

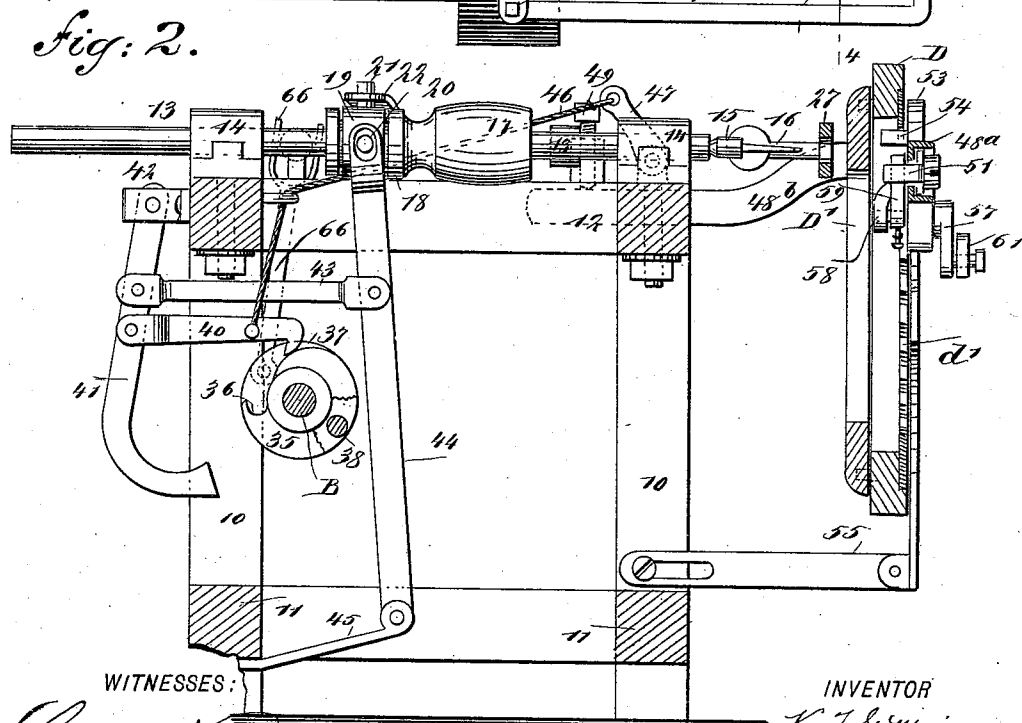
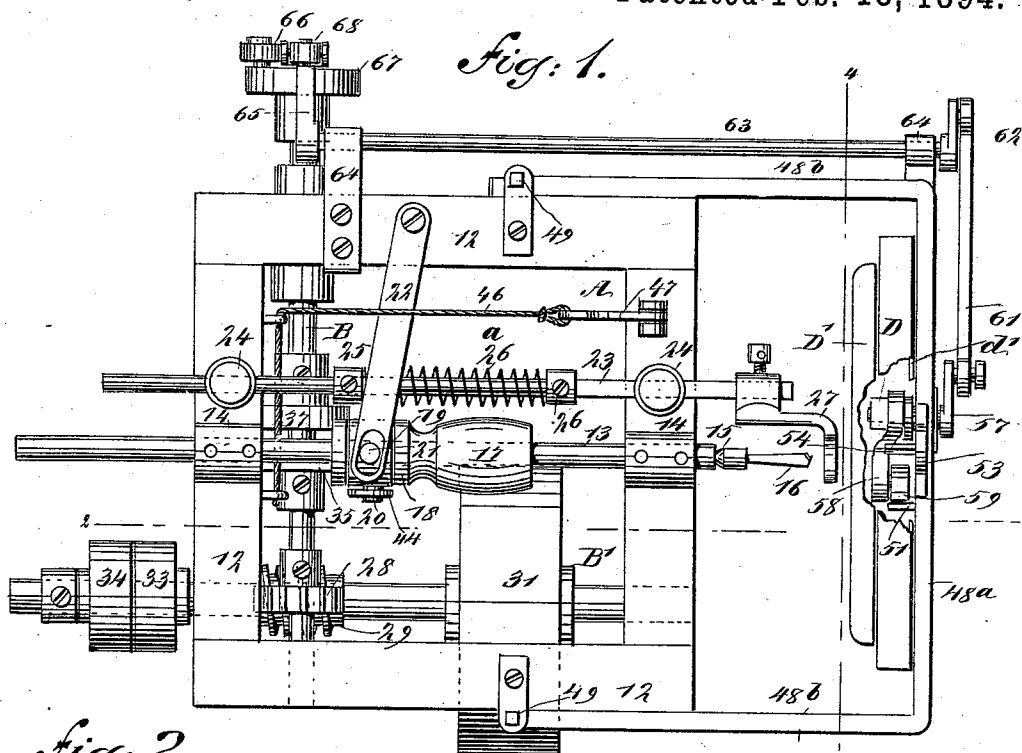
(No Model.)

3 Sheets—Sheet 1

K. F. G. MAIER.
MACHINE FOR BORING FRAMES TO BE CANED.

No. 514,762.

Patented Feb. 13, 1894.



WITNESSES:

Chas. Nisq.
C. Sedgwick

INVENTOR

K. F. G. Maier

BY

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(No Model.)

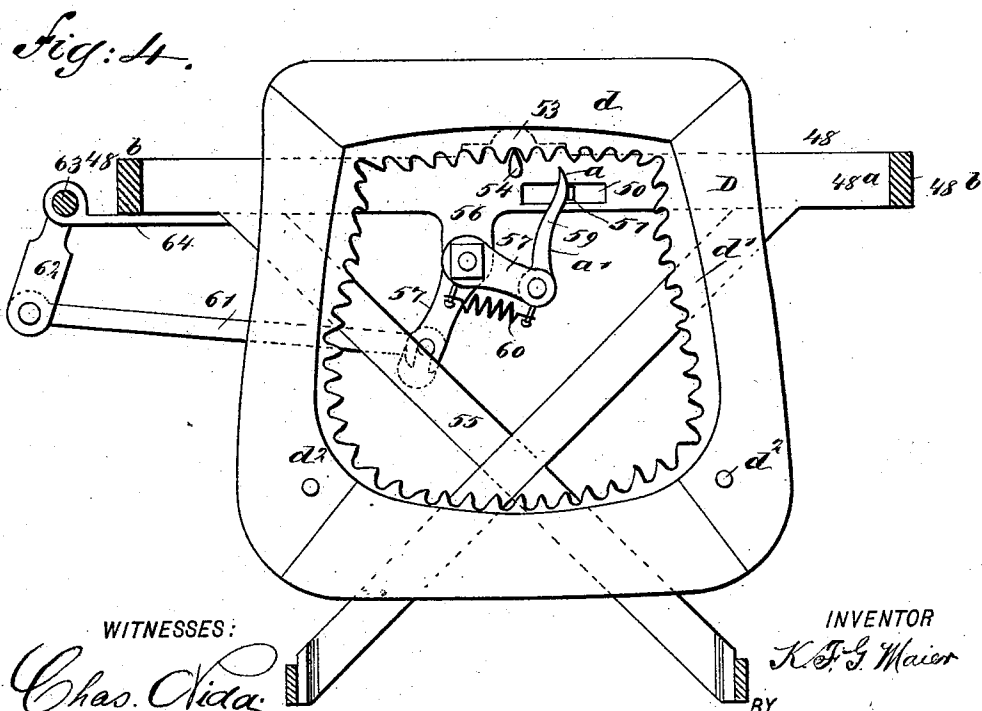
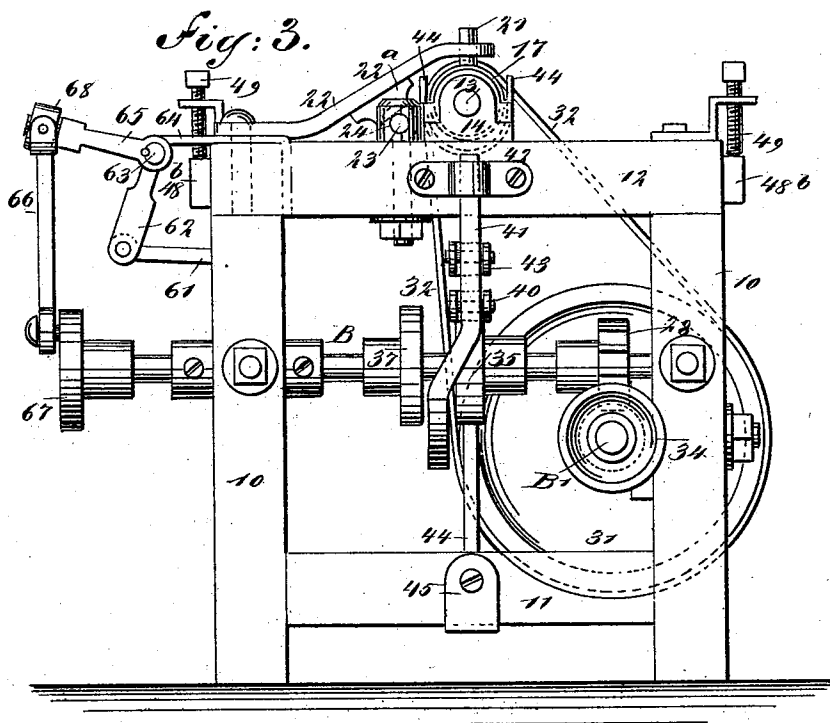
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Fig: 5.

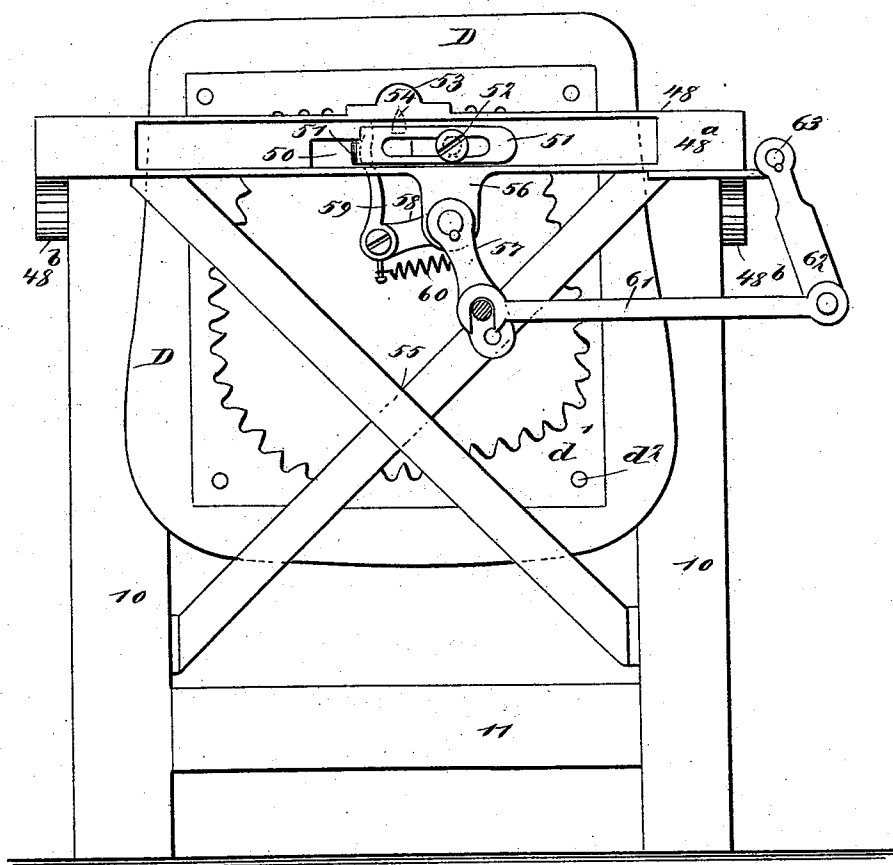
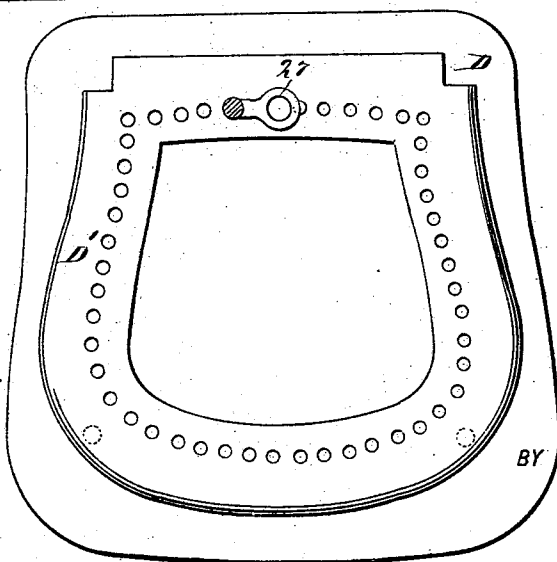


Fig: 6.



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UNITED STATES PATENT OFFICE.

KARL F. G. MAIER, OF BALTIMORE, MARYLAND.

MACHINE FOR BORING FRAMES TO BE CANED.

SPECIFICATION forming part of Letters Patent No. 514,762, dated February 13, 1894.

Application filed July 17, 1893. Serial No. 480,755. (No model.)

To all whom it may concern:

Be it known that I, KARL F. GUSTAV MAIER, of the city of Baltimore, in the State of Maryland, have invented a new and Improved Machine for Boring Frames to be Caned, of which the following is a full, clear, and exact description.

My invention relates to an improvement in machines especially adapted for boring holes in seat frames to be caned, and the object of the invention is to provide a machine which will be an improvement upon the ordinary upright, hand feed machine, being so constructed that when power is applied and a form is placed upon the machine in front of the boring tool, the form will be automatically shifted to constantly present a new surface of the seat frame to be bored, and whereby also after each adjustment of the form it will assume a proper perpendicular position, the position being due to gravitation of the form.

Another feature of the invention is to provide a simple means for driving the boring tool simultaneously with the operation of the form, and likewise to provide a simple mechanism for imparting to the boring tool a timed advance and return movement, the boring tool performing its work after the adjusting mechanism of the form has ceased its operation.

Another object of the invention is to provide a machine which will be exceedingly simple, compact and durable as well as economic in its construction, and through the medium of which a youth will be enabled to accurately perform much more work than an experienced hand is capable of performing upon the common upright form of machine.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth and pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar figures and letters of reference indicate corresponding parts in all the views.

Figure 1 is a plan view of the machine, a portion of the form and seat frame to be operated upon being broken away. Fig. 2 is a longitudinal vertical section taken practically on the line 2—2 of Fig. 1. Fig. 3 is an end view of the machine. Fig. 4 is a transverse

vertical section, taken essentially on the line 4—4 of Fig. 1. Fig. 5 is likewise an end view of the machine, representing that end at which the form is applied. Fig. 6 is a front elevation of a form and a cane seat frame attached to the form, and a sectional view of the guide for the boring tool; and Fig. 7 is a detail view of the hooked face cam and the connected disk on the driven shaft.

The bed A of the machine consists of a frame, which frame is preferably made somewhat rectangular, and comprises corner posts 10, connected at the bottom by cross bars 11, and at the top by upper cross bars 12, whereby a frame of skeleton form is obtained. A boring shaft 13, is mounted to turn in suitable bearings 14, secured upon the upper central portion of the bed, and the said boring shaft is provided at what may be termed the front end of the machine with a chuck or socket 15, capable of receiving and holding any approved form of boring tool 16. The shaft is provided with a pulley 17, secured thereon between its bearings, and the said pulley is preferably provided with an integral collar 18. The said collar is fitted with a coupling ring 19, loosely mounted upon it, and the coupling ring is provided at opposite sides with pins 20, while a third pin 21, is located upon the top of the ring. A shifting lever 22, is pivoted at its outer end upon one of the upper side beams 12, the inner end of the lever being provided with an elongated slot, receiving the top pin 21 of the ring 19. A shifting shaft 23, has sliding movement in bearings 24, located upon the upper end cross bars of the frame, as shown in Fig. 1; and the shifting shaft at its forward end is preferably made polygonal in cross section, while the remaining portion of the shaft is usually circular in cross section. Between its bearings the shifting shaft is provided with two collars 25 and 26 secured thereon, and a spring 26^a is coiled around the shaft between the collars, having bearing against one of the collars, the forward one for example, and against a lug 22^a, projected from the shifting lever, which lug is apertured to loosely receive the shifting shaft; and the rearward movement of the shifting lever is controlled by impinging upon the rear collar 25 of the shifting shaft, as is likewise best shown in Fig. 1.

A guide 27, through which the boring tool 16 is adapted to pass, is adjustably secured

upon the forward end of the shifting shaft, said guide being necessarily of angular or curved construction, as its head, which is apertured to admit of the passage through it of the boring tool, is adapted to be located immediately in front of the tool, while the attachment of the guide to the shifting shaft is made at one side of the said tool.

A driven shaft B, is journaled transversely upon the bed about mid-way between the top and bottom cross bars, the boxes of the driven shaft being secured to the rear uprights in any approved manner; and the said driven shaft is provided with a worm wheel 28, meshing with a worm 29, located upon the drive shaft B', said latter shaft being located at one side of the machine, and it is held to turn in suitable bearings. The drive shaft is provided with a large pulley 31, which is connected by a belt 32 with the pulley 17 on the boring shaft; and at one outer end of the drive shaft a fixed and a loose pulley are secured, the pulleys being designated respectively as 33 and 34.

A cam 35, is firmly secured upon the driven shaft B, and the said cam is provided with a hook face 36 at one point of its periphery; and adjacent to the cam a disk 37, is secured upon the driven shaft, the disk and cam being usually connected by a rod 38, located near the periphery of both and nearly opposite the hook face 36 of the cam.

A dog 40, provided with a hook-shaped inner end, is adapted for engagement with the peripheral surface of the cam, as the head of the dog normally rests upon the cam; and the outer end of the dog is pivotally connected with an arm 41, which arm is pivoted at its upper end in a suitable bracket 42, secured about centrally to the rear upper cross bar of the bed. The arm 41, which may be termed a trip arm, has its lower end bent laterally out of the plane of its upper end, and the lower end of the trip arm 41, is curved inwardly, the arm being so shaped and of such length that when the head of the dog has been in contact with the hook surface of the cam 35 a predetermined period, the lower end of the trip arm will be engaged by the connecting rod 38 of the disk and cam, and the lower portion of the trip rod will be drawn outward, compelling the boring shaft with which it is connected to return to its normal or inner position.

A link 43, is pivotally connected with the trip arm 41 above the dog 40, and the said link is likewise pivotally connected with a rod 44, the upper end of which rod is bifurcated and made to partially surround the loose ring 19 upon the boring shaft. The upper members of the rod 44, are slotted in order to receive the side pins 20 of the said ring, while the lower end of the rod 44 is in hinged connection with a bracket 45, or the equivalent thereof, firmly secured at any desired point in the lower portion of the bed.

The operation of the cam with relation to

the boring shaft is as follows: While the dog is upon the plain surface of the cam the boring shaft will be in its normal position, namely, with the tool out of the reach of the object to be operated upon; but when the hook surface of the cam engages with the dog, the dog is carried forward, the trip arm 41 is carried in the same direction, as is likewise the connecting rod 44, and consequently the loose ring upon the boring shaft is pushed in a forward direction, carrying the shaft with it, and the shifting lever will at its forward end follow the movement of the boring shaft, and thereby compress the spring upon the shifting shaft, and at the same time the shifting shaft will move with the boring shaft, and therefore the head of the guide 27, will be carried to a contact with the work to be operated upon in advance of the tool engaging with the work. The moment, however, that the dog is released from the cam, the spring will force the shifting lever rearward, and it will carry both the shifting shaft and the boring shaft to what may be termed their inner or normal position, and the arm 41, being engaged by the cam pin 38 will compel the shafts to make such a return. When desired the dog may be held entirely out of engagement with the cam by attaching a chain or cable 46 to the dog, carrying it through suitable guides upon the bed to a lever 47 upon the upper surface of the bed, which lever when carried in one direction will hold the dog in an elevated position; but when the lever is carried in a reverse direction the dog is free to perform its work.

The form D employed is shown in rear elevation in Fig. 4, and in front elevation in Fig. 5. This form may be the form ordinarily employed in connection with upright hand machines, and comprises a frame *d*, corresponding substantially in shape, especially at its inner contour, to the corresponding contour of the seat frame D' to be operated upon, but the form is larger than the seat frame. In addition to the frame *d* the form consists of a toothed plate *d'* of metal, which plate is secured to the front of the form in such manner that its teeth will extend inward beyond the inner margin of the frame of the form, as shown in Fig. 4, and the grouping of the spaces between the teeth of the form will represent the grouping of the holes in the seat frame after the latter has been bored. Pins *d*², are usually located upon the back of the form D, and the pins are adapted to enter apertures in the under face of the seat frame, and in this manner the seat frame to be bored, and the form, will be held together in proper relation.

The mechanism for operating the seat form is as follows: A yoke frame 48, is secured to the front upper portion of the bed. This frame comprises a front bar 48^a, which is located a predetermined distance in advance of the upper front end of the bed, and is parallel with the same, and arms 48^b, which ex-

tend from the ends of the front bar rearwardly, and the said arms are pivotally connected with the upper side bars of the bed; the front bar of the yoke is adjusted vertically, high or low as occasion may demand, by means of adjusting screws 49, located at the sides of the bed. The front bar is preferably U-shaped in cross section for the entire, or a portion of its length; and at or near its center the front bar is provided with an opening 50, to receive one end of an angular guide plate 51, which is held to slide adjustably upon the back of the bar, as the body portion of the guide plate is provided with a slot receiving an adjustable screw 52, as shown in Fig. 5, while the shorter member of the guide plate extends through the slot 50 in the front bar of the yoke frame, extending rearwardly at right-angles to the bar. At the central upper portion of the front bar of the yoke frame an extension 53, is formed, and the said extension carries a pin 54, which is somewhat oval, as shown in Fig. 4. The yoke frame is braced by a bracket 55, which bracket as shown in Fig. 2, is adjustably connected with the lower portion of the bed, the lower ends of the bracket being provided with slots through which set screws are passed into the bed, so that when the lower set screws are loosened and the upper set screws are adjusted, the yoke frame will be free to move in the desired direction, and after the adjustment has been accomplished the lower set screws are tightened and the yoke frame is prevented from moving. The front bar of the yoke frame, in addition to the upper extension 53, is provided with a lower extension 56 at one side of the upper one. One member of a crank arm 57 is passed from the front of the frame through the lower extension in a rearward direction, the member being free to turn in the extension; and the rear end of the crank arm 57, has secured to it a link 58, and the said link carries a dog 59, which dog stands in an upright position and has bearing against the rearwardly projecting member of the guide plate 51, the dog being held in that position by means of a spring 60, connected with it and with the lower extension 56, as shown in both Figs. 4 and 5.

The dog 59 is of peculiar shape, being given a compound curve, its upper end having an outer convexed face, while the lower portion of the said face is concaved, as is best shown in Fig. 4, the convexed surface being designated as α and the concaved surface as α' . The dog is operated by connecting with the free end of the crank arm a pitman 61, which pitman is carried in direction of one side of the machine and is pivotally connected with a crank arm 62, fast upon a line shaft 63, and the said shaft is journaled in bearings 64 attached to the upper, side portion of the machine. The rear end of the line shaft is provided with a second crank arm 65, shown best in Fig. 3, and the said crank arm 65 has

practically a universal connection with a short pitman 66, and the pitman is connected with a crank disk 67, mounted upon the driven shaft B. The universal connection between the pitman and the crank arm 65 of the line shaft is usually effected by loosely mounting upon the outer end of the crank arm a ring 68, which is connected with the upper end of the pitman 66, said end being bifurcated.

The seat frame having been placed upon a form, the form is suspended upon the pin 54 as shown in Fig. 4, by causing the pin to enter one of the spaces between the teeth of the form, and when placed upon the pin the form will immediately gravitate to a perpendicular position. Supposing the next movement of the machine, after the form has been placed in position, to be that causing the advance of the tool shaft, the tool will enter the seat frame and a hole will be drilled therein. When the hole has been drilled through the frame the dog will have slipped from the cam on the driven shaft, and the tool shaft will be carried rearward to its inner or normal position. At that time the driving connection between the driven shaft and the crank arm carrying the forward dog 59, will be brought into action in a manner to carry the said dog upward; the dog in traveling upward will enter the space between the teeth of the form above it and will lift the form and attached seat frame from the pin 54. When the concaved face α' of the dog engages with the guide plate 51, the dog will carry the form and seat frame in direction of one side of the machine a sufficient distance to cause the pin 54 to enter the next space between the teeth of the form; when the latter has been carried downward, or lowered by the downward movement of the dog, the form will immediately assume a vertical position, and at about that time the cam will again act upon the shifting dog of the machine and the tool will drill a second hole.

It is obvious that with a machine of the character above described, the work of drilling cane seat frames, or panels adapted to be caned, will be greatly facilitated and rendered much more economic than heretofore; and it is further obvious that the drilling will be accurately accomplished. The machine will not only drill holes regularly arranged as shown in the drawings, but will as perfectly produce holes in a frame in zigzag order, and the latter arrangement is in many instances desired as the frame is not then materially weakened. It is obvious that no matter in what order the holes are to be bored, if a proper pattern is furnished the shifting device will follow the same.

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

1. In a machine for boring frames to be caned, a support, a form, suspended therefrom a dog having an upward and a lateral throw and adapted for engagement with the

form, a boring shaft, a driving mechanism, and a time connection between the driving mechanism, the boring shaft and dog, substantially as shown and described, whereby the position of the form will be shifted alternately with the boring action of the boring shaft, substantially as specified.

2. In a machine for boring frames to be caned, the combination, with a support and a form having a toothed outline, and removably suspended at its toothed surface upon the support, of a dog adapted for engagement with the toothed surface of the form, and a driving mechanism, substantially as shown and described, imparting an upward and lateral throw to the dog, as and for the purpose specified.

3. In a machine for boring frames to be caned, the combination with a reciprocating shaft carrying a boring tool, a support, an adjustable guide carried by the support, a pin secured to said support and a form suspended from said pin, of a dog having one face provided with a convexed and a concaved surface, engaging the guide, and a driving mechanism imparting to the dog an upward movement, substantially as shown and described, whereby the dog will move laterally as well as upwardly, as and for the purpose specified.

4. In a machine for boring frames to be caned, the combination, with a support, an adjustable guide extending beyond the face of the support, and a form having a toothed margin and adapted to be removably suspended upon the support by its toothed surface, of a dog having one face shaped as a compound curve, which face engages with the guide, the dog being located beneath a portion of the toothed margin of the form, a drive shaft, and a crank and pitman connection between the drive shaft and the dog, whereby the dog is given an upward movement and also a lateral movement, automatically raising, shifting and lowering the form, substantially as and for the purpose specified.

5. In a machine for boring frames to be caned, the combination, with a form shifting device, of a boring shaft having rotary and sliding movement, a shifting shaft located adjacent to the boring shaft, a guide for the boring tool carried by the shifting shaft, a drive shaft, and a timed driving connection between the form shifting mechanism and the drive shaft, and the drive shaft and the boring shaft, the shifting and the boring shafts having a spring-controlled connection, as and for the purpose set forth.

6. In a machine for boring frames to be caned, the combination with a support adapted to receive a toothed form, a dog adapted for engagement with the toothed surface of the form and capable of an upward and lateral movement, a drive shaft, and a driving connection between the shaft and the dog, of a boring shaft, a shifting shaft located adjacent to the boring shaft, having spring-con-

trolled connection with the boring shaft, a tool guide carried by the shifting shaft, a driven shaft geared with the main shaft and provided with a cam, a shifting dog operated by the cam and connected with the shifting and boring shaft, a trip pin carried by the cam, and a trip arm to which the shifting dog is pivoted, which arm is adapted for engagement by the trip pin of the cam, substantially as shown and described.

7. In a machine for boring frames to be caned, the combination with a boring shaft mounted to slide, of a cam having a hook face, a dog pivoted to a movable support and engaging the hook cam, a pivoted rod connected with the boring shaft, and a link connected with the movable support of the dog and with said rod, substantially as described.

8. In a machine for boring frames to be caned, the combination with a boring shaft mounted to slide, of a cam having a hook face and provided with a lateral projection, a pivoted trip arm adapted to be engaged by the said projection, a dog pivoted to the trip arm and engaging the cam, a pivoted rod connected with the boring shaft, and a link connecting the trip arm with the pivoted rod, substantially as described.

9. In a machine for boring frames to be caned, the combination with a boring shaft mounted to slide, of a driven shaft, a cam mounted on the shaft and having a hook surface, a disk also mounted on the driven shaft and connected with the cam by a rod, a pivoted trip arm adapted to be engaged by the bar connecting the cam and disk, a dog pivoted to the trip arm and engaging the cam, a pivoted rod connected with the boring shaft, and a link connecting the trip arm with the said rod, substantially as described.

10. In a machine for boring frames to be caned, the combination with a sliding boring shaft, of a sliding shifting shaft at one side of the boring shaft, a pivoted shifting lever connected with the boring shaft and provided with an apertured lug through which the shifting shaft passes, and a spring surrounding the shifting shaft and engaging a collar on the said shaft and the lug of the shifting lever, substantially as described.

11. In a machine for boring frames to be caned, the combination with a sliding boring shaft, of a sliding shifting shaft, a pivoted shifting lever loosely connected with the boring shaft and provided with an apertured lug through which the shifting shaft extends, a spring surrounding the said shaft and engaging a collar on the shaft and the lug of the lever, and a device to hold the seat frame in position when boring tool is being withdrawn, substantially as described.

KARL F. G. MAIER.

Witnesses:

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