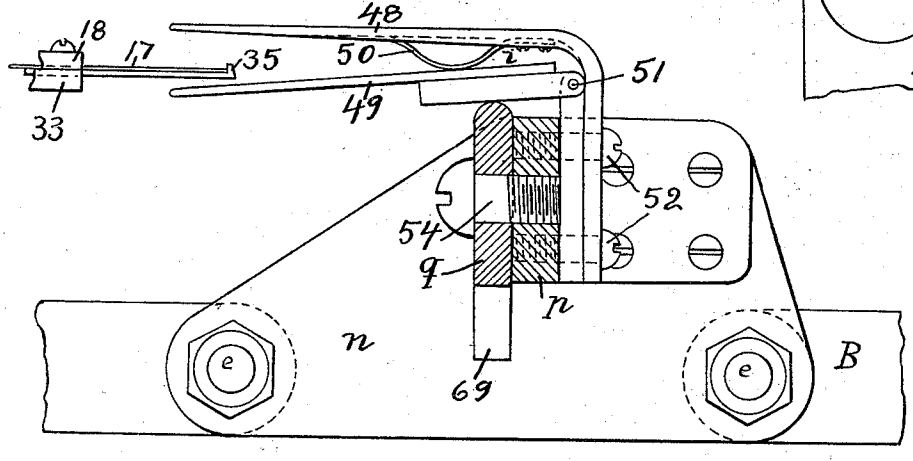


Fig. 5.



Witnesses

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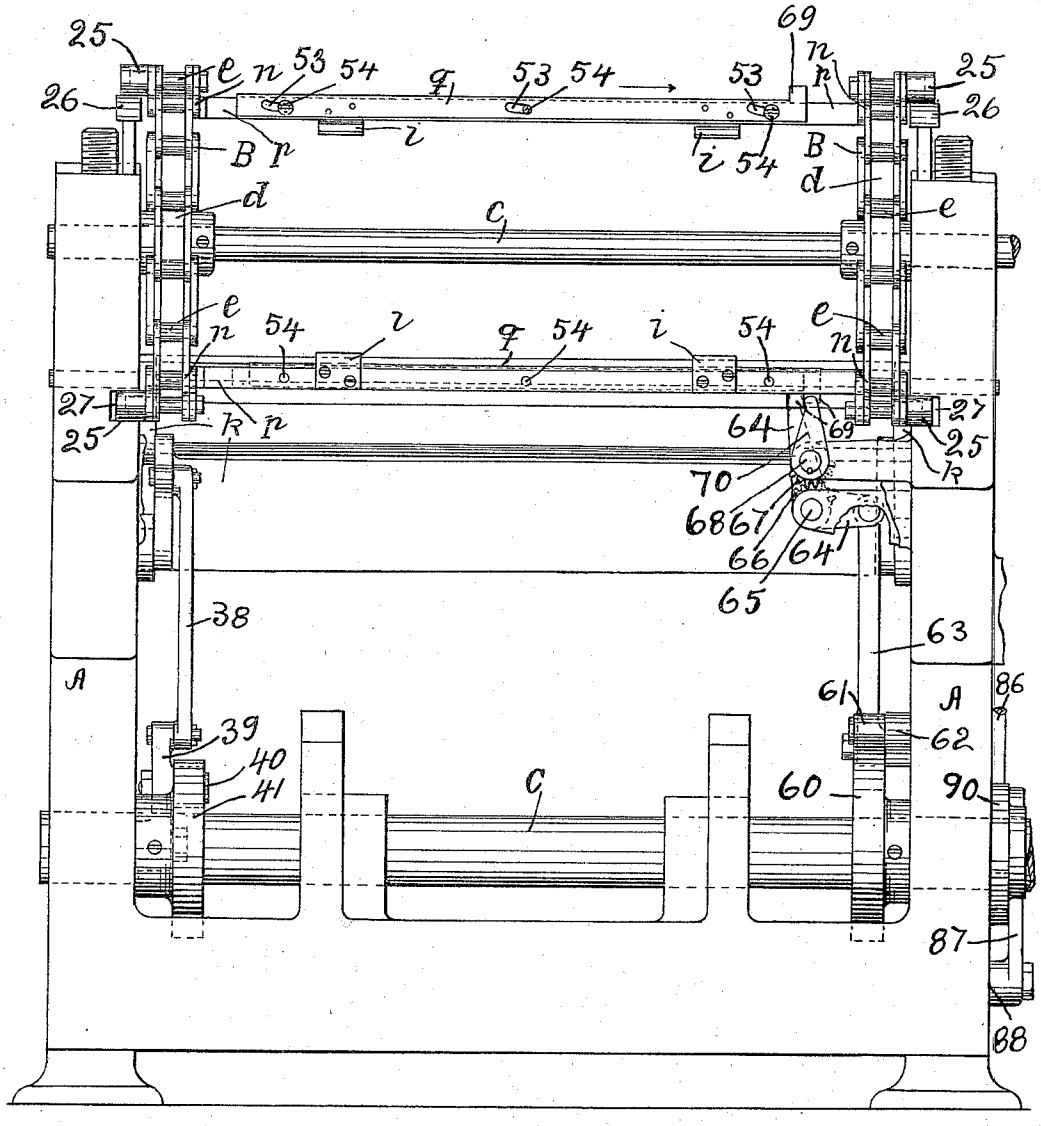
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(Application filed Mar. 31, 1899.)

(No Model.) 4 Sheets—Sheet 4.

Fig. 4.



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UNITED STATES PATENT OFFICE.

FRANCIS MEISEL, OF BOSTON, MASSACHUSETTS.

MACHINE FOR CUTTING, SCORING, AND EMBOSSING PAPER FOR BOXES.

SPECIFICATION forming part of Letters Patent No. 641,215, dated January 9, 1900.

Application filed March 31, 1899. Serial No. 711,229. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS MEISEL, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Machines for Cutting, Scoring, and Embossing Paper for Boxes, &c., of which the following is a specification.

My invention has for its object to improve the construction and increase the product of machines for cutting, scoring, and embossing paper for boxes and other purposes; and my invention consists in the several novel features of construction and combinations of parts hereinafter described, and specifically pointed out in the claims.

In the accompanying drawings, Figure 1 is an elevation of one side of my improved machine. Fig. 2 is an elevation of the opposite side of the same. Fig. 3 is a rear end elevation of the machine. Fig. 4 is an enlarged rear elevation showing the gripper-operating mechanism and the mechanism for actuating the swinging table. Fig. 5 is a detail, partly in section, showing a portion of the endless carrier-chain, one of its grippers, the gripper-bar which actuates the grippers, its supporting-bar, and the front end of the swinging sheet-supporting table. Fig. 6 is a detail of one of the carrier-chain-locking devices. Fig. 7 is a detail of the carrier-chain-operating mechanism. Fig. 8 is a plan of the sheet-supporting table and the ends of the grippers.

Referring to the drawings, A represents the framework of the machine, in suitable bearings in which are journaled two parallel shafts *b c*, on each of which are fixed two sprocket-wheels *d*, which support endless carrier-chains B B, one on each side of the machine. The pins *e*, Figs. 1 and 4, which connect the links of said chains, engage the notches of the sprocket-wheels *d*, whereby the chains are caused to travel at the same speed and with a positive motion in the desired direction. The chains B are provided on their outer sides with antifriction-rolls 25, placed at suitable intervals, said rolls running on guide-rails 26 at the top of the machine and in guide-grooves 27 in the framework, as shown in Figs. 3 and 4. These guide-rails and guide-grooves support, respectively, the upper and lower portions of the chains and prevent them from sagging in case they should become slack from wear or other cause.

C is the driving-shaft, which carries a driving-pulley D, to a crank-pin on which is pivoted a rack-bar E, which slides in a guide or casing *f* and meshes with a gear *g*, loosely mounted on a transverse shaft *h*, to which gear is secured a disk 28, carrying a pawl 29, adapted to engage a notch or tooth in a disk 21, Fig. 7, fast on the shaft *h*. A gear 30, also fast on the shaft *h*, meshes with an intermediate gear 31, the latter meshing with a gear 32 on the sprocket-wheel shaft *c*, an intermittent movement of the carrier-chain being thus produced as the driving-pulley is rotated.

The sheets of paper 17 to be cut, scored, or embossed to form blanks for paper boxes or for other purposes are piled on a table G at the front of the machine and are fed forward singly by hand onto a table 33, pivoted at its outer end at 34 and provided with a side gage 18 and at its inner end with gages 35, which form stops against which the front edge of the sheet is placed by the operator, ready to be seized by one of the several sets of grippers *i*, with which the bars extending between the chains B are provided, said chains at each forward movement traveling a distance equal to that between two adjacent sets of grippers. The gages 35 extend inward beyond the grippers, so that the leading edge of the sheet when pushed forward against said gages may be in a proper position to be seized by said grippers while the chains are at rest. The tilting table 33 is raised from its lowest position, as shown in Fig. 2, to its highest position, as shown in Fig. 5, before the sheet is fed onto it by the operator to insure the leading edge of the sheet being pushed between the jaws of the grippers *i*, and just before the chains commence to move said table is lowered into the position shown in Fig. 2 to move the gages out of the way of the sheet and allow it to pass without obstruction to the cutting, scoring, or embossing mechanism, to be hereinafter described. The table 33 is swung upward on its pivot and lowered at the proper times by means of a toggle *k*, to one arm of which is pivoted a rod 38, the opposite end of

which is pivoted to a lever 39, carrying a roll 40, which is acted upon by a cam 41 on the main shaft C.

At each forward movement of the chains B a sheet 17 is carried onto a vertically-reciprocating member H, which coöperates with a stationary member I, placed thereover, said member H being provided, as may be required, with cutting-knives, scoring-rules, or embossing-dies properly disposed to cut from the sheet, score, or emboss box-blanks or other articles. If preferred, the cutting-knives, scoring-rules, and embossing-dies may be secured to the stationary member I instead of to the member H. These members H I may be generically termed "impression" members.

Immediately under the reciprocating member H on each side are placed a pair of toggles J, connected by a horizontal bar 42. To one of the toggles J is pivoted a slotted connecting-piece K, which slides on the shaft C. Within this connecting-piece K is placed the main cam 44, Fig. 3, which is secured to the shaft C and acts on the cam-roll 45 to straighten out the toggles, and thereby raise the member H. Outside the connecting-piece K are secured on the shaft C cams 46, which act on rolls 47, mounted on a shaft at the lower end of the connecting-piece K, and serve to open the toggles and return the parts to their normal positions. The cams are so formed and timed as to permit the member H to remain at rest while the sheet is being drawn thereover and held by the grippers *i*. The grippers do not release their hold upon the sheet during the time that it is being cut, scored, or embossed, and as soon as the member H has come to rest after its descent the carrier-chains are again set in motion, thereby causing the sheet which has been cut, scored, or embossed to be carried over a table L, when it is released by the grippers and drops onto the pile on said table L, as shown in Fig. 2.

I will now describe the construction of the grippers and the manner in which each set is operated to seize the front end of the sheet and afterward release the same to permit it to drop onto the table L after being carried thereover by the movement of the carrier-chains B, reference being had particularly to Figs. 1, 4, and 5. Between two opposite links *n n* of the chains B B is secured a transverse bar *p*, to which are secured a series of grippers *i*, (shown enlarged in Fig. 5,) each of which is composed of a stationary jaw 48 and a movable jaw 49, normally kept apart, preferably by a spring 50 placed between them, the vertical portion of the stationary jaw and the plate to which the movable jaw 49 is pivoted at 51 being secured to the bar *p* by screws 52. The grippers are operated by a longitudinally-sliding bar *q*, Figs. 3, 4, and 5, which bears against the movable jaws 49, as shown in Fig. 5, said bar *q* being provided with inclined slots 53, through which pass screws 54, by which it is fastened to the bar *p* in such manner that when it is moved in the direction of the arrow, Fig. 4, it will, by the action of the inclined slots on the stationary screws 54, be moved on the bar *p*, thus closing the jaws 49 against the action of the springs 50 and causing the grippers to seize the sheet previously pushed against the gages by the operator. On the return movement of the bar *q* the inclined slots cause it to be drawn back to the position shown in Figs. 3, 4, and 5, which permits the springs 50 to open the grippers and release the sheet.

The bar *q* is slid first in the direction to close the grippers and then in the opposite direction to open the same in the following manner: On the shaft C is a cam 60, Figs. 1 and 4, which acts on a roll 61 on a lever 62, to which is pivoted a rod 63, the opposite end of which is pivoted to a bell-crank 64, secured to a short shaft 65. The upper arm of the bell-crank 64 bears against a projection 69 on the sliding bar *q*, which is thus moved at the proper time to cause it to close the grippers upon the sheet. To the shaft 65 is secured a toothed segment 66, meshing with another toothed segment 67 on a shaft 68, extending to the rear or delivery end of the machine. On the shaft 68, at the rear end of the machine, is an arm 70, which bears against the side of the projection 69 opposite to that in contact with the bell-crank 64 and moves the bar *q* in a direction contrary to the arrow, thus opening the grippers and releasing the sheet, which then drops onto the table L beneath, the grippers remaining open until they are again brought around to the front of the machine ready to take a fresh sheet. In the machine here represented the carrier-chains are provided with six sets of grippers arranged at equal distances apart, but any suitable number of sets may be employed to meet the requirements of the case. When the carrier-chains B stop, the gripper-operating bars *q* of the front grippers to be closed on the sheet and the rear ones to be opened are always in such positions that their projections 69 can be acted upon by the arm of the bell-crank 64 and the arm 70 of the shaft 68.

As soon as the carrier-chains come to a stop they are locked to insure the several sets of grippers being in their proper positions with respect to the gages, the cutting, scoring, and embossing mechanism, and the delivery-table by means of a bar *r*, sliding in a vertical guide on the framework and having its upper end shaped to engage a notch 73, Fig. 7, in the hub of the gear 30, which is thus held stationary when the bar *r* is within the said notch. The lower end of this bar *r* is connected by means of a link 74 with a bell-crank lever 75, fast on a transverse rock-shaft *s* and having pivoted to its short arm a rod 76, also pivoted to a lever 77, fulcrumed at 79 and carrying a roll 78, which is acted on by a cam 80 on the shaft C, said cam being timed to raise the lock-

ing-bar *r* and cause its upper end to engage the notch at the instant that the movement of the chains B is arrested.

On account of the lost motion between the chain-links, sprocket-wheels, and gears I employ an auxiliary locking device which causes the chains to be held positively at a predetermined point for the purpose of bringing every sheet into precisely the same position at the termination of each movement of said chains, thereby insuring perfect register. This locking device consists of two bars S S, one for each chain and each provided at its upper end with a semicircular notch, Fig. 6, for engagement with the pins *e*, which connect the links of the carrier-chains, said bars S sliding in vertical guides on the framework A and being connected by means of bars 82 with arms 83, fast on the rock-shaft *s*, which latter is actuated by the cam 80, as before described.

In order to diminish the speed of the carrier-chains just before the termination of their movement, and thus prevent them from being carried by their own momentum and that of their actuating mechanism beyond the desired point, which would interfere with the proper operation of the locking devices, I employ a brake consisting of a friction-strap *w*, encircling the hub of the gear 32 and connected at its upper end by means of a link 84 to a bell-crank 85, the latter being connected by a rod 86 to a lever 87, fulcrumed at 88 and carrying a roll 89, acted upon by a cam 90, Figs. 3 and 4, on the shaft C, which is properly timed to apply the brake just before the termination of each intermittent movement of the chains.

It is obvious that the above-described machine can be easily adapted for printing by simply substituting a printing-form for the cutting, scoring, or embossing dies and employing the proper inking mechanism in connection therewith.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination with impression members and an operating means therefor, of an intermittently-moving sheet-carrier provided with grippers, means for opening and closing the grippers, and a movable sheet-support provided with means for moving it into line with the grippers to permit a sheet to be fed thereto and then moving it out of the plane of the grippers before the carrier begins to move forwardly, substantially as set forth.

2. The combination with impression members and an operating means therefor, of an intermittently-moving sheet-carrier provided with gripping-fingers and means for opening and closing the fingers at the receiving and discharging ends, respectively, a movable sheet-support at the receiving end of the machine and provided with front stops to stop the sheet within the grippers and means for moving the sheet-support into line with the open grippers to permit a sheet to be fed thereto and then moving it to throw its front stops out of the plane of the grippers before the carrier begins its forward movement, substantially as set forth.

3. The combination with impression members, of an intermittently-actuated sheet-carrier provided with grippers, means for opening and closing the grippers, a vertically-movable sheet-support having front stops to project between the grippers at their receiving-point and deliver a sheet thereto, toggles for raising and lowering the sheet-support at the proper times and means for actuating the toggles, substantially as set forth.

4. The combination with impression members, of an intermittently-actuated sheet-carrier provided with grippers to seize the sheets and carry them singly to the impression devices, a locking device to lock the carrier while the grippers so hold the sheet for action by the impression members, means for closing the grippers upon a sheet, and opening them to release the sheet operated upon, and a vertically-movable sheet-support to guide a sheet between the grippers and then move away before the carrier moves the sheet forwardly, substantially as set forth.

5. The combination with the frame, parallel end shafts, sprocket-wheels mounted thereon, endless chains carried by said sprockets, and impression members operating between the lower runs of the chains, of gripper mechanisms comprising cross-bars connecting the two chains, stationary and movable gripper-fingers mounted on said cross-bars, a movable gripper-operating bar on every cross-bar and engaging the outer sides of the said movable fingers, to open and close them, and means for operating said gripper-operating bar at the receiving and delivery ends of the machine, substantially as set forth.

6. The combination with impression members, of endless carrier-chains provided with grippers, and having an intermittent movement, means for locking the chains at the termination of each movement to produce register of the sheet, a movable sheet-supporting table, and means for raising and lowering said table, substantially as described.

7. The combination with an intermittently-moving sheet-carrying device, of means for locking and holding the driving mechanism of said sheet-carrying device while at rest, and a second locking device for accurately positioning said sheet-carrying device, substantially as described.

8. The combination with the endless chains and their sprocket-shafts, of cross-bars connecting the chains, stationary and movable gripper-fingers mounted on said cross-bars, gripper-operating bars having oblique slots through which screws or pins pass into the cross-bars, said slotted bars operatively engaging the movable gripper-fingers to close them as described or allow them to open, and means for actuating said slotted bar, substantially as set forth.

9. The combination with the frame, the par-

allel end shafts having sprocket-wheels, the endless chains mounted on said sprockets and connected by cross-bars, means for intermittently operating said chains, and the impression devices between the lower runs of the chains, of stationary and movable gripper-fingers mounted on the cross-bars, sliding bars mounted on the cross-bars to operate the movable gripper-fingers, and provided with end projections, a longitudinal shaft having an arm at the delivery end of the machine to engage said end projections and open the grippers, a short shaft at the feed end of the machine geared to the longitudinal shaft, a bell-crank on the short shaft with its upper arm adapted to engage said end projections and close the grippers upon a sheet, and means for actuating the bell-crank from the main shaft, substantially as set forth.

10. The combination with the endless carrier-chains, their sprocket-shafts one of which has a drive-pinion 32 and the impression members between the lower runs of the chains, of a main shaft operatively connected with the impression mechanism, a rack-bar E reciprocated from the main shaft, a loose gear *g* mounted on a short shaft *h* and meshing with the upper end of said rack-bar, a pawl-carrying disk 28 secured to said loose gear, a notched disk 21 fastened on said short shaft and engaged by the pawl 29 on the disk 28, a gear 30 fast on said short shaft, and having a notch 73 in its hub, a gear 31 meshing with gears 30 and 32, a vertically-movable locking-bar *r* to enter the notch 73 and lock the chain-operating mechanism, and a lever mechanism operatively connecting the lower end of the locking-bar with the drive-shaft.

11. The combination with the endless sheet-carrying chains and their sprocket-shafts and a drive-shaft operatively connected to one of said sprocket-shafts, to intermittently operate it and the chains, of a friction-strap encircling a hub on the driven sprocket-shaft, a bell-crank 85 to which the free end of the friction-strap is connected, a lever 88 actuated by a cam on the drive-shaft and a rod 86 connecting the lever 88 to the said bell-crank, substantially as set forth.

12. The combination with the frame, the end shafts having sprocket-wheels, endless chains mounted on said sprocket-wheels and connected at intervals by cross-bars, upper and lower longitudinal guides at the sides of the frame to prevent any raising and lowering of the chains between their sprockets, and impression members located between the lower runs of the chains, of gripping-fingers on chain cross-bars and projecting at the lower run of the chain toward the receiving end of the machine to receive and grip the sheets as fed, carry them to and hold them for action by the impression devices and release them at the delivery end of the machine, means for operating the grippers and means for locking the chains during their intervals of rest.

13. The combination with the endless chains provided with grippers to seize the sheets, the impression members between the lower runs of the chains, and means for intermittently operating the chains, of vertically-sliding locking-bars having a forked upper end to engage the chain-link pivots or pins and lock the chains when at rest, and means for operating said locking-bars from the drive-shaft of the machine.

14. The combination with a stationary and a movable member, of a pair of toggles for supporting the movable member, a driving-shaft located between said toggles and beneath said movable member, cams on said driving-shaft for operating said toggles, endless carrier-chains having an intermittent movement, and provided with a series of sets of grippers, and means for actuating the chains and operating the grippers at fixed intervals, substantially as described.

Witness my hand this 27th day of March, A. D. 1899.

FRANCIS MEISEL.

In presence of—
P. E. TESCHEMACHER,
M. B. WILSON.