D. A. HOPPING.

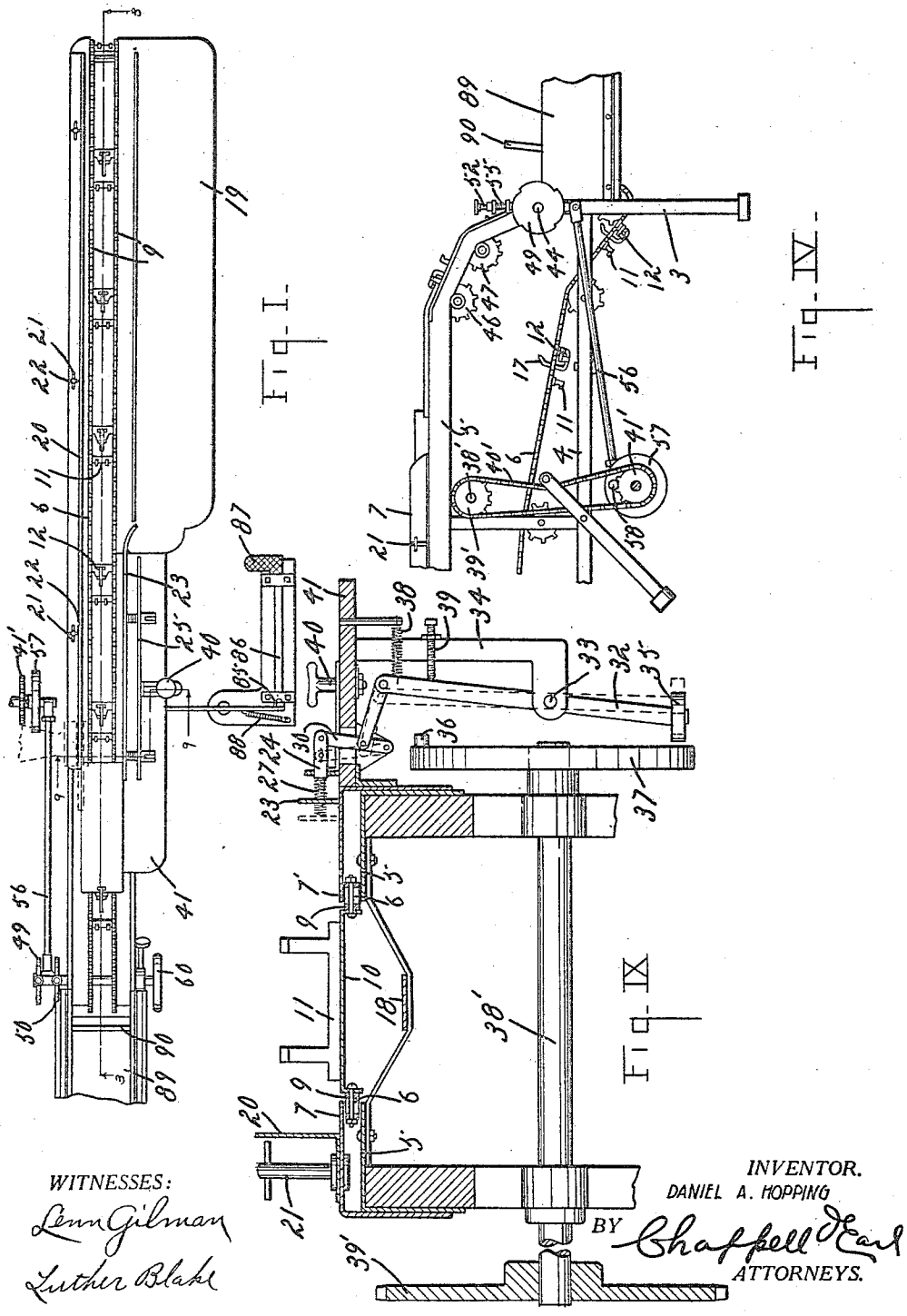
SHEET STAPLING MACHINE.

APPLICATION FILED OCT. 13, 1917.

1,276,528.

Patented Aug. 20, 1918.

4 SHEETS—SHEET 1.



WITNESSES:

Lenn Gilman

Luther Blake

INVENTOR.

DANIEL A. HOPPING

BY Chappell & Earl

ATTORNEYS.

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

D. A. HOPPING.

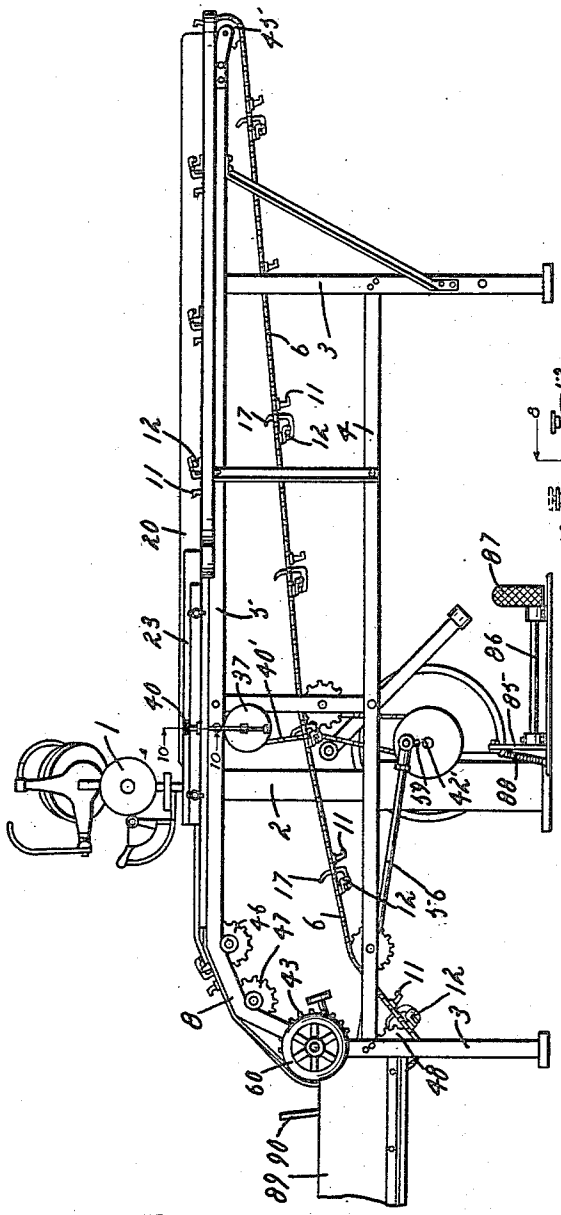
SHEET STAPLING MACHINE.

APPLICATION FILED OCT. 13, 1917.

1,276,528.

Patented Aug. 20, 1918.

4 SHEETS—SHEET 2.



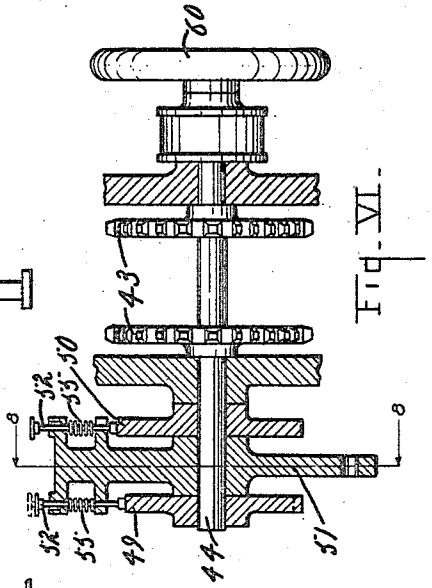


Fig. VI.

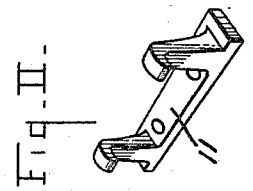


Fig. II.

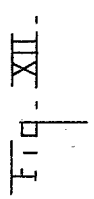


Fig. XII.

WITNESSES:

Lynn Gilman

Luther Blake

INVENTOR.

DANIEL A. HOPPING

BY Chappell & Earl

ATTORNEYS.

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

D. A. HOPPING.

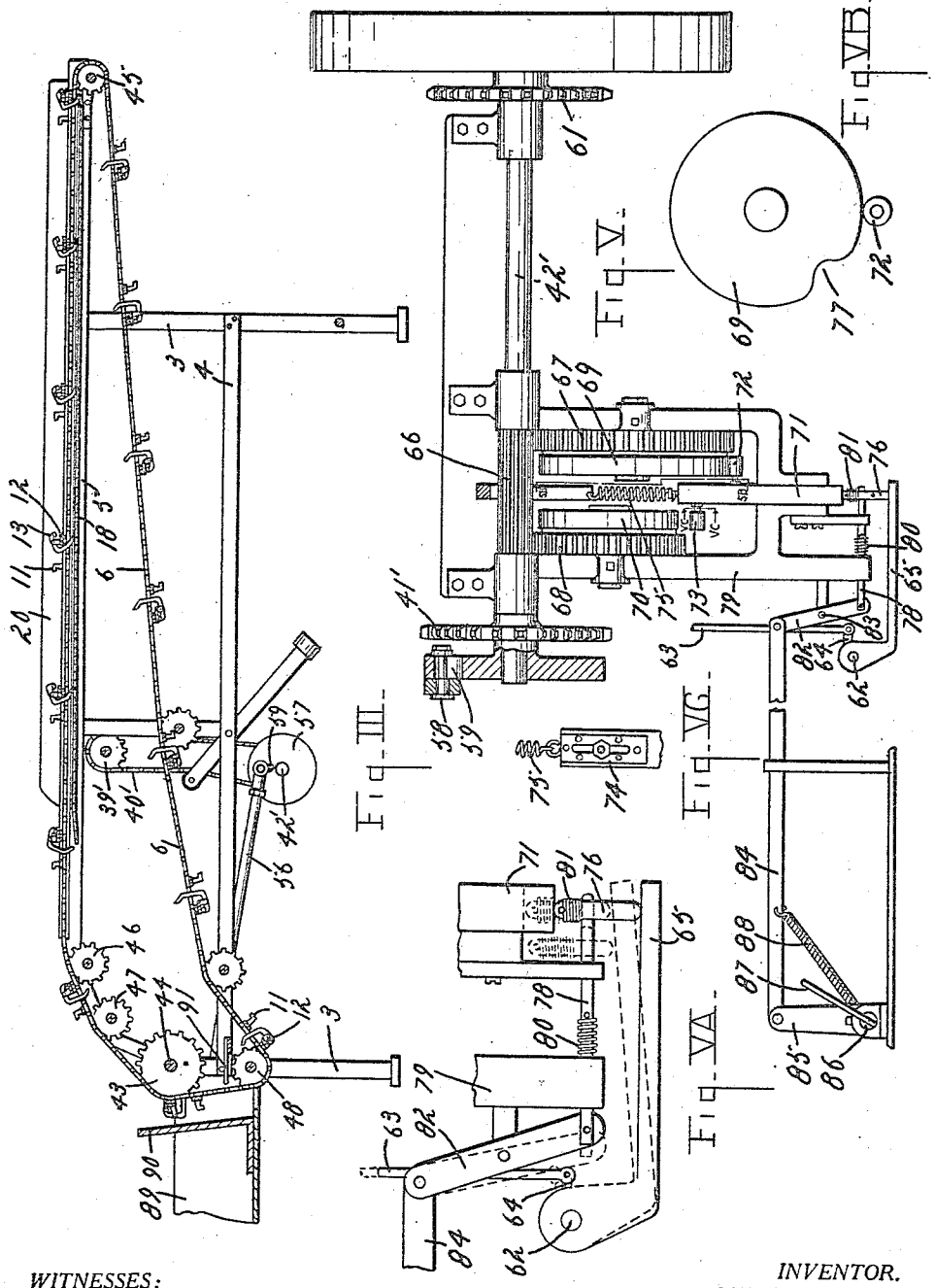
SHEET STAPLING MACHINE.

APPLICATION FILED OCT. 13, 1917.

1,276,528.

Patented Aug. 20, 1918.

4 SHEETS—SHEET 3.



WITNESSES:

Lenn Gilman

Luther Blake

INVENTOR.

DANIEL A. HOPPING.

BY Chappell & Earl

ATTORNEYS.

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

D. A. HOPPING.

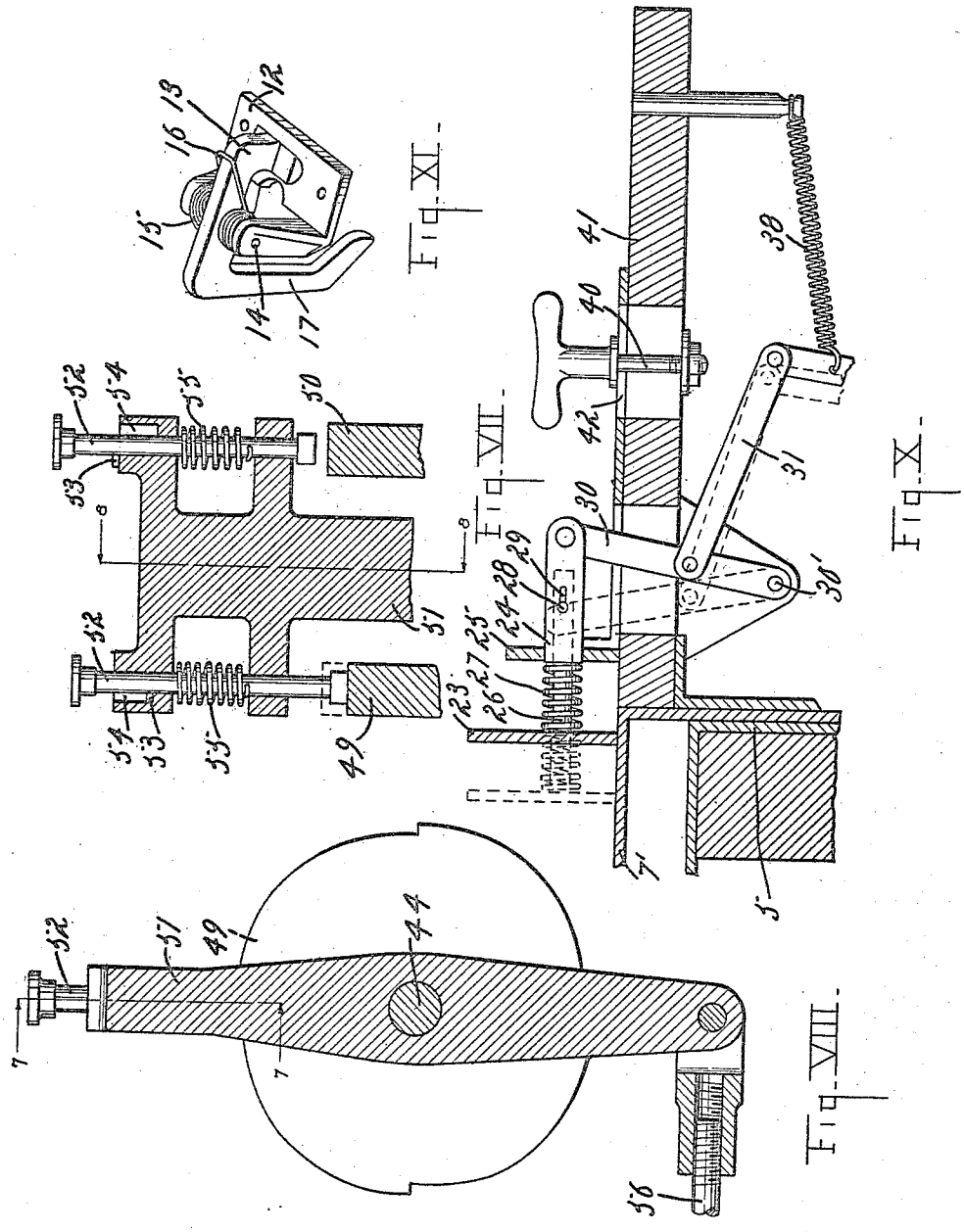
SHEET STAPLING MACHINE.

APPLICATION FILED OCT. 13, 1917.

1,276,528.

Patented Aug. 20, 1918.

4 SHEETS—SHEET 4.




WITNESSES:

Lenn Gilman

Luther Blake

INVENTOR.

DANIEL A. HOPPING

BY Chappell & Earl

ATTORNEYS.

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

# UNITED STATES PATENT OFFICE.

DANIEL A. HOPPING, OF STURGIS, MICHIGAN.

## SHEET-STAPLING MACHINE.

1,276,528. Specification of Letters Patent. Patented Aug. 20, 1918.

Application filed October 13, 1917. Serial No. 196,415.

*To all whom it may concern:*

Be it known that I, DANIEL A. HOPPING, a citizen of the United States, residing at Sturgis, county of St. Joseph, State of Michigan, have invented certain new and useful Improvements in Sheet-Stapling Machines, of which the following is a specification.

This invention relates to improvements in sheet stapling machines.

My improved book stapling machine is especially designed by me for use in the manufacture of sales books and I have illustrated the same as embodied in a structure adapted for that purpose, although my improvements may be readily embodied and adapted for use in stapling other types of books or sheets.

The main objects of this invention are:

First, to provide in a stapling machine an improved means for feeding books to and supporting them to properly receive the staples.

Second, to provide an improved feed mechanism for stapling machines in which the pad or bundle of sheets may be easily placed in the machine.

Third, to provide an improved feed mechanism for stapling machines in which the sheets are effectively "jogged" up and supported to receive the staples.

Fourth, to provide in a stapling machine a feed means of large capacity.

Fifth, to provide an improved feed means for a stapling machine adapted to deliver the stapled books in a convenient manner for handling or packaging.

Further objects, and objects relating to structural details, will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification. The invention is clearly defined and pointed out in the claims.

A structure which is a preferred embodiment of my invention is clearly illustrated in the accompanying drawing, forming a part of this specification, in which:

Figure I is a detail plan view of a structure embodying the features of my invention, the stapling head being indicated by dotted lines.

Fig. II is a side elevation with the stapling mechanism shown more or less conventionally.

Fig. III is a vertical longitudinal section on a line corresponding to line 3—3 of Fig. I.

Fig. IV is a detail side elevation of the side opposite that shown in Fig. II.

Fig. V is an enlarged detail partially in section, showing details of the stapler control means.

Fig. $V^A$ is an enlarged detail elevation of the stapler control means.

Fig. $V^B$ is an enlarged detail view on a line corresponding to line $5^B$—$5^B$ of Fig. V.

Fig. $V^C$ is a detail view on a line corresponding to line $5^C$—$5^C$ of Fig. V.

Fig. VI is an enlarged detail partially in section, showing details of the conveyer feed means.

Fig. VII is an enlarged detail partially in section on a line corresponding to line 7—7 of Fig. VIII, showing further details of the conveyer feed.

Fig. VIII is a detail vertical section on a line corresponding to line 8—8 of Figs. VI and VII, showing still further details of the feed means.

Fig. IX is an enlarged detail transverse section on a line corresponding to the broken line 9—9 of Fig. I, showing details of the sheet jogger.

Fig. X is an enlarged detail section on a line corresponding to line 10—10 of Fig. II, showing further details of the sheet jogger.

Fig. XI is a perspective view of one of the sheet clamps removed from the conveyer.

Fig. XII is a perspective view of one of the conveyer flights.

In the drawing similar reference characters refer to similar parts throughout the several views, and the sectional views are taken looking in the direction of the little arrows at the ends of the section lines. Referring to the drawing, the numeral 1 indicates the stapler mechanism generally. As the details of this mechanism, other than the control thereof, form no part of my present invention they are not further described herein.

The stapler mechanism is supported on a pedestal 2. My improvements are illustrated in operative relation to the stapler proper.

I provide a frame consisting of the uprights 3 and horizontal pieces 4. A pair of ways 5 is mounted on the frame to face inwardly and support the top reach of the

conveyer chain 6. These ways 5 are, in practice, formed of a pair of spaced sheet metal members 7 and 7',—see Figs. IX and X, of considerable width, the advantage of which will appear later. The rear ends of the ways are directed downwardly at 8 at the rear end of the frame. The ways also constitute frame members.

The conveyer 6 comprises a pair of chains 9, the links of which are connected by cross pieces 10. On certain of these cross pieces I mount flights 11. At the rear of each flight and coacting with the succeeding flights in providing conveyer pockets or holders is a bracket, designated generally by the numeral 12 having a jaw 13 pivoted thereon at 14. The coiled springs 15 are disposed on the pivot and have a central arm 16 engaging the jaws. The jaws 13 are provided with tails or releasing extensions 17 which are adapted to engage the plate 18 by which they are held open to receive the sheets while in receiving position.

A feed table 19 is disposed at the front end of the conveyer so that the operator may stand in front of this table with the unstitched or unstapled pads or bundles of sheets stacked thereon and lay the same upon the conveyer between the flights and clamping jaw.

A guide 20 is disposed at the rear of the conveyer. This guide is preferably adjustably supported by means of the clamping screws 21 which engage in slots 22 in the horizontal arms of the guide, the guide being an angled strip of metal.

Before the jaws 13 are released the sheets are "jogged" up by means of the jogger comprising the blade 23 carried by the slides 24 reciprocating through the supporting bracket 25. The jogger blade 23 is mounted upon the slides by means of the pins 26 which reciprocate in the slides and are held yieldingly outward by means of the springs 27. Stops 28 on these pins coact with the slots 29 on the slides limiting the movement of the pins 26.

The slides are actuated by the levers 30 pivoted at 30' and connected to the outer ends of the slides. These levers are connected by the link 31 to the upper end of the lever 32, which is pivoted at 33 to the hanger 34. The lever 32 is provided with a roller 35 at its lower end, which is engaged by the tappet 36 on the wheel 37 as the wheel revolves, so that a quick movement is imparted to the lever and, through the connection described, to the jogger, jogging or squaring up the sheets against the guide 20. The lever 32 is returned to its initial position against the adjustable stop 39 by the coiled spring 38.

The slide supporting bracket 25 is adjustably supported by the clamping screw 40 arranged through the support 41 and engages a slot 42 in the bracket,—see Figs. I and X.

The wheel 37 is mounted on the shaft 38' provided with a sprocket wheel 39' connected by the sprocket chain 40' to a sprocket 41' on the main driving shaft 42'.

The conveyer is driven from the sprocket wheels 43 mounted on the shaft 44 at the rear of the conveyer. The front end of the conveyer is supported by the sprockets 45. Guide and supporting sprockets 46, 47, and 48 are provided, the sprockets 46 and 47 being located in front of the drive sprockets 43, while the sprockets 48 are located below the drive sprockets,—see Fig. III. The shaft 44 is provided with a pair of ratchets 49 and 50 disposed in a spaced relation with the pawl carrying lever or rocker 51 between them,—see Fig. VI. The teeth vary on the ratchets 49 and 50 so that the feed of the conveyer may be varied by adjusting the pawls 52 which are arranged so that one or the other may be locked in operative position,—see Fig. VII, the pawls being provided with pins 53 which may be turned to engage on the upper ends of the pawl carrier 51, as is the case with the right hand pawl in Fig. VII, or dropped into the recess 54, as is the case with the left hand pawl of Fig. VII.

Springs 55 hold the pawls yieldingly against the ratchet wheels. The pawl carrier 51 is connected by the pitman 56 to the crank wheel 57 on the driving shaft 42'. The wrist pin 58 of the crank wheel 57 is adjustable in a radial slot 59 so that the throw of the pitman may be regulated.

The shaft 44 is provided with a handwheel 60 by means of which the conveyer may be operated should occasion require. The driving connections from the sprocket 61 to the stapler are not shown.

The stapler control shaft is indicated at 62. This shaft is connected to the stapler head by the rod 63 mounted on the arm 64 of the shaft 62. Further details of these connections are not shown as they form no part of this invention. They are commonly disposed within the standard 2.

The rock shaft is provided with a lever 65 which is substituted for the foot lever or treadle commonly present when pads are fed into the stapler by hand. To synchronize the action of the stapler with the conveyer, this lever 65 is actuated through the shaft 42', which is provided with a pinion 66 with which the gears 67 and 68 mesh. Connected to these gears are cams 69 and 70, respectively. These cams act upon the plunger 71 which has rollers 72 and 73, respectively, adjustably mounted thereon so that either roller may be adjusted to operative position to coact with one of the cams. The adjustment is effected by mounting the journals in slotted plates 74,—see Fig. V°.

The plunger is returned by the coiled spring 75.

As stated, the ratchet wheels 49 and 50, have a different number of teeth, and the gears 67 and 68 and the cams vary accordingly.

The plunger 71 acts upon the tappet 76, which is adjustably supported so that it may be shifted to and from operative position. When in operative position the stapler is continuously actuated until the roller 73 drops into the dwell 77 of the cam, which allows the lever 65 to rise and stop the stapler. This takes place during the feed step of the conveyer, which carries the conveyer flights and clamps past the stapling mechanism, the parts being otherwise timed so that the stapler acts during the period of rest between each stroke of the conveyer.

To permit the stopping of the stapler as occasion may require, the tappet 76 is mounted on the slide 78 carried by the depending arm on the bracket 79. A spring 80 holds this slide normally in operative position. The tappet is slotted to receive the end of the slide, the coiled spring 81 holding the tappet normally against the end of the plunger. This slide is connected to the lever 82 pivoted at 83 and connected by the link 84 to an arm 85 on the rock shaft 86. This rock shaft is provided with a foot piece 87.

The coiled spring 88 is connected to the link to retract or return the same, so that as soon as the foot piece is released the spring retracts the link 84, thus throwing the tappet into operative position.

The rock shaft is positioned so that the foot piece is readily accessible to the operator placing the pads in the conveyer pockets.

The stitched or stapled pads are delivered into the receiving trough 89 positioned at the rear of the conveyer so that the pads are carried into the trough by the conveyer.

A support 90 is arranged in the trough so that the pads are delivered on edge in front thereof. A releasing trip 91 is positioned to engage the tails 17 of the jaws as the stitched pads are carried into the trough,—see Fig. III, so that they are released and deposited in the trough successively. When the jaws pass from the trip 91 they close again and remain closed until they pass over the strip 18 which swings them to open position, so that the pads or bundles of sheets may be slipped into the conveyer pockets.

The rear end of the plate 18 is disposed so that the jaws are released gradually and permitted to grip the pads immediately after the sheets are jogged up by the jogger 23 and are held by the jaws during the stapling process and until the stitched or stapled pads are delivered into the receiving trough.

My improved mechanism is especially well adapted for the stitching of pads used in sales books, although advantageous for use in the manufacture of writing tablets and other articles of manufacture in which sheets are stapled together.

I have not attempted to illustrate or describe various modifications and embodiments of my improvements which I contemplate, as I believe the disclosure made will enable the adaptation and use thereof as circumstances and conditions may render most desirable.

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

1. In a machine for stapling sheets, the combination with a stapler comprising a control means, of a conveyer comprising conveyer chains and connecting cross pieces, supporting and driving sprockets for said chains, conveyer ways adapted to support the upper reaches of said conveyer chains, pockets for said conveyer comprising flights and clamping jaws mounted in coacting relation, said jaws being provided with inwardly projecting releasing tails, a jaw releasing plate with which said tails engage disposed below the upper reach of said conveyer so that said jaws are held open in receiving position, a jogger disposed to engage the sheets prior to the engagement thereof by said jaws, the stapler being disposed to act while the said jaws are engaged, ratchet members of varying numbers of teeth connected to the driving sprocket, an oscillating pawl carrier, pawls mounted thereon to coact with said ratchet members, the pawls being adapted to be adjusted to and from operative position, and operating connections for said control means and ratchet members, for the purpose specified.

2. In a structure of the class described, the combination with a stapler comprising a control means, of a conveyer comprising conveyer chains and connecting cross pieces, supporting and driving sprockets for said chains, conveyer ways adapted to support the upper reaches of said conveyer chains, pockets for said conveyer comprising flights and clamping jaws mounted in coacting relation, said jaws being provided with inwardly projecting releasing tails, a jaw releasing plate with which said tails engage disposed below the upper reach of said conveyer so that said jaws are held open in receiving position, the stapler being disposed to act while the said jaws are engaged, ratchet members of varying numbers of teeth connected to the driving sprocket, an oscillating pawl carrier, pawls mounted thereon to coact with said ratchet members, the pawls being adapted to be adjusted to and from operative position, and operating connections for said control means and ratchet members, for the purpose specified.

3. In a structure of the class described, the combination with a stapler comprising a control means, of a conveyer comprising conveyer chains and connecting cross pieces, supporting and driving sprockets for said chains, conveyer ways adapted to support the upper reaches of said conveyer chains, pockets for said conveyer comprising flights and clamping jaws mounted in coacting relation, said jaws being provided with inwardly projecting releasing tails, a jaw releasing plate with which said tails engage disposed below the upper reach of said conveyer so that said jaws are held open in receiving position, the stapler being disposed to act while the said jaws are engaged, an adjustable guide disposed at the rear side of said conveyer, ratchet members of varying numbers of teeth connected to the driving sprocket, an oscillating pawl carrier, pawls mounted thereon to coact with said ratchet members, the pawls being adapted to be adjusted to and from operative position, and operating connections for said control means and ratchet members, for the purpose specified.

4. In a machine for stapling pads, the combination with a stapler comprising a control means, of a conveyer comprising conveyer chains and connecting cross pieces, supporting and driving sprockets for said chains, conveyer ways adapted to support the upper reaches of said conveyer chains, pockets for said conveyer comprising flights and clamping jaws mounted in coacting relation, said jaws being provided with inwardly projecting releasing tails, a jaw releasing plate with which said tails engage disposed below the upper reach of said conveyer so that said jaws are held open in receiving position, the stapler being disposed to act while the said jaws are engaged, a receiving trough disposed at the rear end of said conveyer, a trip disposed to be engaged by said jaw tails to release said jaws and deposit the stapled pads within said trough, ratchet members of varying numbers of teeth connected to the driving sprocket, an oscillating pawl carrier, pawls mounted thereon to coact with said ratchet members, the pawls being adapted to be adjusted to and from operative position, and operating connections for said control means and ratchet members, for the purpose specified.

5. In a machine for stapling pads, the combination with a stapler, a conveyer comprising a pair of conveyer chains and connecting cross pieces, conveyer ways adapted to support the upper reaches of said conveyer chains, pockets for said conveyer comprising flights and clamping jaws mounted in coacting relation, said jaws being provided with inwardly projecting releasing tails, a jaw releasing plate with which said tails engage disposed below the upper reach of said conveyer so that said jaws are held open in receiving position, a receiving trough disposed at the rear of said conveyer, a trip disposed to be engaged by said jaw tails to release said jaws and deposit the stapled pads within said trough, means for driving said conveyer step by step, and operating connections for said conveyer and stapler.

6. In a structure of the class described, the combination with a stapler, a conveyer comprising a pair of conveyer chains and connecting cross pieces, conveyer ways adapted to support the upper reaches of said conveyer chains, pockets for said conveyer comprising flights and clamping jaws mounted in coacting relation, said jaws being provided with inwardly projecting releasing tails, a jaw releasing plate with which said tails engage disposed below the upper reach of said conveyer so that said jaws are held open in receiving position, means for driving said conveyer step by step, and operating connections for said conveyer and stapler.

7. In a machine for stapling sheets, the combination with a stapler, of a conveyer, pockets for said conveyer comprising flights and clamping jaws mounted in coacting relation, said jaws being provided with inwardly projecting releasing tails, a jaw releasing plate with which said tails engage disposed below the upper reach of said conveyer so that said jaws are held open in receiving position, a jogger disposed to engage the sheets prior to the releasing of said jaws, the stapler being disposed to act while the said jaws are engaged, an adjustable guide disposed at the rear side of said conveyer, means for driving said conveyer, and operating connections for said conveyer and stapler.

8. In a structure of the class described, the combination with a stapler, of a conveyer, pockets for said conveyer comprising flights and clamping jaws mounted in coacting relation and in front of the flights so that the articles are carried along by the flights, said jaws being provided with inwardly projecting releasing tails, a jaw releasing plate with which said tails engage disposed below the upper reach of said conveyer so that said jaws are held open in receiving position, means for driving said conveyer, and operating connections for said conveyer and stapler.

9. In a machine for stapling pads, the combination with a stapler, of a conveyer, pockets for said conveyer comprising flights and clamping jaws mounted in coacting relation and in front of the flights so that the articles are carried along by the flights, said jaws being provided with inwardly projecting releasing tails, a jaw releasing plate with which said tails engage disposed below

the upper reach of said conveyer so that said jaws are held open in receiving position, a receiving trough disposed at the rear end of said conveyer, a trip disposed to be engaged by said jaw tails to release said jaws and deposit the stapled pads within said trough, means for driving said conveyer, and operating connections for said conveyer and stapler.

10. In a machine for stapling sheets, the combination with a stapler, of a conveyer comprising flights and clamping jaws mounted on said conveyer and adapted to clamp the sheets arranged thereon, the clamping jaws being mounted in front of the flights with which they coact so that the sheets are carried along by the flights, means for holding said jaws open while in receiving position, a jogger disposed to act while the jaws are open, said stapler being disposed to act while the jaws are engaged, and means for releasing said jaws.

11. In a machine for stapling sheets, the combination of a conveyer comprising conveyer chains, connecting cross pieces, flights, and coacting clamping jaws mounted on said cross pieces, the clamping jaws being mounted in front of the flights so that articles carried along by the flights may be clamped by the jaws, said jaws being provided with inwardly projecting releasing tails, ways adapted to support the upper reaches of said conveyer chains, a jaw releasing plate with which said tails engage disposed below the upper reach of said conveyer so that the jaws are held open in receiving position, and a trip disposed to be engaged by said jaw tails for releasing the stapled sheets from said jaws.

12. In a machine for stapling sheets, the combination of a conveyer comprising conveyer chains, connecting cross pieces, flights, and coacting clamping jaws mounted on said cross pieces, the clamping jaws being mounted in front of the flights so that articles carried along by the flights may be clamped by the jaws, said jaws being provided with inwardly projecting releasing tails, ways adapted to support the upper reaches of said conveyer chains, and a jaw releasing plate with which said tails engage disposed below the upper reach of said conveyer so that the jaws are held open in receiving position.

13. In a machine for stapling sheets, the combination with a stapler, of a conveyer provided with flights, clamping jaws mounted on said conveyer in front of the flights to coact therewith and so that the sheets are carried along by the flights, means for holding said jaws open when in receiving position, and means for releasing said jaws.

14. In a machine for stapling sheets, the combination with a stapler, of a conveyer provided with flights, sheet clamping jaws mounted thereon in front of said flights and adapted to engage the sheets carried along by the flights, means for holding said jaws open when in receiving position, a jogger disposed to act prior to the engagement of the sheets by said jaws, means for driving said conveyer step by step, coöperating connections for said conveyer and stapler, means for actuating said jaws after the jogger has acted upon the sheets and prior to the stapling, and means for releasing said jaws.

15. In a machine for stapling sheets, the combination with a stapler, of a conveyer provided with flights, sheet clamping jaws mounted thereon in front of said flights and adapted to engage the sheets carried along by the flights, means for holding said jaws open when in receiving position, means for driving said conveyer step by step, coöperating connections for said conveyer and stapler, means for actuating said jaws prior to the stapling, and means for releasing said jaws.

16. In a structure of the class described, the combination with a stapler, of a conveyer, clamping jaws mounted on said conveyer and adapted to clamp the sheets arranged thereon, the clamping jaws being mounted in front of the flights with which they coact so that the sheets are carried along by the flights, means for holding said jaws open while in receiving position, and means for releasing said jaws.

17. In a structure of the class described, the combination with a stapler comprising a control shaft, of a driving shaft, a conveyer, driving ratchet members for said conveyers, an oscillating pawl carrier, pawls mounted thereon to coact with said driving ratchet members, the pawls being adapted to be adjusted to to and from operative positions, a pitman for said pawl carrier, a crank disk on said driving shaft having a radial slot therein, a wrist pin for said pitman adjustably disposed in said slot, a pinion on said driving shaft, gears having different numbers of teeth meshing with said pinion, cams connected to said gears, a plunger having rollers adapted to be adjusted to and from operative position so that said plunger may be actuated by either of said cams, a lever on said control shaft, a tappet actuated by said plunger to actuate said lever, and means for shifting said tappet into and out of operative position.

18. In a structure of the class described, the combination with a stapler comprising a control shaft, of a driving shaft, a conveyer, driving ratchet members for said conveyer, an oscillating pawl carrier, pawls mounted thereon to coact with said driving ratchet members, the pawls being adapted to be adjusted to and from operative posi-

tions, a pitman for said pawl carrier, a crank disk on said driving shaft having a radial slot therein, a wrist pin for said pitman adjustably disposed in said slot, a pinion on said driving shaft, gears having different numbers of teeth meshing with said pinion, cams connected to said gears, a plunger having rollers adapted to be adjusted to and from operative position so that said plunger may be actuated by either of said cams, and operating connections for said plunger to said control shaft.

19. In a structure of the class described, the combination with a stapler comprising a control shaft, of a driving shaft, a conveyer, driving connections for said driving shaft and conveyer whereby the conveyer is driven with a step by step movement, a pinion on said driving shaft, a gear meshing with said pinion, a cam connected to said gear, a plunger actuated by said cam, a lever on said control shaft, a tappet actuated by said plunger to actuate said lever, and means for shifting said tappet into and out of operative position.

20. In a structure of the class described, the combination with a stapler comprising a control shaft, of a driving shaft, a conveyer, driving connections for said driving shaft and conveyer whereby the conveyer is driven with a step by step movement, a pinion on said driving shaft, a gear meshing with said pinion, a cam connected to said gear, a plunger actuated by said cam, and operating connections for said plunger to said control shaft.

In witness whereof, I have hereunto set my hand and seal in the presence of two witnesses.

DANIEL A. HOPPING. [L.S.]

Witnesses:
LLOYD T. CROMER,
E. E. STEVENSON.

Copies of this trade-mark may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."