F. C. NICKOL & M. C. STERN.

MANIFOLDING DEVICE.

APPLICATION FILED MAR. 27, 1911.

1,015,581.

Patented Jan. 23, 1912.

3 SHEETS—SHEET 1.

Fig. 1.

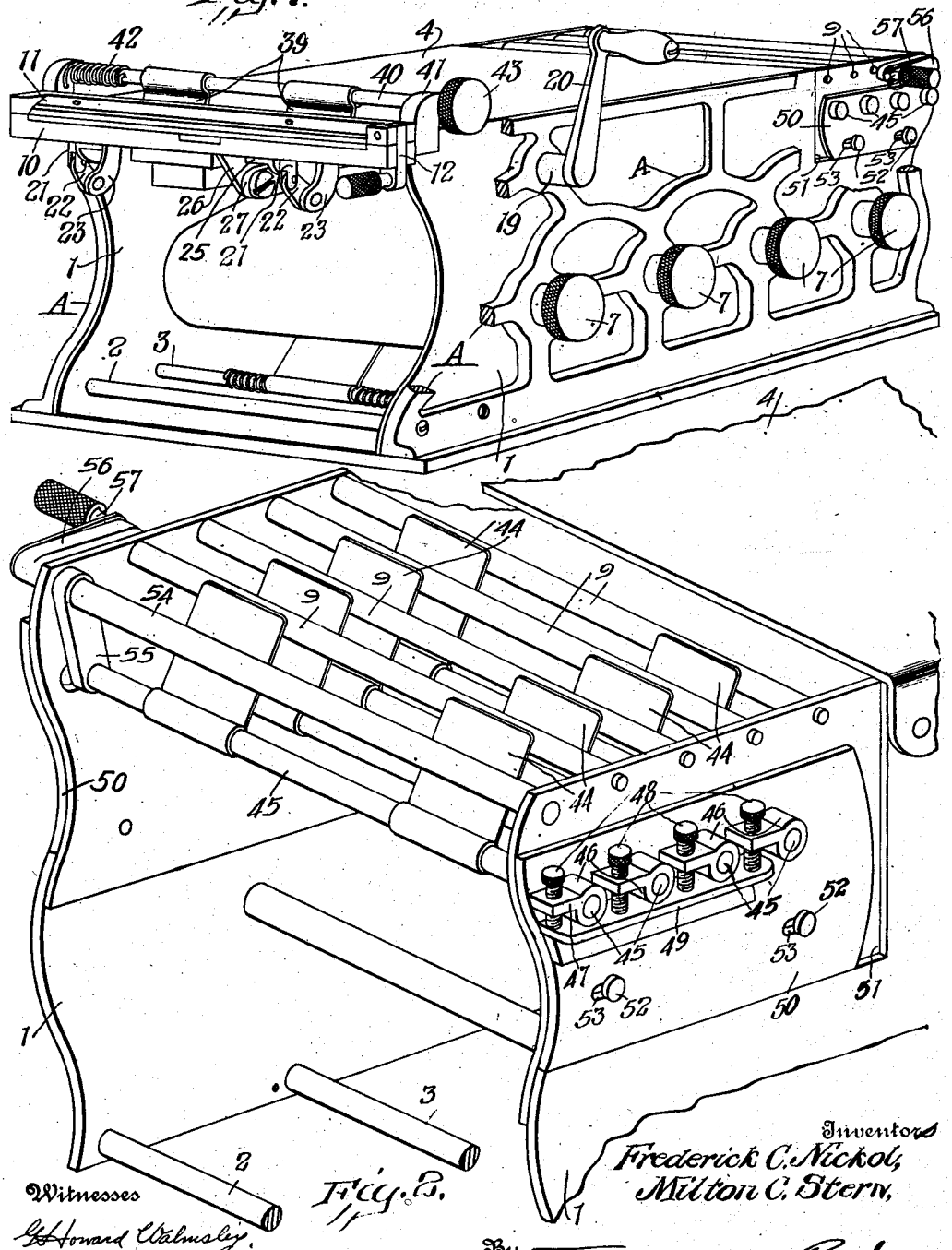

Fig. 2.

Witnesses

Howard Walmsley.

Harrick L. Hammaker.

Inventors

Frederick C. Nickol,

Milton C. Stern,

By Fulmer & Reed

Attorneys

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3 SHEETS—SHEET 2.

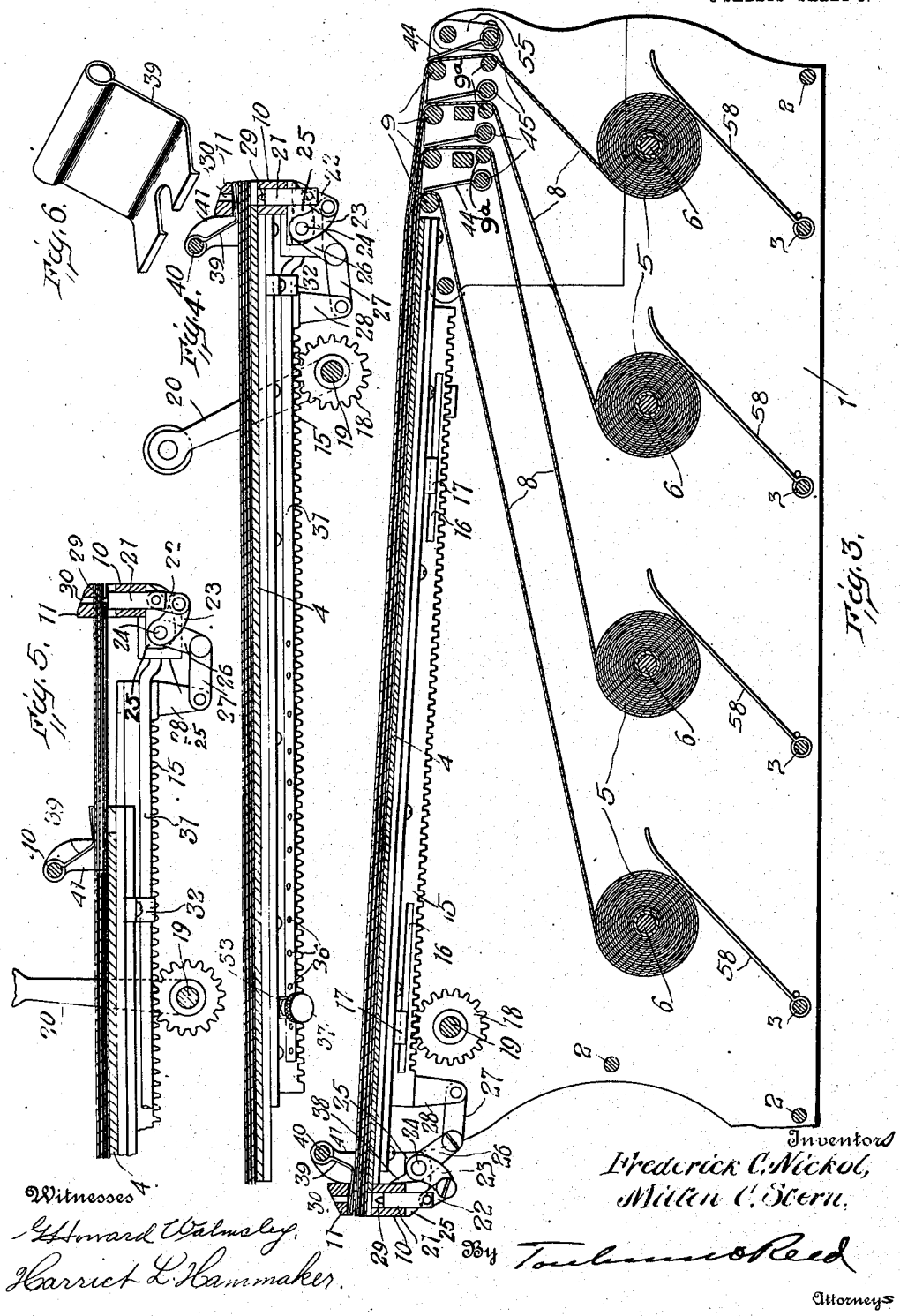

Fig. 6.

Fig. 4.

Fig. 5.

Fig. 3.

Witnesses

G. Howard Walmsley.

Harriet L. Hammaker.

Inventors

Frederick C. Nickol,

Milton C. Stern.

By Toulmin & Reed

Attorneys

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3 SHEETS—SHEET 3.

Fig. 7.

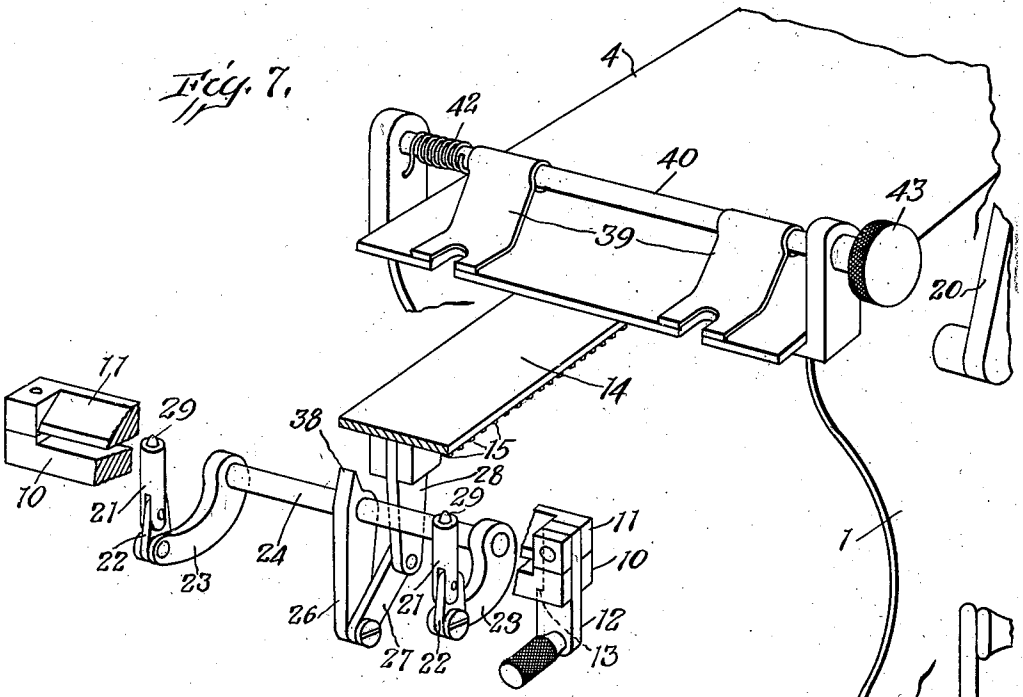


Fig. 8.

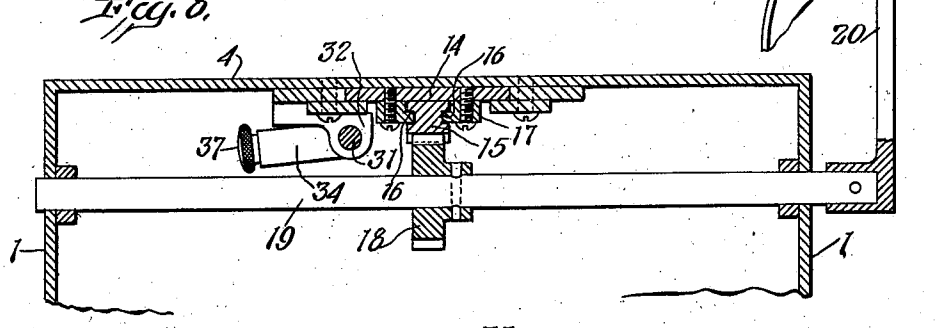
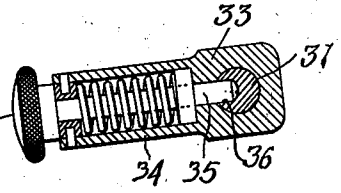


Fig. 9.



Witnesses

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Inventors

Frederick C. Nickol,

Milton C. Stern,

By Toulmin & Reed

Attorneys

UNITED STATES PATENT OFFICE.

FREDERICK C. NICKOL AND MILTON C. STERN, OF DAYTON, OHIO, ASSIGNORS TO THE EGRY REGISTER COMPANY, OF DAYTON, OHIO, A CORPORATION OF OHIO.

MANIFOLDING DEVICE.

1,015,581. Specification of Letters Patent. Patented Jan. 23, 1912.

Application filed March 27, 1911. Serial No. 617,076.

To all whom it may concern:

Be it known that we, FREDERICK C. NICKOL and MILTON C. STERN, citizens of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Manifolding Devices, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to manifolding devices, and the object of the invention is to provide a manifolding device with means for feeding forward the several webs of paper a distance sufficient to cause those portions of the webs containing the writing or record to project beyond the end of the table to enable the same to be detached from the webs; to provide means for gripping the paper prior to the outward movement of the feeding device and for releasing the same prior to the return movement of the feeding device; and also to provide means for holding the several webs of paper against rearward movement when the feeding device is returned to its normal position, for maintaining the several webs of paper taut upon the writing table and for holding the same against lateral displacement.

It is a further object of the invention to provide tension devices for each web of paper which may be individually adjusted and which may be actuated by a common throw-off to simultaneously release all the webs.

It is also an object of the invention to so construct the device as a whole that it will be exceedingly simple in its operation and of such a strong, durable character that it will be little liable to injury in the hands of a careless operator.

In the accompanying drawings, Figure 1 is a perspective view of a manifolding device embodying our invention; Fig. 2 is a perspective view, on a larger scale, of the rear end of such a device; Fig. 3 is a sectional view, taken longitudinally of such a device; Fig. 4 is a sectional view of a portion of the device showing the operating mechanism for the paper carriage and gripping devices in detail; Fig. 5 is a similar view, showing the gripping devices in their operative positions; Fig. 6 is a detail view of one of the forward tension fans; Fig. 7 is a perspective view of the forward end of the device with the paper feeding carriage advanced; Fig. 8 is a transverse, sectional view of the same; and Fig. 9 is a sectional, detail view of the stop for the feeding mechanism.

In these drawings we have illustrated one embodiment of our invention and have shown the same as comprising a main frame consisting of side members 1 connected one to the other by transverse rods 2 and 3 and mounted in a suitable casing A. This frame is provided with a flat top 4 constituting a writing table. The paper upon which the record is to be written is preferably supplied in the form of rolls 5 which are mounted beneath the writing table on rods or shafts 6 which extend through openings in one of the side members of the main frame and are screw-threaded into corresponding openings in the other side member. Preferably each rod is provided on that end opposite the screw-threaded end with a milled head 7 to facilitate the insertion and removal thereof. The webs of paper, which are indicated at 8, are carried from the respective rolls rearward and upward about guides 9 and 9^a, thence forward across the writing table 4. The several webs are superimposed one upon the other and sheets of carbon paper are interposed between them in the usual manner so that any record which may be written upon the uppermost web will be transferred to the other webs. The number of webs employed is controlled by the number of records it is desired to make. The present machine is adapted for use with as many as four webs, but a larger or smaller number may be employed if desired. Ordinarily, the webs are provided with printed forms upon which the record is written, and, in order that each web may receive the record on the proper part of the form, it is necessary that the webs be maintained in their proper relative positions. After the record has been written on the forms these are fed beyond the end of the table and detached from the webs, suitable feeding mechanism being provided for this purpose. This feeding mechanism is of such a character that it will feed the several webs forward simultaneously and equal distances. In the particular form of device here shown a paper feeding carriage is movably supported near the forward edge of the writing table. This paper feeding carriage preferably comprises a lower member 10 and an upper member 11 arranged substantially parallel thereto and

spaced away from the upper surface thereof to form a horizontal slot which is supported in alinement with the webs of paper upon the feeding table 4 and is adapted to receive those webs and permit the same to move freely therethrough. In order that the paper may be more readily threaded through the slot between the upper and lower members the upper member is preferably connected at one end to the lower member on a vertical axis and is provided at its other end with a fastening device to retain the two members normally parallel. As here shown, this fastening device comprises a finger 12 pivotally mounted in a slot formed in the free end of the upper member 11 of the carriage and adapted to enter a corresponding slot in the lower member and having a shoulder 13 to engage the edge of said lower member and retain the finger 12 within the slot therein.

Suitable operating mechanism is provided to move the paper carriage away from the writing table to feed the several webs of paper forward and to return the same to its normal position. In the present construction the lower member or bar 10 of the carriage is secured to a bar 14 mounted in suitable guideways secured to and extending longitudinally to the lower side of the writing table 4. Mounted on the bar 14 is a rack bar 15 which is capable of a limited longitudinal movement relatively to the bar 14 and to the carriage. To this end the rack bar is preferably provided in each side with one or more slots 16 into which extend guides 17 which are rigidly secured to the supporting bar 14 for the carriage. The rack bar is actuated by the gear 18 mounted on a shaft 19 journaled in the side members 1 of the main frame and having a handle 20 for rotating the same. The paper feeding carriage is provided with gripping devices, by means of which the paper is secured thereto during the forward movement thereof. These gripping devices are so connected with the actuating mechanism for the carriage that they will be caused to grip the paper immediately prior to the forward movement of the carriage and to release the same immediately prior to the rearward movement of the carriage. As here shown these gripping devices comprise plungers 21 slidably mounted in vertical openings in the lower member 11 of the carriage. There may be any suitable number of these plungers, and, in the present device, we have shown two. Each plunger is connected by means of a link 22 with a crank arm 23 which is rigidly secured to a rockshaft 24 journaled in bearing brackets 25 rigidly secured to the carriage. The rockshaft, in turn, is provided with a crank arm 26 which is connected by a link 27 with a finger 28 rigidly secured to the rack bar 15. By means of this connection any movement of the rack bar relatively to the carriage is transmitted to the gripping devices or plungers 21, and, when this movement is toward the carriage, the plungers have moved upward into engagement with the paper which extends through the slot in the carriage and this paper is gripped firmly between the plunger and the upper member 11 of the carriage. To give the plungers a better hold on the paper and to prevent any liability of the paper slipping the plungers are preferably provided with reduced upper portions or pins 29. To facilitate the piercing of the paper by the pins 29 the upper member 11 of the carriage is provided with recesses or apertures 30 arranged in alinement with the pins. It will be noted that when the first movement is imparted to the rack bar 15 by the pinion 18 this rack bar will be moved forward relatively to the carriage, thereby rocking the shaft and causing the plungers to grip the paper.

The forward movement of the rack is limited, and, as soon as this limit is reached and the rack can have no further movement relatively to the carriage, the latter is caused to move along with the rack and the paper is fed forward beyond the writing table. The forward movement of the rack may be limited in any suitable manner, but in the present instance we rely upon the plungers 21 for this purpose. When these plungers are in engagement with the paper in the slot of the carriage they are locked against further movement, and, consequently, the connecting parts and the rack bar are also locked against further movement in a forward direction. By thus utilizing the plungers to limit the movement of the rack bar we are enabled to maintain a constant pressure on the plungers during the forward movement of the carriage and thus maintain the same in firm engagement with the paper which is being fed forward.

The forward movement of the carriage is controlled by a suitable stop which may be regulated to adjust this movement to accommodate the device to forms of different length. In the present instance a rod 31 is rigidly secured to the carriage and extends rearwardly through a suitable guide 32. This guide also acts as a fixed stop and coöperates with a stop 33 to check the forward movement of the carriage. This latter stop is preferably in the form of an apertured block having a hollow lateral extension 34 in which is mounted a spring-pressed pin 35 adapted to engage any one of a series of recesses 36 formed in one side of the rod 31 and provided on its outer end with a head 37 by means of which it may be manipulated to permit the stop to be moved from one recess to another.

When the carriage has reached the outer

limit of its movement the handle 20 is operated in the reverse direction and a rearward movement imparted to the rack bar 15 relatively to the carriage, thereby rocking the shaft 24 and withdrawing the plungers 21 from the slot in the carriage and thus releasing the paper. This rearward movement of the rack bar is also limited, preferably by a projection 38 secured to the rockshaft 24 and adapted to engage the inner surface of the lower member of the carriage. For convenience of manufacture this projection is formed integral with the rock arm 26. After the plungers or gripping devices have released the paper and the rearward movement of the rack bar relative to the carriage has been checked, the continued movement of the rack bar will return the carriage to its normal position at the forward end of the writing table and will cause those portions of the webs which have been fed forward to project beyond the carriage. These projecting portions of the webs may be detached in any suitable manner. In the present instance the upper member 11 of the carriage has a cutting edge by means of which the projecting portions of the webs are severed by tearing in a well known manner. By utilizing the upper member or bar 11 of the carriage to sever the projecting ends of the webs a simple inexpensive cutting device is provided which cannot be easily broken or rendered inoperative.

In order to prevent any of the several webs from buckling when the paper feeding carriage is returned to its normal position and to maintain the several webs in a flat position upon the writing table we have provided suitable tension devices adapted to bear upon the several webs near the forward edge of the writing table, and, in the present form of the invention, these tension devices comprise a plurality of spring-actuated vanes or tension fans 39 rigidly secured to a shaft 40 extending transversely to the writing table and journaled in brackets 41 carried by the side members of the main frame near the forward ends thereof. A spring 42 is coiled about the shaft 40 to move the fans toward the writing table and a nut or head 43 is mounted on one end of the shaft to enable the same to be rotated to move the fans away from the table and permit the webs of paper to be passed between the same and the table and to be adjusted relatively one to the other. In the preferred form of the device the top plate 4, which constitutes the writing table, extends forward beyond the ends of the side members of the main frame, and, when the paper feeding carriage is in its normal position, this forwardly projecting portion of the top plate will extend into the slot in the carriage and its forward edge will be substantially flush with the forward edge of said carriage. To permit of the action of the paper gripping plungers 21 the forward edge of the plate is provided with slots to register with the apertures in the lower member of the carriage in which the plungers are mounted. The tension fans 39 extend downward and forward to a point near the top plate and immediately in the rear of the upper bar 11 of the carriage and the lower ends of the fans, which are turned forward, extend substantially parallel with the top plate and enter the slot in the carriage, thus enabling the same to engage the paper near the forward edge of the writing table. Preferably, the tension fans correspond in number to the number of paper gripping devices on the carriage, and, in the present instance, we have provided two fans and have arranged the same adjacent to the gripping devices. The forwardly extending ends of the fans are bifurcated and extend on the opposite sides of the respective paper gripping devices. The arrangement of the tension fans is such that they will not interfere with the forward movement of the paper when the paper feeding carriage is actuated, but will effectually prevent any of the webs from moving rearward when this carriage is returned to its normal position. The upper and lower webs are in engagement with the respective members of the carriage and the friction between the same and these members has a slight tendency to move these webs rearward and to cause the same to buckle over the writing table. The arrangement of the tension fans above described effectually prevents this rearward movement or buckling of the webs and maintains the webs in their proper relative positions. Suitable tension devices are arranged to engage the several webs at the rear end of the writing table to maintain the said webs taut and flat on the table. In the form of device here shown these tension devices consist of tension fans 44 mounted on rods 45 arranged adjacent to and in a plane below the guide rollers 9 about which the webs extend. These tension devices preferably correspond in number to the tension devices at the forward end of the plate and are arranged substantially in alinement with these tension devices, and thereby maintain a uniform tension across the full width of the webs. These tension devices are adjustable to permit the amount of tension to be regulated, and, to this end, we have shown the fans 44 as rigidly secured to the respective rods 45 and have provided these rods at one end, and on the outer side of the main frame member in which they are mounted, with collars 46 having lateral projections 47 constituting crank arms in which are screw-threaded set screws 48 arranged to engage a bracket or plate 49 arranged immediately beneath the same. By adjusting

the screws in the projections 47 the tension fans 44 will be caused to bear upon their respective webs with more or less pressure. To facilitate the threading of the webs about their guide rollers it is necessary that the tension fans should be moved away from these rollers and we have provided means to accomplish this movement of the fans without affecting the adjustment thereof. To this end we have mounted on the frame members 1 slide plates 50, these plates being preferably mounted in recesses 51 formed in the upper rear corners of the side members of the frame and connected thereto by pins 52 extending through longitudinal slots 53 in the plates. The openings in the main frame members through which the rods 45 pass are elongated and the ends of these rods extend beyond the side members of the frame through the plates 50 and have no movement relatively to these plates other than a rotary movement. Consequently, by moving the plates 50 rearwardly the fans 45 will be moved bodily away from the guide rollers 9, but the adjustment of the fans will not be affected inasmuch as no rotary movement is imparted to the rods 45. The movement of the plates 50 must be in unison and may be accomplished in any suitable manner. In the present form of the device we have mounted a shaft 54 in the frame members near the rear ends thereof and have rigidly secured to this shaft crank arms 55 which are connected with one of the rods 45. The outer end of the shaft 54 has secured thereto an arm 56 by means of which it may be rocked and this arm has movably mounted thereon a spring-pressed pin 57 adapted to engage an aperture in the main frame to lock the arm 56 and the shaft 54 against movement to retain the tension fans in engagement with the webs of paper. This pin may also constitute a handle for actuating the arm 56.

To control the rolls of paper 5 and prevent the same from unwinding faster than the paper is fed forward over the writing table tension fans 58 may be mounted on the connecting rods 3 and caused to bear against the outer surface of the rolls.

The operation of the device has been fully explained in connection with the description of the several parts thereof and it will be understood that after the record has been written on the webs of paper the handle 20 is actuated to feed the several webs forward a distance equal to the length of the forms thereon and is then actuated in a reverse direction to return the feeding device and allow those portions of the webs which have been fed forward to project beyond the carriage and the cutting device carried thereby. These forms are then severed and the operation is repeated.

While we have used the term "writing table" in the present description to indicate the flat top plate upon which the several webs of paper rest while the record is being written thereon, it will be understood that this term includes any device which will support the paper while the record is being made thereon, whether it is made by writing or in any other manner. We further wish it to be understood that we do not desire to be limited to the details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

Having thus fully described our invention, what we claim as new and desire to secure by Letters Patent, is:—

1. In a device of the character described, the combination, with a writing table, and a paper carriage movably mounted near one edge thereof and having a paper gripping device, of a rack bar operatively connected with said carriage and movable relatively thereto, a gear meshing with said rack bar, and a connection between said rack bar and said gripping device, whereby the first movement of said gear will actuate said gripping device and the further movement of said gear will actuate said carriage.

2. In a device of the character described, the combination, with a writing table, of a carriage movably supported near one edge of said table and comprising two substantially parallel members spaced apart to form a slot between them to receive the paper, a gripping device mounted on one of said members and adapted to enter said slot and engage the paper between said members, a toothed bar operatively connected with and movable relatively to said carriage, an operative connection between said toothed bar and said gripping device, and a toothed actuating member for said toothed bar.

3. In a device of the character described, the combination, with a writing table, and a paper carriage movably mounted near one edge thereof and comprising two members spaced apart to receive a web of paper, and plungers reciprocally mounted on one of said members and coöperating with the other thereof to grip said web of paper, of actuating mechanism to move said carriage away from and toward said table, and a connection between said actuating mechanism and said plungers to cause said actuating mechanism to move said plungers into engagement with said paper before said carriage is moved away from said table and to move the same out of engagement with said paper before said carriage begins its return movement.

4. In a device of the character described, the combination, with a writing table, a paper carriage movably supported near one edge of said table and comprising two members spaced apart to permit the paper to pass

between them, plungers reciprocally mounted in one of said members and adapted to enter the space between said members and engage said paper, and a toothed bar operatively connected with said carriage, of an operative connection between said toothed bar and said plungers, whereby said plungers will be actuated prior to the movement of said carriage, and a toothed actuating member engaging said bar.

5. In a device of the character described, the combination, with a writing table, a paper carriage movably mounted near one edge of said table, a plunger movably mounted on said carriage to grip the paper thereon, and a crank arm supported by said carriage and connected with said plunger, of a rack bar operatively connected with said carriage and movable relatively thereto, a gear meshing with said rack bar, an operative connection between said rack bar and said crank arm, whereby, the first movement of the gear will actuate the plunger and the further movement thereof will actuate said carriage, and means to rotate said gear.

6. In a device of the character described, the combination, with a writing table, and a paper carriage movably mounted near one edge of said table, a plurality of plungers movably mounted on said carriage to grip the paper thereon, a rockshaft journaled on said carriage and a crank arm rigidly secured to said shaft and connected to said plungers, of a rack bar operatively connected with said carriage and movable relatively thereto, a gear to actuate said rack bar, an operative connection between said rack bar and said rockshaft, whereby the first movement of said gear will actuate said plungers and the further movement thereof will actuate said carriage, and means to rotate said gear.

7. In a device of the character described, the combination, with a writing table, of a paper carriage movably supported near one edge of said table and comprising two members spaced apart to permit the paper to pass between them, plungers slidably mounted in one of said members and adapted to enter the space between said members and engage said paper, an actuating device for said carriage, and an operative connection between said actuating device and said plungers, whereby said plungers will be actuated prior to the movement of said carriage.

8. In a device of the character described, the combination, with a writing table, of a paper carriage movably supported near one edge of said table and comprising two substantially parallel members spaced apart to permit the paper to pass between them, one of said members being pivotally connected at its end to the other of said members, a fastening device to secure the other end of said pivoted member to the corresponding end of said other member, a gripping device mounted on said other member adapted to engage the paper in the space between said members, an actuating device for said carriage, and an operative connection between said operating device and said gripping device.

9. In a device of the character described, the combination, with a writing table, of a paper feeding device comprising a lower member supported near one edge of said table, an upper member pivotally mounted on said lower member and spaced away from the same to form a slot, plungers slidably mounted on said lower member and adapted to enter said slot, a supporting bar connected to said lower member and slidably mounted beneath said table, a rack bar slidably mounted on said supporting bar and operatively connected with said plunger, a gear meshing with said rack bar, and means to actuate said gear.

10. In a device of the character described, the combination, with a writing table provided with a forwardly extending portion having recesses in the forward edge thereof, of a paper feeding carriage having a slot to receive the forwardly extending portion of said table and the paper supported thereon, plungers slidably mounted on said carriage and adapted to be moved through the recesses in said table and to engage the paper above the same, an actuating device for said paper feeding carriage, and a connection between said actuating device and said plungers, whereby said plungers are actuated prior to the movement of said carriage.

11. In a device of the character described, the combination, with a writing table provided with a forwardly extending portion having recesses in the forward edge thereof, of a paper feeding carriage having a slot to receive the forwardly extending portion of said table and the paper supported thereon, plungers slidably mounted on said carriage, adapted to be moved through the recesses in said table and to engage the paper above the same, tension fans supported above said table and having forwardly extending, bifurcated portions arranged to enter said slot and to engage the paper on both sides of the respective plungers, an actuating device for said paper feeding carriage, and a connection between said actuating device and said plungers, whereby said plungers are actuated prior to the movement of said carriage.

12. In a device of the character described, the combination, with a writing table, of a paper feeding carriage movably supported near one edge of said table and having a slot to receive the paper, a plunger movably mounted on said carriage and adapted to enter said slot and engage the paper therein, a tension fan supported above said table and having a forwardly extending bifurcated portion arranged to enter the slot in

said carriage and engage the paper on both sides of said paper gripping device, an actuating device for said carriage, and an operative connection between said actuating device and said paper gripping device.

13. In a device of the character described, the combination, with a writing table, a paper feeding device arranged near the forward edge thereof, and means for actuating said paper feeding device, of tension fans arranged to engage the paper near the forward edge of said writing table, other tension fans arranged near the rear edge of said writing table to engage the paper after it has been drawn from the roll, said last-mentioned tension fans being arranged to engage the paper in substantially the same longitudinal line with the corresponding tension fans at the forward end of said table.

14. In a device of the character described, the combination, with a writing table, a paper feeding device arranged near the forward edge thereof, and means for actuating said paper feeding device, of tension devices arranged to engage the paper near the forward edge of said table, other tension devices arranged to engage the paper near the rear edge of said table, means for adjusting the tension of the last mentioned devices, and means for moving said tension devices out of engagement with the paper without affecting the adjusting thereof.

15. In a device of the character described, the combination, with a main frame, a writing table supported thereby, means to support a plurality of rolls of paper beneath said writing table, guide rollers mounted in said main frame near the rear edge of said writing table, a paper feeding device arranged near the forward edge of said table, and means for actuating said paper feeding device, of tension devices arranged to engage the paper near the forward edge of said table, other tension devices arranged to engage the paper as it passes about said guide rollers, and supporting devices for said tension devices, said supporting devices being movable relatively to said main frame.

16. In a device of the character described, the combination, with a main frame, a writing table supported thereby, means to support a plurality of rolls of paper beneath said writing table, guide rollers mounted in said main frame near the rear edge of said writing table, a paper feeding device arranged near the forward edge of said table, and means for actuating said paper feeding device, of tension devices arranged to engage the paper near the forward edge of said writing table, a supporting plate movably mounted on each side member of said main frame, rods mounted in said movable supporting plates and movable relatively to said main frame, tension fans secured to said rods and adapted to engage the paper as it passes about the respective guide rollers, means to rotate said rods to adjust the tension of said fans, and means to move said supporting plates relatively to said main frame.

17. In a device of the character described, the combination, with a main frame, guide rollers mounted therein, rods arranged substantially parallel to said guide rollers, supporting plates for said rods movably mounted on said main frame, tension fans rigidly secured to said rods, means for rotating said rods to adjust the tension of said fans, and means for actuating said movable supporting plates to move said rods and said fans relatively to said guide rollers.

18. In a device of the character described, a writing table, a paper feeding device supported normally near said writing table and having a paper gripping member movably mounted thereon, a supporting member connected with said paper feeding device and movable relatively to the said writing table, a rack bar movably mounted on said supporting member and operatively connected with said paper gripping member, and a toothed actuating member meshing with said rack bar.

19. In a device of the character described, a writing table, a paper feeding device normally supported near one edge of said writing table and having a paper gripping member movably mounted thereon, a supporting bar secured to said paper feeding device and slidably mounted beneath said writing table, a rack bar slidably mounted on said supporting bar and operatively connected with said paper gripping member, and a toothed actuating member meshing with said rack bar.

20. In a device of the character described, a writing table, a paper feeding device normally supported near one edge of said writing table and having a paper gripping member movably mounted thereon, a supporting bar secured to said paper feeding device and slidably mounted beneath said writing table, a rack bar slidably mounted on said supporting bar and operatively connected with said paper gripping member, a toothed actuating member meshing with said rack bar, a rod secured to said paper feeding device extending substantially parallel with said supporting bar, a bearing bracket for said rod secured to a fixed support, and a stop adjustably mounted on said rod and adapted to engage said bearing bracket to limit the outward movement of said paper feeding device.

21. In a device of the character described, a writing table having a forwardly extending portion, a paper feeding carriage having a slot to receive the forwardly extending portion of said table and the paper

supported thereon, paper gripping devices carried by said feeding carriage, tension fans supported above said writing table and having portions extending into the slot in said paper feeding carriage, and means to move said paper feeding carriage relatively to said table to move said paper gripping devices relatively to said carriage.

In testimony whereof, we affix our signatures in presence of two witnesses.

FREDERICK C. NICKOL.
MILTON C. STERN.

Witnesses:
M. A. SMITH,
A. E. BURGMEIER.