C. F. McBEE.

PERFORATING AND BINDING MACHINE.

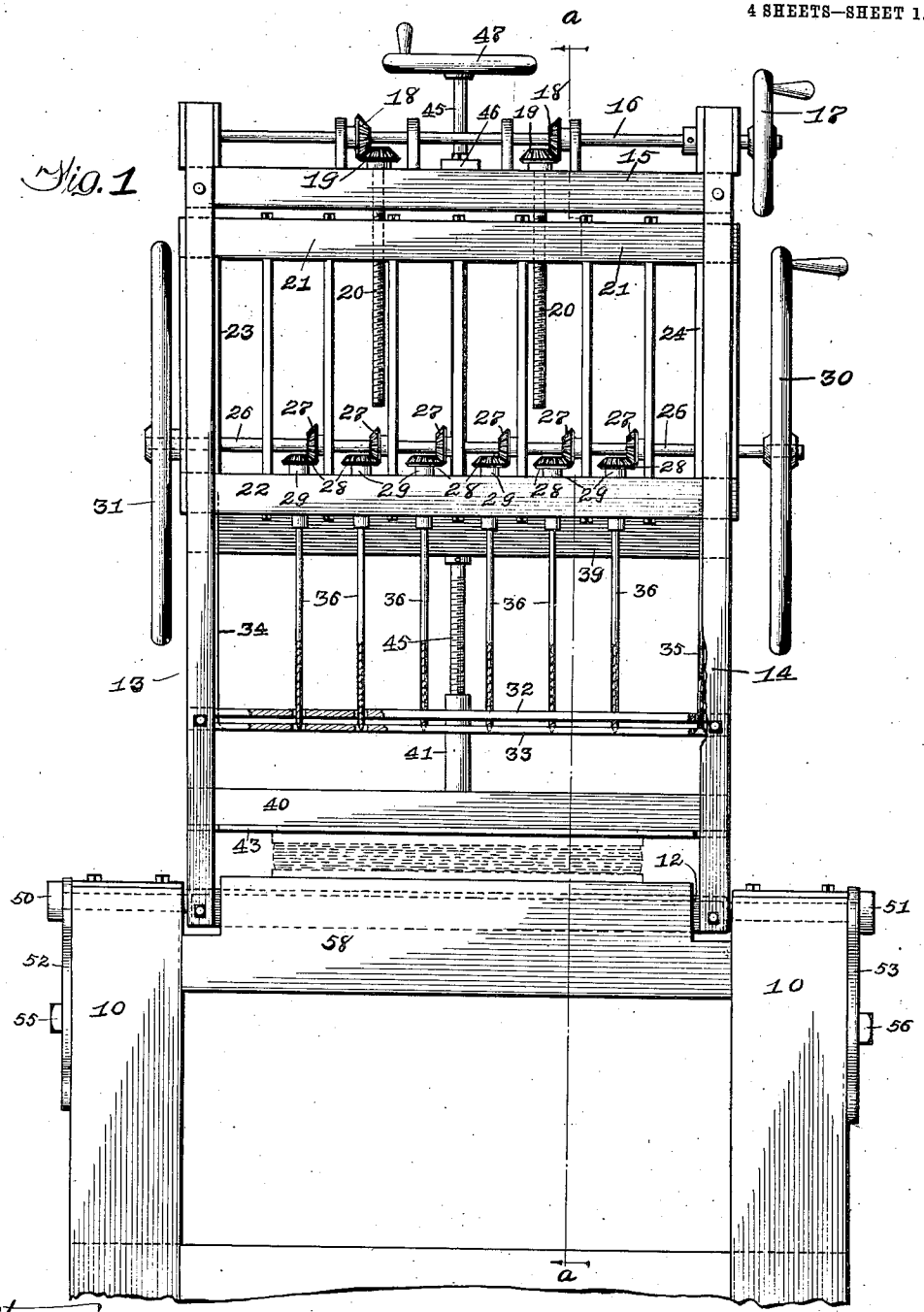
APPLICATION FILED MAR. 31, 1908.

946,458.

Patented Jan. 11, 1910.

4 SHEETS—SHEET 1.

Fig. 1

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4 SHEETS—SHEET 2.

Fig. 11

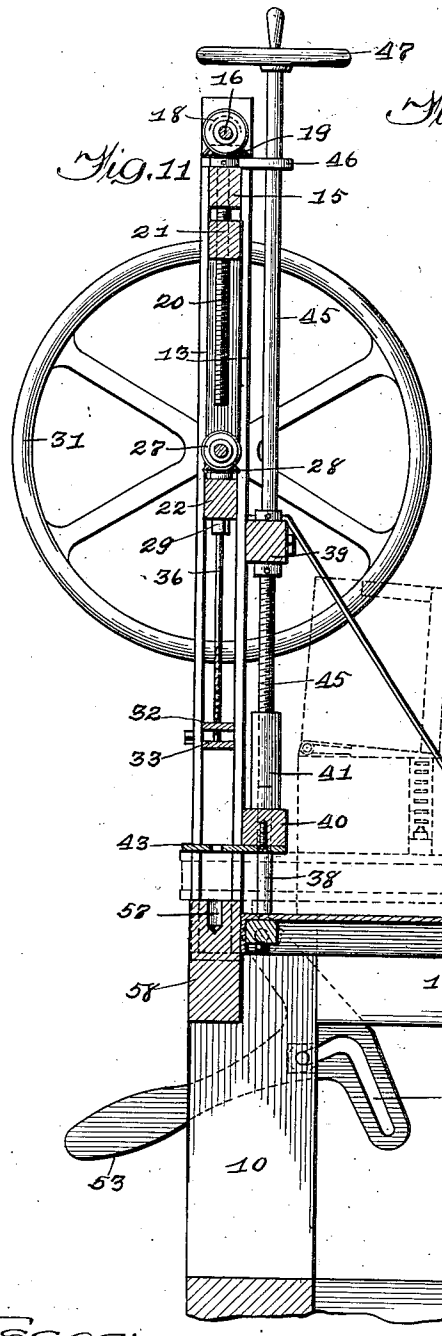
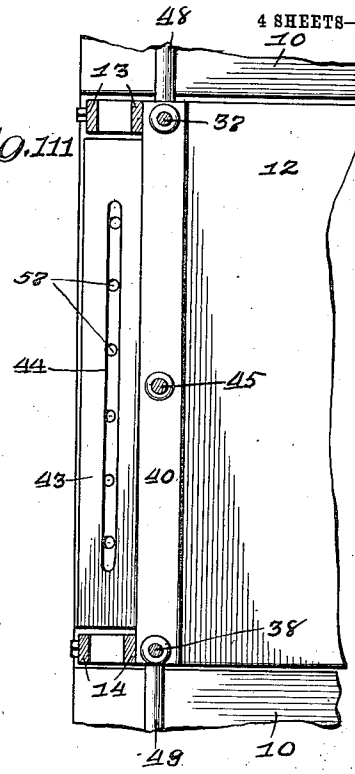
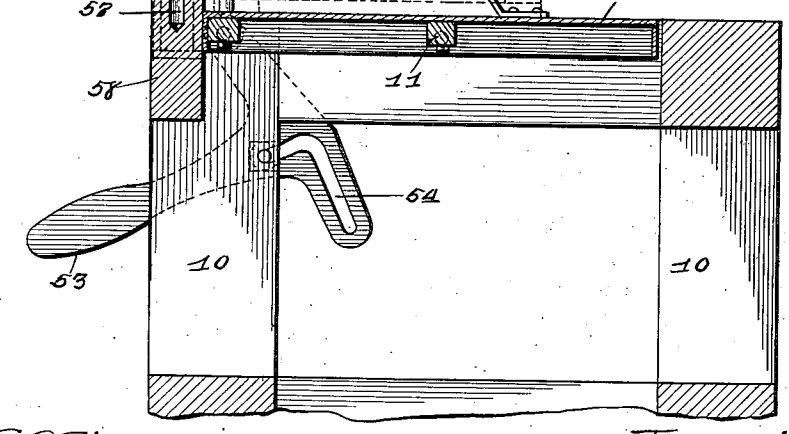



Fig. 111

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4 SHEETS—SHEET 3.

Fig. IV

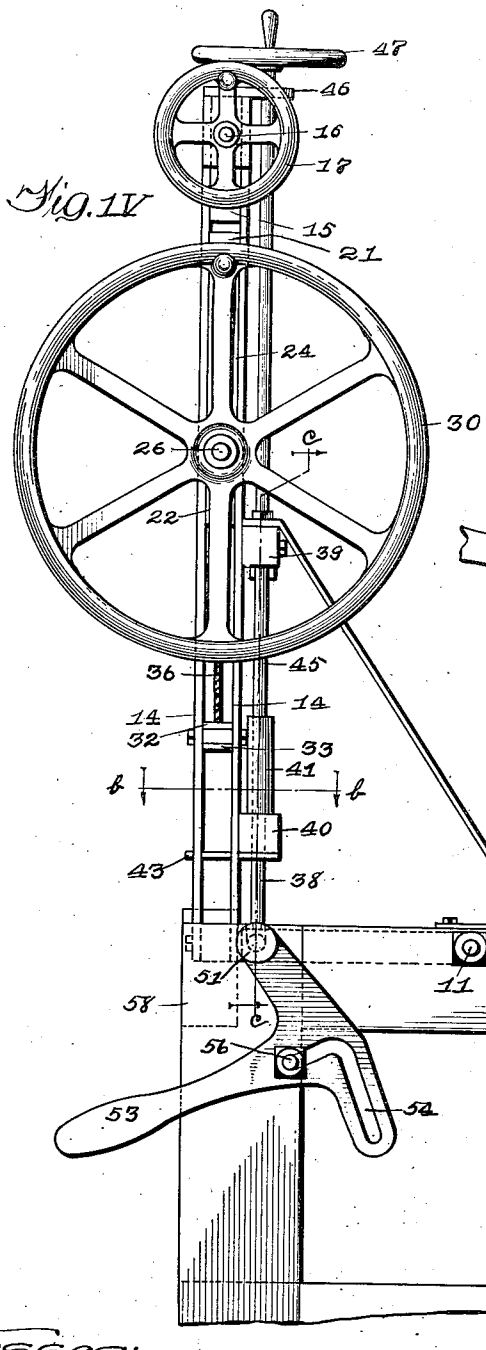
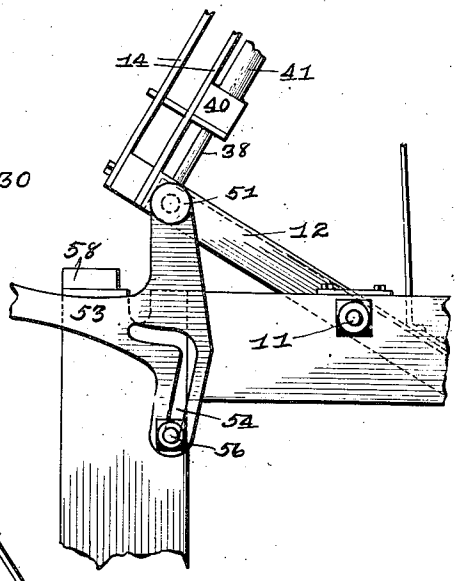



Fig. V

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4 SHEETS—SHEET 4.

Fig. VI

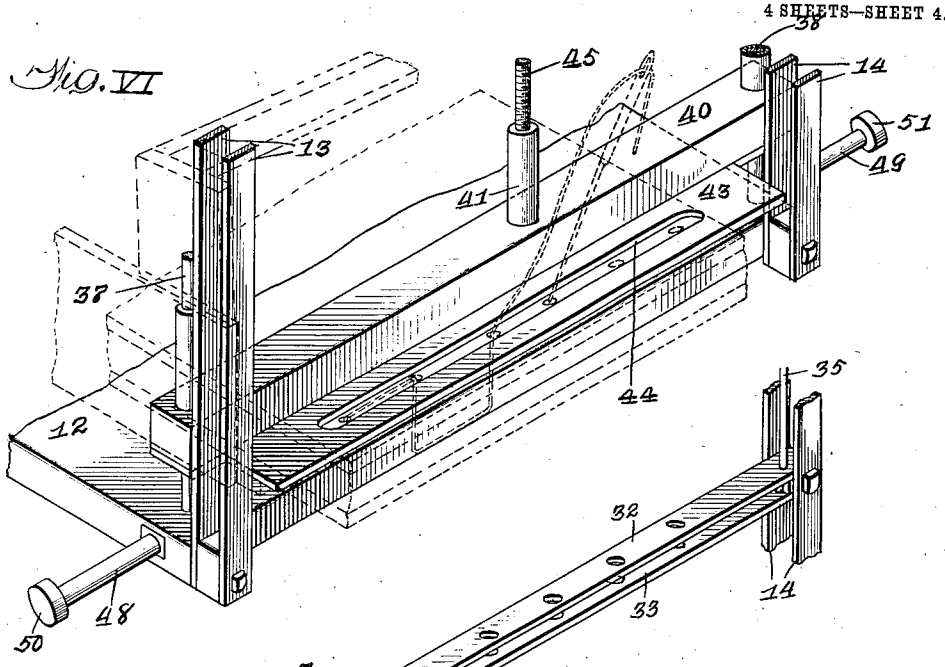



Fig. VII

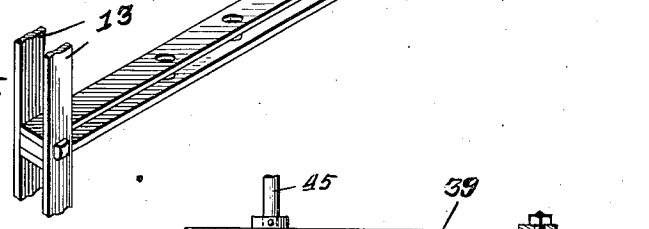
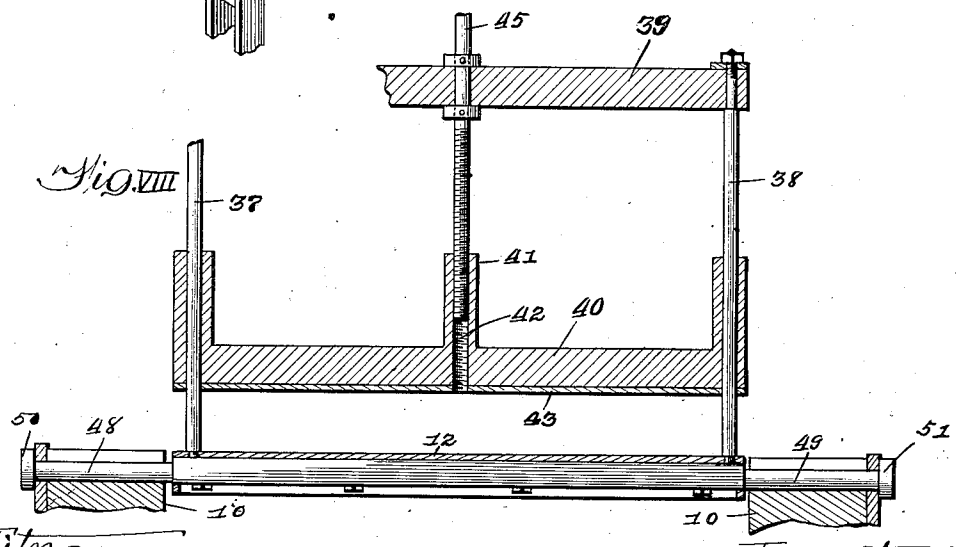



Fig. VIII

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# UNITED STATES PATENT OFFICE.

CHARLES F. McBEE, OF ATHENS, OHIO.

## PERFORATING AND BINDING MACHINE.

946,458. Specification of Letters Patent. Patented Jan. 11, 1910.

Application filed March 31, 1908. Serial No. 424,359.

*To all whom it may concern:*

Be it known that I, CHARLES F. McBEE, a citizen of the United States, residing in Athens, county of Athens, and State of Ohio, have invented a new and useful Improvement in Perforating and Binding Machines, of which the following is a specification.

The object of my invention is to provide a means for perforating papers and covers and to retain them securely together until the whole are bound into a volume.

A further object is to produce a perforating machine adapted to make all the perforations at one and the same time by one operation.

A further object is to facilitate the work of binding papers of all kinds and to greatly reduce the labor heretofore required for this purpose.

Another object is to produce a device of this kind which will be simple, strong, durable and comparatively inexpensive considering the saving of labor and time.

My invention consists of certain details of construction hereinafter set forth, pointed out in my claims and illustrated in the accompanying drawings in which—

Figure I shows a front elevation view of my device; Fig. II shows a sectional view taken on the line *a—a* in Fig. I, looking in the direction of the indicating arrows; Fig. III shows a transverse sectional view taken on the line *b—b* in Fig. IV and looking in the direction of the indicating arrows; Fig. IV shows a side elevation view of my device; Fig. V shows a detail view of my device the upper part being inclined backwardly from its pivotal bearing; Fig. VI shows a detail view of the pressure bar and a part of the forward portion of my device; Fig. VII shows a detail view of the cross bars designed as guides, which I employ; and, Fig. VIII shows a sectional view taken on the line *c—c* in Fig. IV, looking in the direction of the indicating arrows.

Referring to the accompanying drawings the reference numeral 10 is used to indicate a frame work designed as the base or support for my machine proper, said frame work being provided with an open top. Pivotally mounted on the upper portion of said frame work, by means of a shaft 11, is a solid plate 12, constructed preferably of steel, said plate being the base proper of the upper section of my machine. In its normal position the said base engages the rear surface of a forward cross bar 58, but is below the plane of the upper surface of said cross bar, for purposes hereinafter set forth.

Mounted to the extreme forward portion, and on each side, of the plate 12 are vertical uprights 13 and 14 respectively, each of said uprights being comprised of two parallel strips, preferably constructed of steel, and in these uprights the perforating portion of my machine is mounted. Connecting the upper portions of said uprights is a horizontal bar 15, said bar being rigidly mounted and designed to remain in a stationary position. Immediately above the said horizontal bar 15 and mounted between the said uprights 13 and 14 is a shaft 16, mounted for rotary movement and designed to be operated by a hand or belt wheel 17, and secured near the central portion of said shaft 16 are beveled gear wheels 18 designed to mesh with and operate companion gear wheels 19, secured to the upper extremity of screw threaded shaft 20, extending downwardly therefrom through the said bar 15, for purposes hereinafter set forth.

Mounted within the uprights 13 and 14 and designed for upward and downward movement therein is a frame comprised of an upper cross bar 21 and lower cross bar 22 and side bars 23 and 24 respectively. The said frame is rectangular in conformation and the side bars 23 and 24 are so mounted within their respective uprights as to provide for an easy and even upward and downward movement of the frame within the said uprights. The cross bars 21 and 22 are, obviously, parallel to each other and are parallel to the cross bar 15. The upper cross bar 21, of the frame, is provided with screw threaded transverse orifices designed to receive the screw threaded shafts 20 and by this means the said frame is suspended from the cross bar 15, and it is by the operation of the wheel 17 that the frame is moved upward and downward within the said uprights.

Mounted for rotary movement within the side bars 23 and 24 is a shaft 26, so mounted as to be parallel with the cross bar 22, and obviously, at right angles to the uprights 13 and 14, and at regular intervals on the said shaft are mounted beveled gear wheels 27 designed to operate companion wheels 28, se-

cured to shafts 29 transversely mounted, for rotary movement, within the cross bar 22. The lower extremities of the shafts 29 project below the lower surface of the cross bar 22, and are provided with gripping means, by which bits may be secured therein. As this gripping means is old it has not been particularly shown in the drawings. The shaft 26 is designed to be driven by a belt or hand wheel 30, mounted to one end thereof, and to the other end of said shaft is mounted a balance wheel 31.

The numeral 32 indicates a cross bar mounted at right angles to, and connecting, the uprights 13 and 14 said cross bar being provided with orifices, one immediately below and in line with, its respective shaft 29 mounted in the cross bar 22. The numeral 33 indicates a second cross bar having its bearing within the uprights 13 and 14, said cross bar being designed for upward and downward movement within the said uprights. The said cross bar 33 is suspended from the cross bar 22 by means of rods 34 and 35, provided with enlarged heads passing upwardly through orifices in the cross bars 32 and 33, and being secured to the cross bar 22. The heads of the rods 34 and 35 are designed to be countersunk in their respective bearings of the cross bar 33 and the said cross bar is suspended from the cross bar 22 in this manner, the weight of the said cross bar resting upon the countersunk heads of the said rods, but the said rods are not rigidly secured within the said cross bar 33. Obviously the cross bar 32 is provided with orifices to receive the said rods, in line with the orifices in the cross bar 33. The shafts 29 are each provided with a downwardly depending bit 36, said bits being designed to be of such a length that when the frame is resting in its normal position, at its upward limit of movement, they will project through their respective orifices in the cross bar 32 and into their respective orifices in the cross bar 33.

Directly in the rear of the uprights 13 and 14, and mounted in the plate 12 are rods 37 and 38, respectively, projecting upwardly in a vertical plane, to a point nearly in line with the cross bar 22, and the upper extremities of the said shafts are connected by a horizontally mounted cross bar 39.

The numeral 40 indicates a pressure bar mounted for upward and downward movement upon the rods 37 and 38, in the manner shown in Fig. VIII, and in the central portion of said pressure bar is a lug 41 containing a screw threaded channel 42 said channel extending also through the pressure bar 40 and through a plate 43 secured to the under portion of the said pressure bar. Said plate 43 is also mounted for vertical movement, as shown in Fig. VIII, upon the rods 37 and 38, and that portion of the said plate which extends forwardly from the under portion of said pressure bar and between the uprights 13 and 14, as shown in Fig. VI, is provided with a longitudinal channel 44 through which the bits 36 are designed to pass. The said plate 43 is rigidly secured to the pressure bar 40 and moves upward and downward with the same. The cross bar 39 is provided with a transverse channel, in line with the screw threaded channel 42 and extending through this channel and secured to the said cross bar 39, as shown in Fig. VIII, is a screw threaded shaft 45 designed to engage, and mesh with the threads in the internally screw threaded opening 42. The said shaft extends upwardly to the top of the machine, through a bearing 46, and is provided on its upper portion with a belt or hand wheel 47 and by this means the said pressure bar is raised or lowered.

It is obvious from the foregoing explanation that the pressure bar operates independent of the frame conveying the bits. By construction the uprights 13 and 14 are directly in front of, and secured to, the forward face of the plate 12. The said plate is also provided, on each lateral side, with an arm 48 and 49 respectively, designed to engage recesses provided for them in the frame work constituting the base of my machine, as indicated by the dotted lines in Fig. I. The said arms are designed to be slightly longer than the width of the uprights in which they rest thus, obviously, causing them to protrude beyond the frame constituting the base and the upper end of each of said arms is provided with a head 50 and 51 respectively.

The numerals 52 and 53 indicate T shaped levers secured to the shafts 50 and 51 respectively, within the space between their respective heads and their respective sides of the base, as shown in Fig. I, and the said levers are hung for pivotal movement therefrom. Each of the said levers is provided with a rearwardly and downwardly inclined L-shaped slot 54, as shown in Fig. IV, and in each side of the machine is a bearing 55 and 56 respectively designed to protrude through the slot in its respective T shaped lever, for the purpose of forming a bearing as clearly shown in Figs. IV and V. The elongated arm of the T shaped lever is designed as a handle for pulling the said lever forwardly and upwardly and thus raising the machine upwardly and backwardly from its pivotal bearing 11, as shown in Fig. V. By construction the shaft 11 is so mounted that the part of the machine forward therefrom is heavier than that part in the rear thereof, thus giving the necessary weight to keep the upper portion of the machine firmly resting within the base 10, in a horizontal position; but when the upper portion of the machine is raised, by means of the T-shaped levers 52

and 53, as shown in Fig. V, the weight is so distributed as to cause the upper portion to remain in the position shown in Fig. V until forced downwardly again into its normal position.

The numeral 58 indicates the forward cross bar of my lower frame work, said bar being designed as a guide and buffer for an assembly box when the same, containing the papers to be perforated, is placed in the machine. The upper surface of this bar is above the elevation of the upper surface of the plate 10, as shown in Fig. II. When the assembly box, containing its papers and covers to be perforated, is placed in the machine the cross bar 58 is designed to engage the forward end of the box, and thereby determine its forward limit of movement, and the papers and covers are designed to project over the upper surface of the said cross bar so as to receive the perforating bits when the machine is operated. I have provided channels, or recesses, 57 in the upper surface of the cross bar 58 which are designed to be in line with their respective bits, and to receive the same after they have passed through the covers and papers.

It is my purpose to employ any kind of an assembly box, or any means whatsoever, to retain the papers designed to be perforated and bound within my machine for all that I claim in this invention is relative to the perforating and binding construction and mechanism.

In practical operation the papers, designed to be bound, having been placed within their covers and placed in my machine, being retained in an assembly box, or without the assembly box, the forward edge of the papers and covers are alined with the forward edge of the plate 43 and the pressure bar 40 is then forced downwardly until it firmly grips and compresses the said papers and covers, and in this manner they are firmly held in position until bound. The bit carrying frame is then moved downwardly by the operation of the wheel 17 until the bar 33 rests on top of the plate 43. The wheel 30 is then operated and this in turn operates all of the bits 36 by the means hereinbefore explained and as the bits operate, the necessary downward feed is supplied by operation of the wheel 17. The plate 33 remains on top of the plate 43 and obviously the rods 34 and 35 keep moving on downward, for by construction the way is left clear for their downward progress. The bits bore their way through the covers and papers and then enter channels 57 provided for them in the cross bar 58, in the base 10, as shown in Fig. II. The bit carrying frame is then moved upward by the reverse motion of the wheel 17, and as it moves upwardly the rods 34 and 35 pick up the plate 33 and carry it back to the position shown in Fig. I. The upper part of the machine is then moved, on its pivotal bar 11, until it assumes the position shown in Fig. V, which makes it more convenient for the sewing and binding, and the operator then takes his twine and needle and sews the leaves and covers together in the manner shown in Fig. VI. When this is accomplished the upper part of the machine is then returned to its normal position and the pressure bar moved upwardly and the bound cover and papers are withdrawn and others placed in position to be bound.

The object of causing the plate 33 to move upward and downward with the bit carrying frame is to provide a second bearing or guide for the bits immediately above the place where they enter upon their boring work. It is obvious that the plate 33 is never moved below the bits and is always a guide for them regardless of the position of the bit carrying frame.

When an assembly box is used, the papers and covers are firmly secured therein their forward ends protruding beyond the forward edge of the base, and the box is then placed on the base 12 and pushed forward until the forward edge of the base of the box engages the rear surface of the cross bar 58. It is obvious that this will cause the forward portions of the papers and covers to be extended, the required distance, over the cross bar 58 and they will be in position to receive the bits.

Having thus described my invention what I claim and desire to secure by Letters Patent of the United States is:

1. A perforating and binding machine comprising a base section and an upper section pivotally mounted thereon for a limited upward movement; levers loosely secured to the said upper section, said levers being provided with L-shaped slots by means of which they are slidably secured to the base section and perforating mechanism secured to said upper section, substantially as shown and described.

2. A perforating and binding machine comprising a base section and an upper section pivotally mounted thereon said upper section being provided with vertical uprights; a horizontal cross bar rigidly secured near the upper extremities of said uprights; a shaft mounted for rotary movement, secured to said uprights above the said cross bar and parallel therewith and an operating wheel on one end of said shaft; bevel gear wheels secured near the center of said shaft; screw threaded shafts mounted, for rotary movement, in said cross bar and depending therefrom, each of said screw threaded shafts being provided with a gear wheel to mesh with, and be operated by, one of the aforesaid bevel gear wheels; a perforating

mechanism depending from said screw threaded shafts, substantially as shown and described.

3. A perforating and binding machine comprising an upper section provided with uprights; a cross bar connecting said uprights; screw-threaded shafts depending from said cross bar; means for rotating said shafts; a rectangular frame provided with an upper and a lower cross bar slidably mounted in said uprights said upper cross bar being provided with internally screw-threaded openings to receive the aforesaid depending screw threaded shafts; a series of shafts, evenly spaced and arranged, mounted for rotary movement within the lower cross-bar of said frame; bits clamped in said shafts; means for uniformly and simultaneously driving said shafts, substantially as shown and described.

4. A perforating and binding machine comprising a rectangular frame provided with an upper and a lower cross bar; uprights provided with a cross bar at their upper extremities; screw threaded shafts, mounted for rotary movement, depending from the cross bar connecting the uprights and engaging screw threaded orifices in the upper cross bar of the frame; a series of shafts, evenly spaced and mounted for rotary movement, in the lower cross bar of the frame; a bit clamped in and suspended from each of said shafts; bevel gear wheels on the upper extremities of said shafts; a shaft mounted horizontally, for rotary movement, in the side pieces of the frame; bevel gear wheels on said shaft, meshing with the aforesaid bevel gear wheels; a lower cross bar, provided with perforations to receive the aforesaid bits, horizontally secured between said uprights; a second cross bar, provided with perforations to receive said bits, slidably secured in said uprights; rods depending from the lower cross bar of the frame and extending through the said second cross bar, said rods being provided with enlarged heads at their base to support the said cross bar; means for raising and lowering said rectangular frame, substantially as shown and described.

5. A perforating and binding machine comprising uprights and a bit-carrying frame slidably mounted therein; a cross bar, provided with perforations to receive the bits, secured in said uprights; rods depending from the bit-carrying frame; a second cross bar, provided with perforations, loosely secured to said rods and slidably mounted in said uprights, substantially as shown and described.

6. A perforating and binding machine comprising in combination an upper section provided with a perforating mechanism on its forward part and a means for raising and lowering same; perforating bits mounted in said upper section; a lower section on which said upper section is pivotally mounted; a forward cross bar on said lower section in line with the said perforating mechanism and provided with recesses to receive the ends of the bits; and a base for said upper section said base being in the rear of the line of the perforating bits and engaging the rear surface of the forward cross bar of the lower section in such a manner as to form a shoulder the said cross bar being slightly above the said base, substantially as shown and for the purposes stated.

7. A perforating and binding machine comprising an upper section provided with uprights on its forward extremity and perforating mechanism slidably mounted in said uprights; uprights directly in the rear of the aforesaid uprights a pressure bar slidably mounted on the last-mentioned uprights; a plate secured to the lower surface of said pressure bar and extending forwardly between the first mentioned uprights, said plate having a longitudinal slot, in line with the perforating mechanism; and means for lowering and raising said pressure bar, substantially as shown and described.

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