

(No Model.)

5 Sheets—Sheet 1.

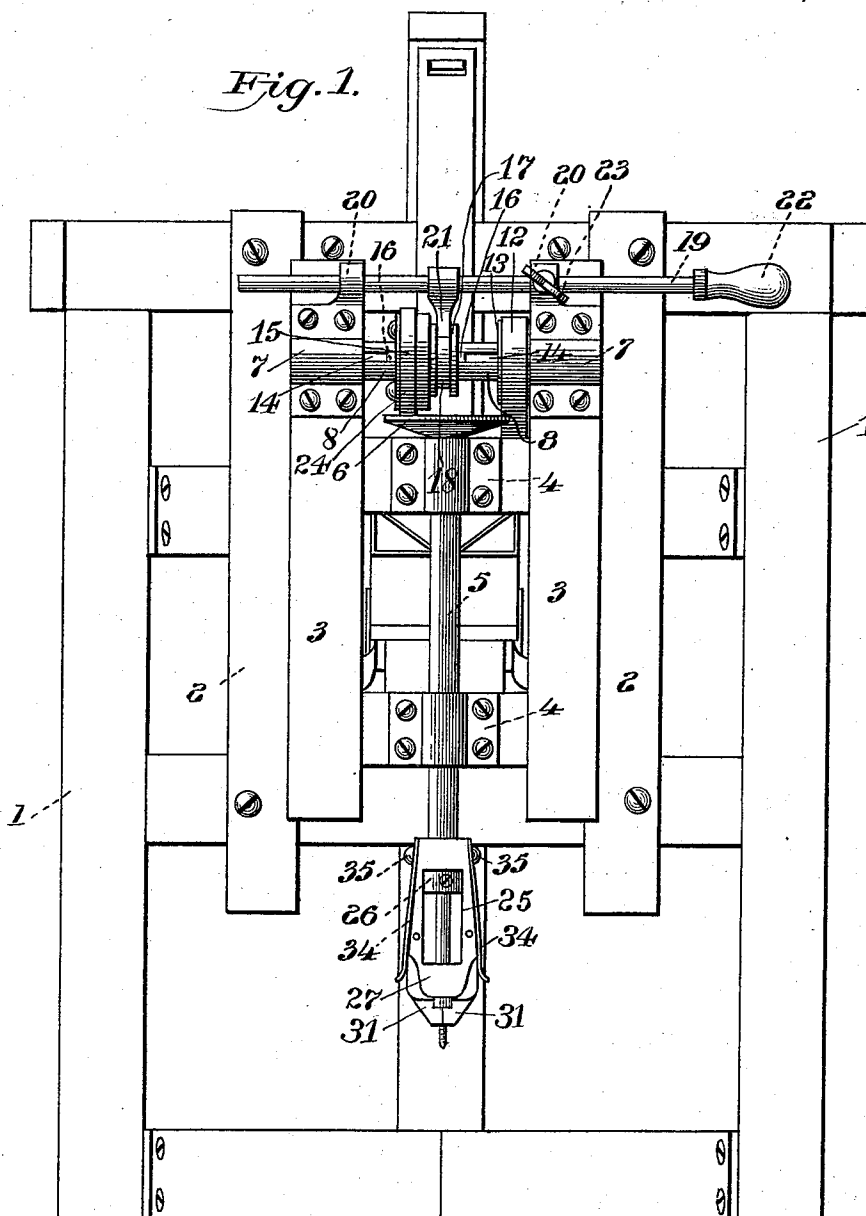
C. L. BRIGGS.

MACHINE FOR DRIVING SCREWS INTO WOOD.

No. 529,701.

Patented Nov. 27, 1894.

Fig. 1.



WITNESSES:

J. F. Finch.
A. J. Tanner

INVENTOR

Charles L. Briggs

BY

D. Smith & Co.
ATTORNEY

(No Model.)

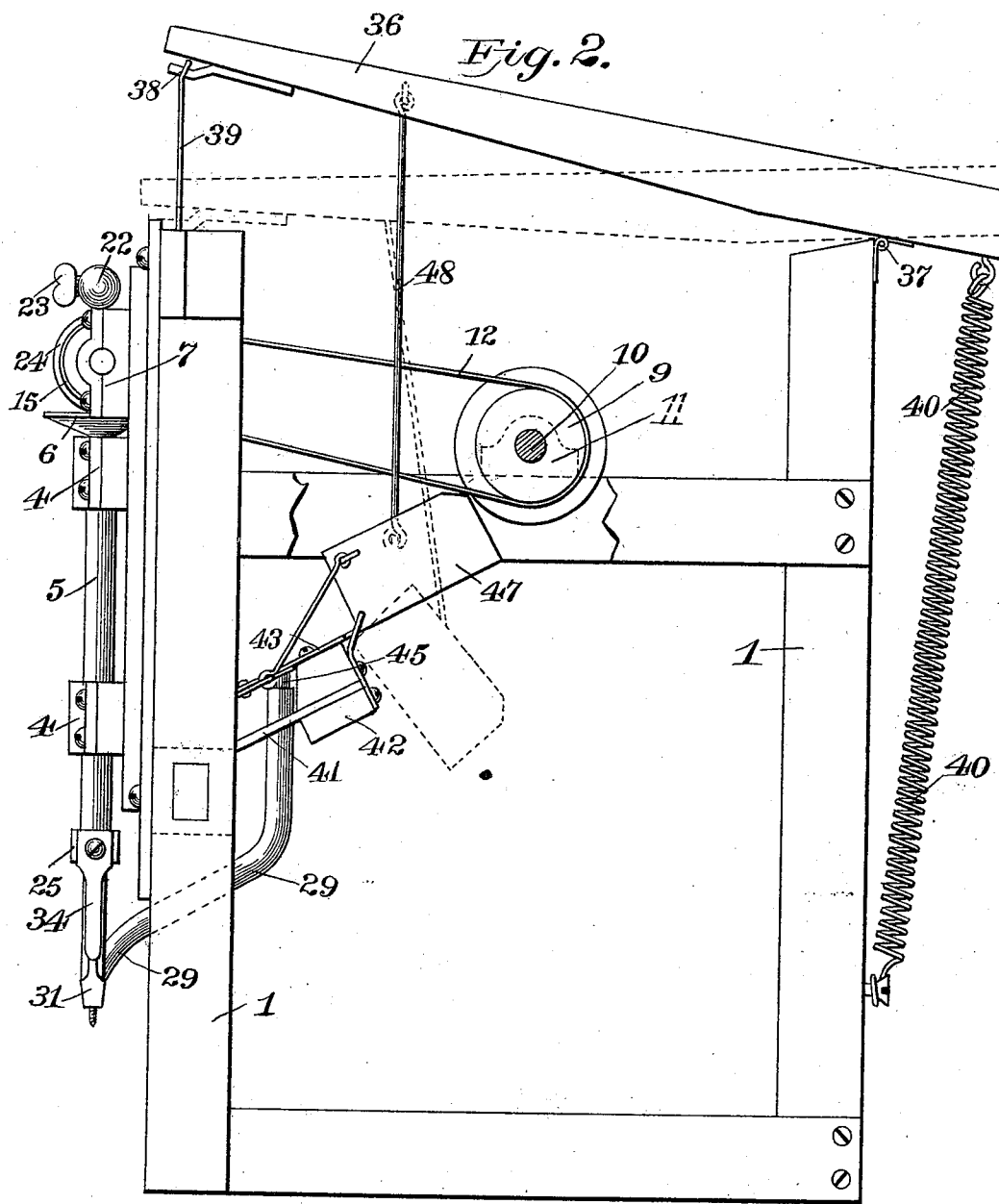
5 Sheets—Sheet 2.

C. L. BRIGGS.

MACHINE FOR DRIVING SCREWS INTO WOOD.

No. 529,701.

Patented Nov. 27, 1894.



WITNESSES:

J. Frueh.
A. J. Tanner

INVENTOR

Charles L. Briggs

BY

M. Smith

ATTORNEY

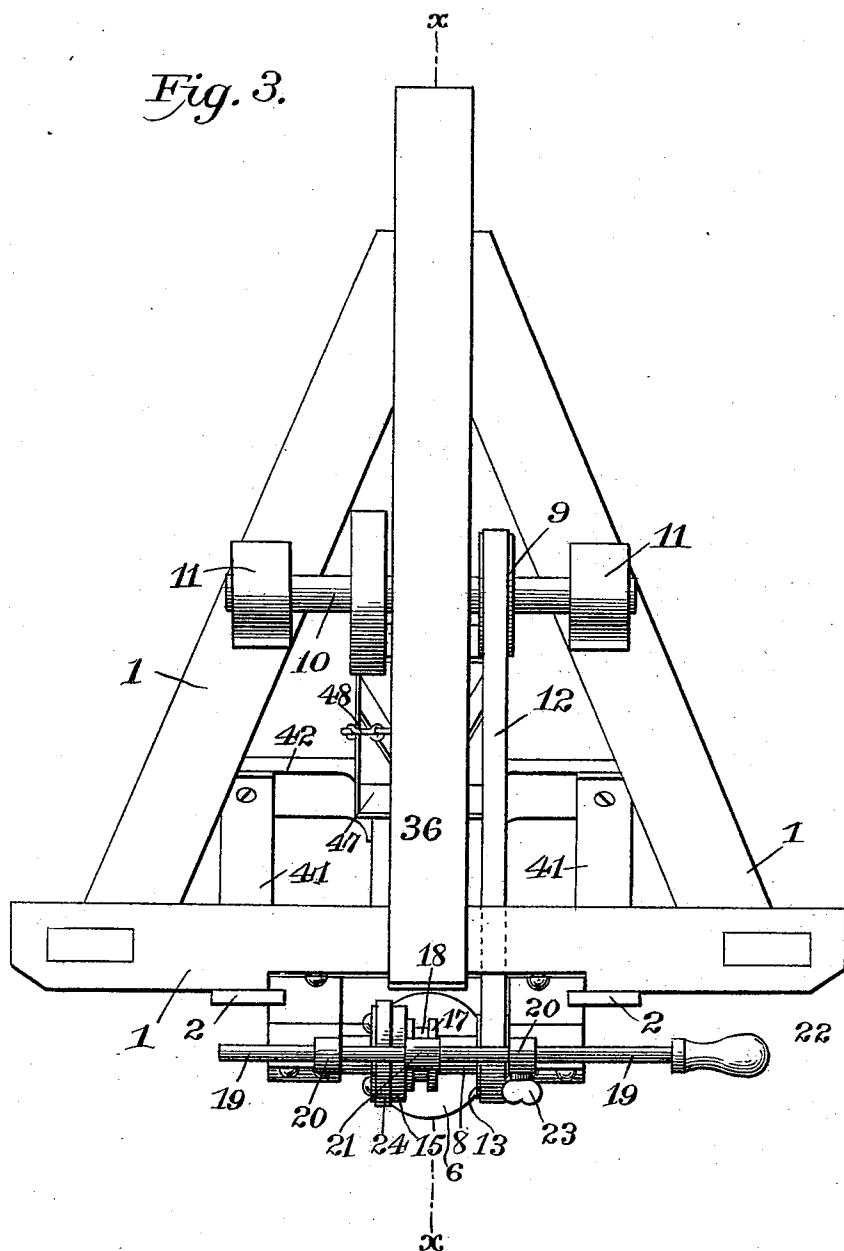
C. L. BRIGGS.

MACHINE FOR DRIVING SCREWS INTO WOOD.

No. 529,701.

Patented Nov. 27, 1894

Fig. 3.



WITNESSES:

J. Finch.
A. J. Tanner

INVENTOR

Charles L. Briggs
BY *M. Smith*
ATTORNEY

(No Model.)

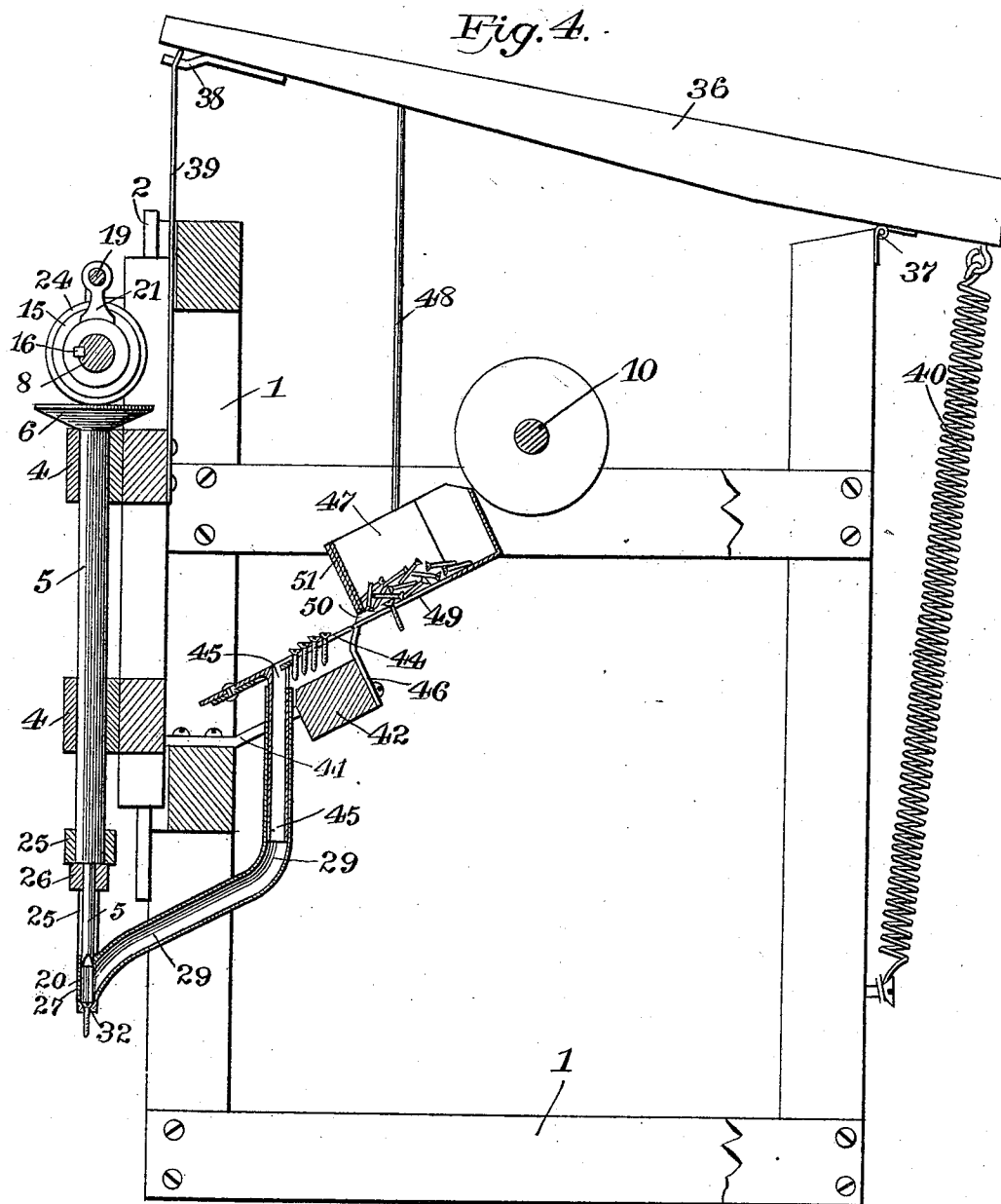
5 Sheets—Sheet 4.

C. L. BRIGGS.

MACHINE FOR DRIVING SCREWS INTO WOOD.

No. 529,701.

Patented Nov. 27, 1894.



WITNESSES:

J. F. Hinch.
A. J. Tanner.

INVENTOR

Charles L. Briggs

BY

M. Smith.

ATTORNEY

C. L. BRIGGS.

MACHINE FOR DRIVING SCREWS INTO WOOD.

No. 529,701.

Patented Nov. 27, 1894.

Fig. 5.

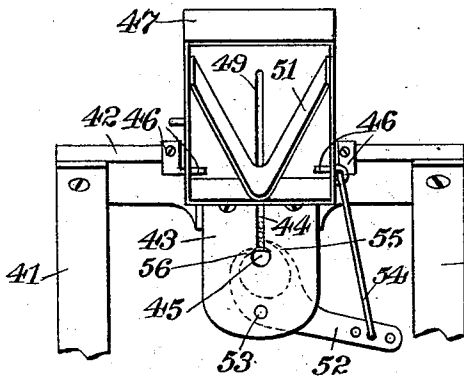


Fig. 6.

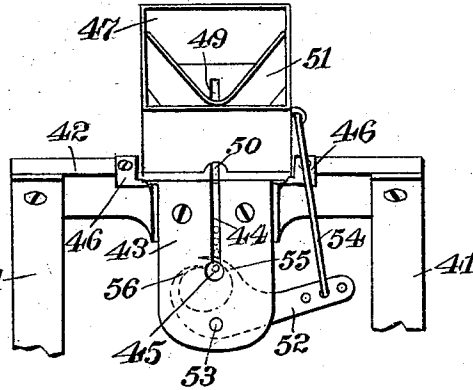


Fig. 7.

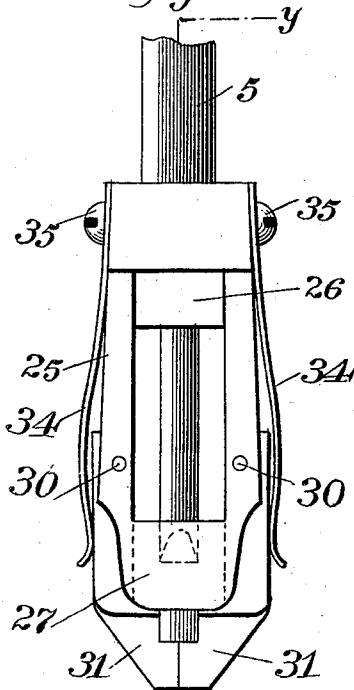


Fig. 8.

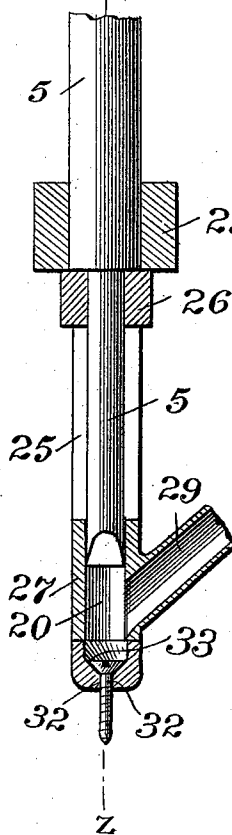
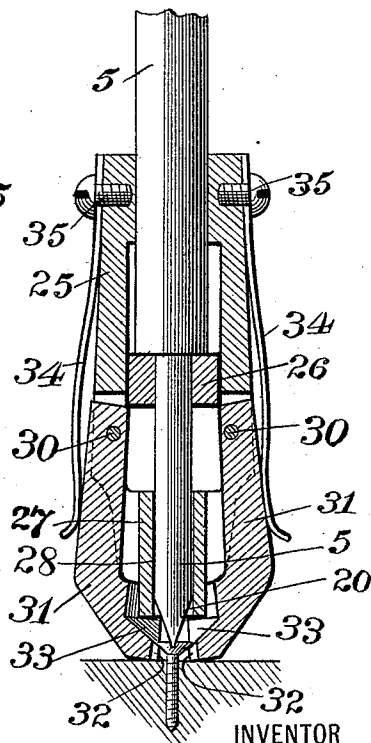


Fig. 9.



WITNESSES: y

J. F. Finch.
A. J. Tanner

INVENTOR

Charles L. Briggs.
BY
P. Smith
ATTORNEY

UNITED STATES PATENT OFFICE.

CHARLES L. BRIGGS, OF NORTON, MASSACHUSETTS, ASSIGNOR TO ISAAC J. BOOTHE, OF BIRMINGHAM, CONNECTICUT.

MACHINE FOR DRIVING SCREWS INTO WOOD.

SPECIFICATION forming part of Letters Patent No. 529,701, dated November 27, 1894.

Application filed July 17, 1893. Serial No. 480,719. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. BRIGGS, a citizen of the United States, residing at Norton, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Machines for Driving Screws into Wood; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain new and useful improvements in machines for driving screws into wood, such screws being automatically selected and delivered one by one to the driving devices, and has for its object to accomplish the end aimed at by the use of simple and positive means, such as will be hereinafter set forth and then specifically designated by the claims.

In the accompanying drawings—Figure 1 is a front elevation of my improved machine. Fig. 2, a side elevation thereof; Fig. 3, a plan view; Fig. 4, a sectional elevation at the line $x-x$ of Fig. 3. Figs. 5 and 6 are detail plan views of the hopper and automatic cut-off mechanisms, showing respectively the positions of the cut-off when the driver is in elevated and depressed positions; Fig. 7, an enlarged detail front elevation of the screw clamping and driving devices; Fig. 8, a section at the line $y-y$ of Fig. 7, and showing a screw in position to be operated upon by the driver, and Fig. 9, a section at the line $z-z$ of Fig. 8, but showing the position of the driver and clamping jaws immediately prior to the final driving of the screw.

Similar numbers of reference denote like parts in the several figures of the drawings.

1 is the frame of my machine having secured to its face guides 2 within which a gate 3 is adapted to reciprocate freely.

4 are boxes secured to this gate one above the other within which is guided and journaled the driving rod 5 to the upper end of which is secured a plain horizontal disk 6. At the top of the gate, on opposite sides thereof and in the same horizontal plane, are boxes 7 within which is journaled the shaft 8.

9 is the power pulley mounted on a shaft 10 which latter is journaled within any suit-

able bearings 11 secured to the frame 1, which pulley is connected by a belt 12 to a pulley 13 on the shaft 8, whereby revolution may be imparted to the latter. Within the shaft 8 and extending longitudinally thereof is a channel 14, and on the shaft is a wheel 15 carrying a key 16 which latter extends within the channel, whereby said wheel is rigid with this shaft as to rotation, and at the same time is capable of a freesliding movement thereon. Extending laterally from this wheel is a hub 17 having therein the annular groove 18.

19 is a rod capable of a free longitudinal sliding movement within supporting brackets 20 which extend upward from the boxes 7, and 21 is a shoe which depends from said rod within the groove 18. The rod 19 is provided with a handle 22 for readily shifting such rod to and fro and thereby imparting a corresponding shifting movement to the wheel 15, and a set screw 23 is provided through one of the brackets 20 for fixing the rod in any desired adjustment. Secured to the wheel 15 is a disk 24 of leather or other suitable material which normally is in contact with the upper face of the disk 6, whereby, when the shaft 8 is revolved, rotary movement will be imparted to the vertical driving rod 5 by the frictional contact of the disk 24 with the disk 6. By shifting this disk to a point more or less distant from the axial center of the disk 6, the speed of the driving rod 5 may be increased or diminished, and this is a very desirable feature since it enables the operator to regulate the driving of the screws in accordance with the requirement of the occasion.

At the lower end of the driving rod 5 and around the same is a yoke 25 which is sustained in position by a collar 26 rigid on said rod. This yoke has a free vertical sliding movement on the rod, but has no connection with the latter which interferes with the free and independent revolution of the same. At the bottom of the yoke is a head 27 which has a central passage 28 for the driving rod 5, and leading into this passage at the rear thereof is a chute 29 which extends upwardly to the screw delivering devices hereinafter to be explained. Within the sides of the yoke are pivoted at 30 the jaws 31 the ends whereof

extend downward and close against each other at a point immediately below the head 27. In the extreme ends of these jaws and in their meeting edges are formed complementary recesses 32, which, when the jaws are closed, present a circular opening through which the shanks of the screws may drop, and these recesses lead upwardly into beveled portions 33 on the inside of the jaws, whereby the under side of the screw heads may be properly supported in position for driving.

34 are springs secured to the yoke by screws 35 and bearing against the outside faces of the jaws whereby the movements of the latter are rendered resilient.

36 is a bar pivoted at 37 to the rear of the frame and loosely connected at 38 to a plate 39 which extends upward from the gate 3.

40 is a coil spring whose ends are connected respectively to the rear of the bar 36 and to the frame 1, whereby the forward end of said bar, and consequently the gate 3, are returned to their normal or elevated position.

In the operation of the parts heretofore described, the bar 36 is depressed by the operator thereby carrying the screw driver and the screw clamping devices downward, and causing the driver to engage with the screw to drive the same within any suitable wooden object, the latter having been previously brought into position beneath the screw. As the driver forces the screw within the wood, the jaws 31 will distend to permit of the passage of the head of the screw, as shown at Fig. 9, and when the head of the screw is flush with the object into which it is driven, the operator releases the bar 36, thereby causing the driver and the screw clamping devices carried thereby to be returned to normal or elevated position.

Having thus described the operation of the means whereby the screws, when properly delivered, are carried into position and driven, I will now describe the devices whereby such screws are automatically selected and delivered one by one to the driving devices.

41 are brackets secured to the frame of the machine and 42 is a cross block secured to the free ends of such brackets.

43 is an inclined slide plate secured on the cross block 42 and having a guide slot 44 the outer end whereof leads into a chute 45 which latter is rigid with such plate and telescopes within the chute 29. The object of this telescoping of the chutes is to provide an unbroken passage for the screws during the vertical movements of the gate, and also to hold the yoke 25 as against any turning or axial movement around the rod 5.

46 are ears secured to the cross block 42, between which ears is pivoted the hopper 47, and 48 is a rod whose ends are loosely connected to the bar 36 and the hopper, whereby when such bar is reciprocated the hopper will be swung up and down on its pivotal points. Within the bottom of the hopper is a slot 49

which extends forward and registers with the guide slot 44, the end wall of the hopper being cut away as shown at 50 in order to permit the passage of the heads of the screws, as will be presently explained. When the hopper has been swung upward to its full elevation by the action of the bars 36, the bottom of the hopper will thereby be brought into the same inclined plane with the side plate 43, and since the slots in these parts are in alignment, a continuous passage for the screws will thereby be afforded from the hopper down through the chutes 45, 29. Within the hopper is a V shaped partition 51 the sides whereof inclose the space within which the screws are placed in mass, while the end or angle part of this partition registers with the slot 49 in the hopper and is slightly elevated to allow the screws to pass beneath the same as they travel along the slot. The object of this partition is to cause the screws to be selected one by one at the angle of such partition and allow them to drop into the slot 49. Of course this partition is not an actual necessity, but it greatly facilitates the proper assembly of the screws within the slot 49, since the great body of such screws in the hopper is thereby prevented from clogging the few screws which are at the angle part of the partition.

From the foregoing description it will be readily understood that the reciprocations of the bar 36 will effect the agitation of the screws within the hopper for the purpose of enabling them to drop through the slot 49 in proper position for delivery down through the chutes.

In order that the screws may be delivered one at a time to the screw driving devices, so as to not interfere with each other or clog the passage 28 in the head of the yoke, I have provided automatically controlled devices for cutting out the screws and for delivering them one at a time down the chutes in synchronism with the reciprocating movement of the gate, which devices I will now describe.

52 is a lever pivoted at 53 to the under side of the plate 43, and 54 is a link whose ends are loosely connected to the hopper and to the outer end of said lever, whereby when the hopper is swung up and down, a to and fro swinging movement will thereby be imparted to the lever. The inner end of this lever terminates in two curved prongs 55, 56, which approach each other, as shown particularly by dotted lines in Figs. 5 and 6. The prong 55 is slightly in advance of the prong 56, the distance between the two being about equal to the diameter of the shank of one of the screws to be fed, and these prongs alternately cross the mouth of the slot 44 during the to and fro movements of the lever 52. When the hopper is swung to its elevated position the prong 56 will thereby be extended immediately in front of the screws in the slot 44, thus cutting off the supply of such screws

to the chute during the raising of the driving rod, but on the depression of the driver and the consequent dropping of the hopper, the prong 55 will be carried immediately behind a screw which had previously rested against the prong 56, thus allowing such screw to drop within the chute. The timing of the action of these prongs is such that the driver will have descended so as to block the lower mouth of the chute 29 by the time the screw reaches that point, so that when the driving rod is elevated said screw will drop within the passage 28 into the proper position for driving. It will thus be seen that the chute is always free from screws during the elevation of the driving devices and until that time when the descent of the driver has blocked the passage into the head 27. I have employed frictional devices, such as the disk 6 and the wheel 15 having secured thereto the disk 24 of leather, for revolving the driving rod, in order that when the screw has been properly driven the disk 24 will simply slip over the disk 6 without revolving the same, but I do not wish to be limited to the employment of frictional devices in this connection as there are very many other ways of revolving this rod all within the scope of ordinary mechanical knowledge and skill. For instance, ordinary beveled gears substituted in place of the disks 6, 24, would answer the purpose of my invention in this respect, for it is a very simple matter for the operator to determine when the screw has been properly driven and to then release the bar 36. Moreover the speed of the driver may readily be changed by the use of ordinary speed pulleys on the shafts 8, 10. Also any suitable device, controlled by the bar 36, may be employed for the purpose of agitating the mass of screws within the hopper, or, in fact, such agitating devices may be entirely dispensed with, since the occasional stirring or shaking of the screws in the hopper by the hand of the operator will accomplish the object aimed at in this connection.

Having thus described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. The screw driving rod and means for rotating the same, the yoke connected to the rod, the jaws pivoted to the yoke and extending near to the axial line of the rod, and the guiding chute terminating in proximity to the jaws, all combined and relatively arranged substantially as described.

2. The vertically movable gate and the rotatable screw-driving rod carried thereby, the screw holding jaws, and the guiding chute, having a terminal section connected to said gate, a hopper, and a telescopic chute section leading from the hopper to the chute section connected to the gate, all combined substantially as described.

3. The vertically movable gate, the power driven screw driver carried thereby, the yoke surrounding and moving with said screw driver, and the telescopic chute connected to a hopper and to said yoke, all combined substantially as described.

4. The combination of the rotatory and vertically reciprocatory driving rod, the yoke loosely supported around the same and confined as to independent vertical movements between prescribed limits, the head at the lower end of said yoke and having a central passage, the resilient clamping jaws pivoted to said yoke and meeting at their lower ends immediately beneath said head, the chute rigid with said head and leading into said passage, and screw delivery devices having depending therefrom a chute which telescopes within the first mentioned chute, whereby a continuous passage for the screws is afforded during the vertical movements of the driving rod and the parts carried thereby, and also all axial movement of the yoke prevented, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES L. BRIGGS.

Witnesses:

FRANK M. COPELAND,
WM. A. COPELAND.