No. 896,356. PATENTED AUG. 18, 1908.

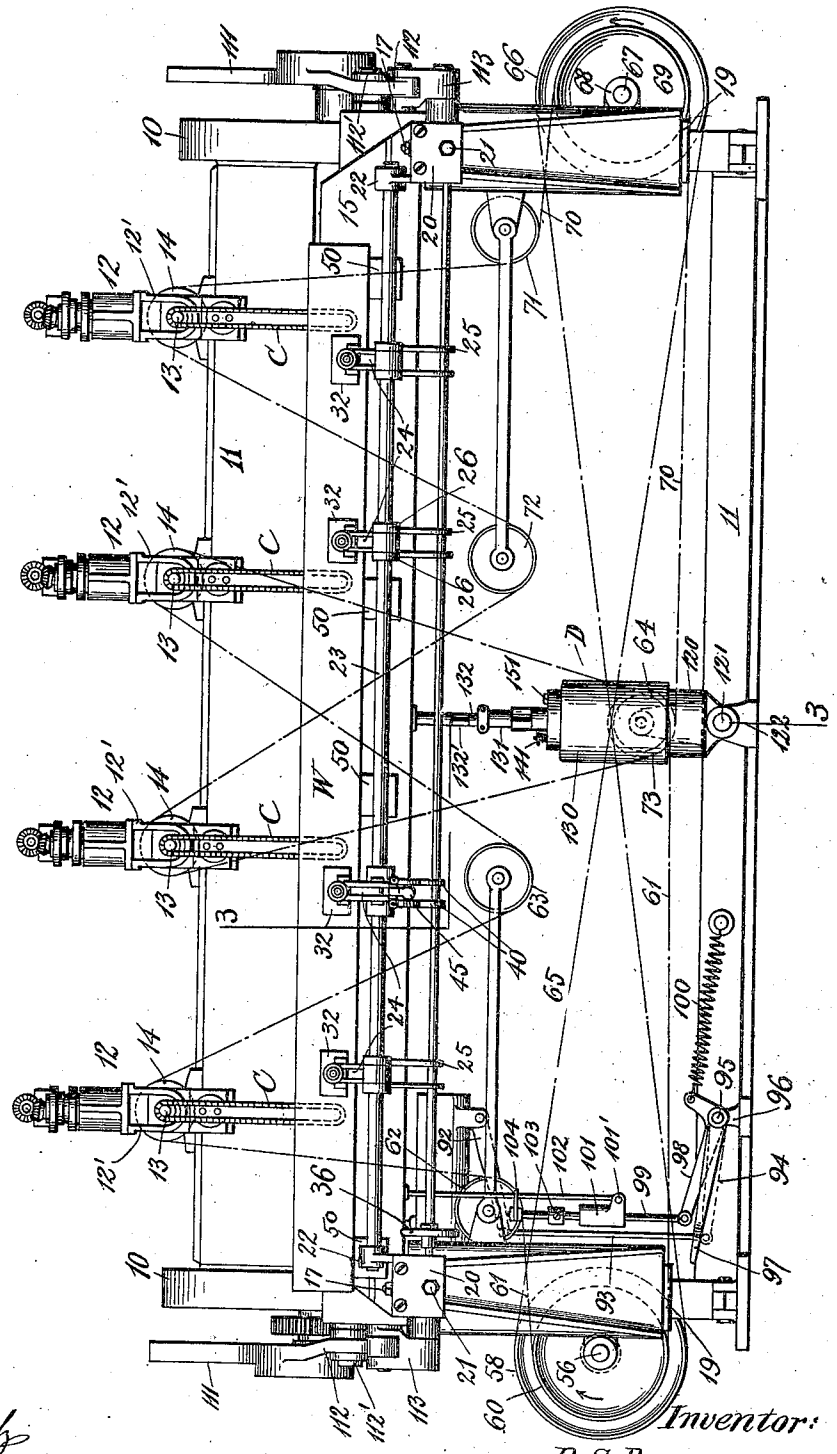
R. S. BROWN.

# WORK SUPPORT FOR MORTISING MACHINES.

APPLICATION FILED APR. 9, 1904. RENEWED MAY 23, 1907.

4 SHEETS—SHEET 1.

Fig. 1.



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No. 896,356. PATENTED AUG. 18, 1908.

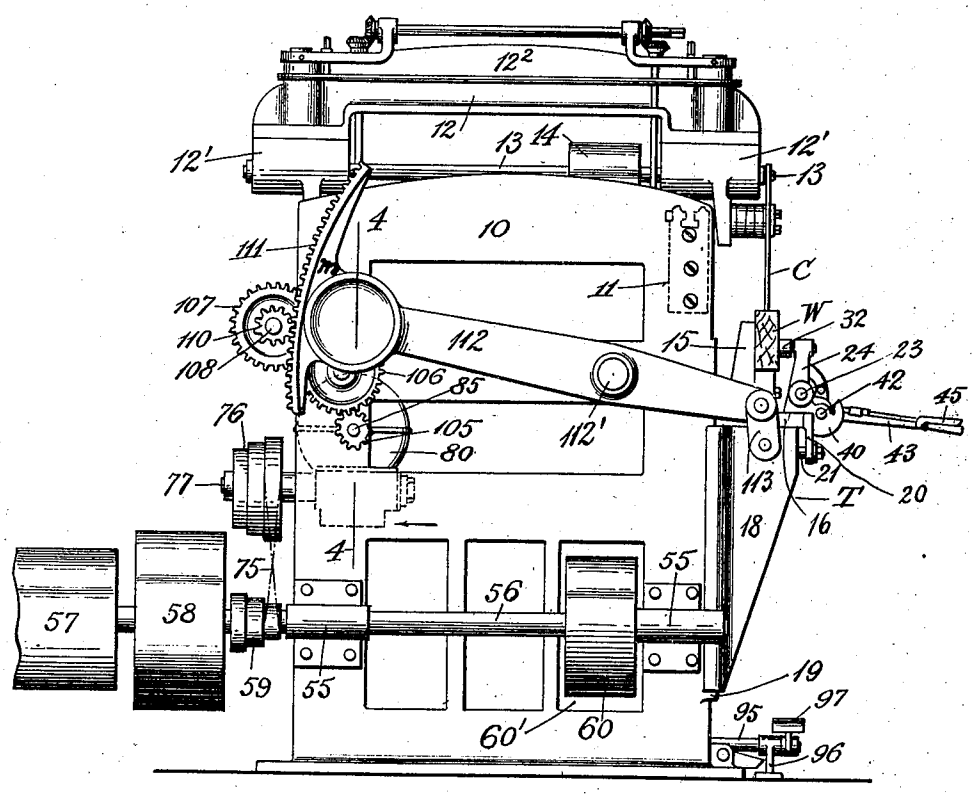
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4 SHEETS—SHEET 2.

*Fig. 2.*




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No. 896,356. PATENTED AUG. 18, 1908.

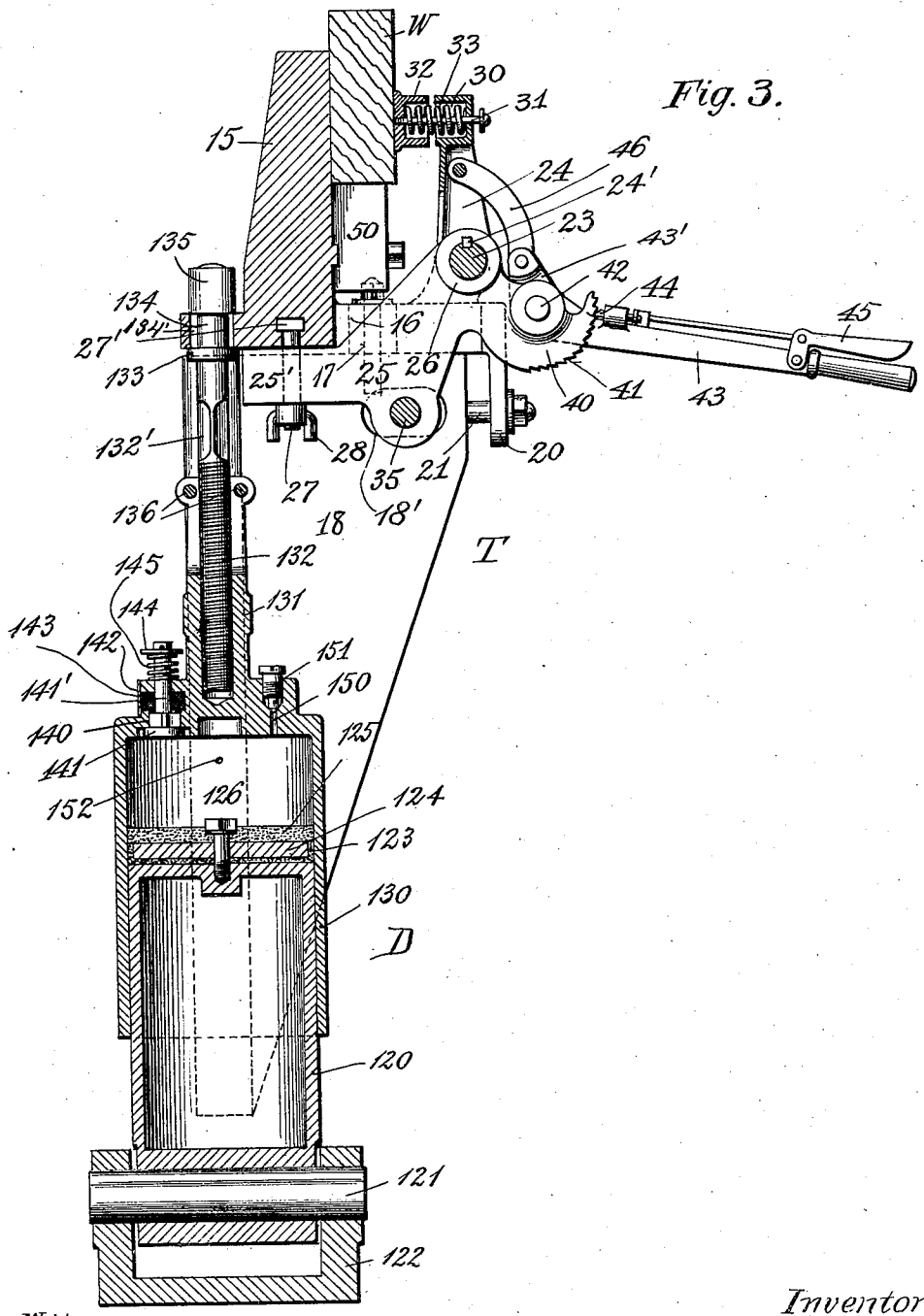
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APPLICATION FILED APR. 9, 1904. RENEWED MAY 23, 1907.

4 SHEETS—SHEET 3.

Fig. 3.




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No. 896,356. PATENTED AUG. 18, 1908.

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WORK SUPPORT FOR MORTISING MACHINES.

APPLICATION FILED APR. 9, 1904. RENEWED MAY 23, 1907.

4 SHEETS—SHEET 4.

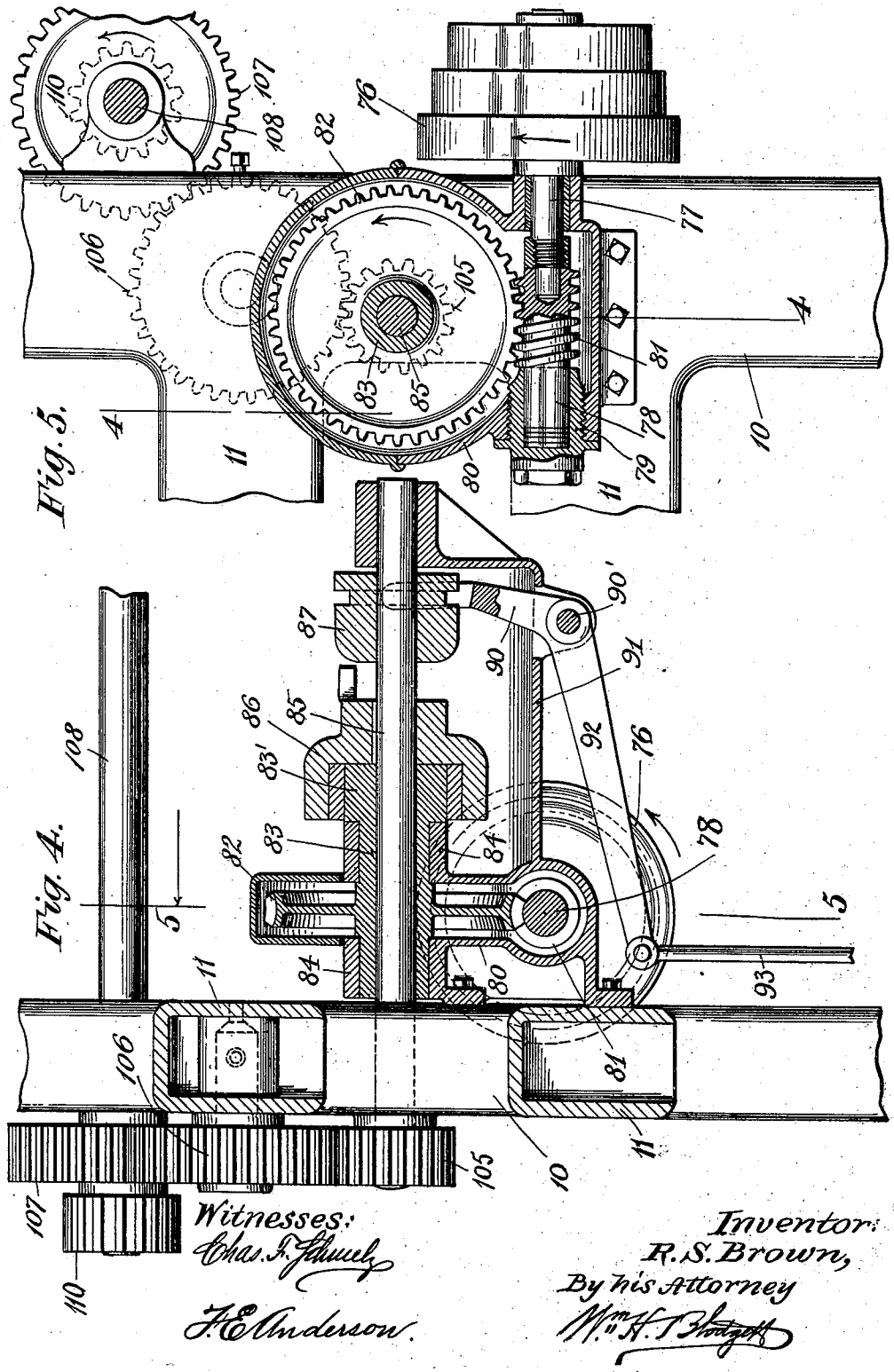



Fig. 5.

Fig. 4.

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# UNITED STATES PATENT OFFICE.

ROBERT S. BROWN, OF NEW BRITAIN, CONNECTICUT, ASSIGNOR TO THE NEW BRITAIN MACHINE COMPANY, OF NEW BRITAIN, CONNECTICUT, A CORPORATION OF CONNECTICUT.

## WORK-SUPPORT FOR MORTISING-MACHINES.

No. 896,356. Specification of Letters Patent. Patented Aug. 18, 1908.

Original application filed September 3, 1903, Serial No. 171,766. Divided and application filed April 9, 1904, Serial No. 202,365. Renewed May 23, 1907. Serial No. 375,253.

*To all whom it may concern:*

Be it known that I, ROBERT S. BROWN, a citizen of the United States of America, residing at New Britain, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Work-Supports for Mortising-Machines, of which the following is a specification.

My invention relates to mortising machines and has for its general object the provision of improvements in said machines, whereby they are rendered more efficient in operation, and various kinds of mortises may be rapidly and accurately formed.

A further object of the invention is the provision of improved devices for clamping the work in place upon its support.

A further object of the invention is the provision of improved mechanism for imparting movement to the blank-support.

Other objects of the invention will be disclosed in the detailed description, which now follows—

In the accompanying drawings, Figure 1 is a side elevation of a gang-mortising machine involving my invention. Fig. 2 is an end view of said machine. Fig. 3 is a longitudinal vertical section of a dash-pot, and of means for clamping the stile upon its support, certain parts being shown in elevation, and the section being taken on line 3, 3 of Fig. 1. Fig. 4 is a section taken on line 4, 4 of Fig. 2, looking in the direction of the arrow. Fig. 5 is a section on line 5, 5 of Fig. 4.

Like numerals designate similar parts throughout the several views.

Referring to the drawings, the frame of the machine which may be of any desired form, comprises a pair of end-standards 10, 10 united by parallel cross-bars or girders 11, as illustrated more particularly in Figs. 1 and 2.

Designated in a general way by the numeral 12 is one of the heads of the machine, and inasmuch as all of said heads are alike in construction each is indicated by the same numeral.

In the depending ends 12′ of each head is journaled the chain-driving shaft 13 having a pulley 14 located in the space beneath the bridge $12^2$ connecting the end portions of the head.

Designated in a general way by T is the work support of the machine shown consisting of a back-plate 15 having lateral extensions 16 at its ends, said extensions being slotted for the reception of bolts 17 by which they are secured with a capability of lateral adjustment, upon knees 18 fitted for sliding movement upon ways 19 of the end frames 10. To the front of each extension 16 is secured a plate 20, and through each plate passes a screw-bolt 21 by which, when the screws 17 are loosened, the work-support may be laterally adjusted on the knees. Carried by each plate 20 is a bearing 22 in which is journaled a long rock-shaft 23, the latter carrying a series of clamping-arms 24 splined to the rock-shaft to be longitudinally adjustable thereon, as at 24′, Fig. 3. Disposed at intervals along the work-support are yokes 25 provided with two-part bearings 26 for sustaining the rock-shaft 23, and between the parts of each bearing one clamping-arm 24 is mounted on said shaft. These yokes have lateral extensions 25′ passing beneath the back-plate 15, and a bolt 27, the head 27′ of which is inserted in a T-slot of said back-plate, passes through each of said extensions, and is provided with a wing-nut 28, whereby the yokes may be secured after they have been adjusted, longitudinally of the machine, to the desired positions.

In the free end of each arm 24 is a socket 30 and passing through said socket is a screw 31 to which is attached a cup-shaped cap 32 having a wide bearing-surface for acting against the work. A spring 33 surrounds each screw 31 and is received in the sockets of the cap and arm, so that the clamps will bear with yielding pressure against the work. A shaft 35 supported by the yoke-frames 25 and passing through apertures 18′ in the knees 18, is journaled at its ends in bearings formed on the extensions 16, and carries a hand-wheel 36 by which it may be turned. This shaft is connected by gearing (not shown) to the screws 21 for adjusting the work-support laterally, as fully illustrated and described in Patent No. 642,073, issued to me, and to which reference may be had.

For actuating the rock-shaft 23 and its series of clamping arms, any desired means may be utilized, but I prefer to employ the improved mechanism now to be described.

Projecting from one of the intermediate yoke-frames are separated, curved extensions 40 having ratchet-teeth 41, and between said extensions is pivoted, on a short shaft 42, a hand-lever 43 to which is connected a double sliding-pawl 44, operated by a pivoted handle 45 in the usual manner. The lever 43 has an extension 43′ projecting at an angle to its pivot, and engages one end of a toggle-link 46, pivoted at its opposite extremity to one of the clamping-arms 24, and, as said arm is splined to the rock-shaft 23, it will be seen that when the handle 43 is manipulated, said shaft will be rocked and all of the clamps 24 will be simultaneously forced against the work, the toggle connection causing them to engage said work with great clamping power, and the pawl 44 engaging the ratchet-teeth 41 and preventing back-action of the parts.

Blocks 50 are secured to the back-plate 15 at intervals along its length, and upon these blocks (which may be the same as those disclosed in my patent aforesaid) the stile or other work to be operated upon is placed.

As it is important to prevent sliding movement of the work $w^1$ in the direction in which a cutter-chain removes a chip, when a series of said chains is in use, the shafts 13 for driving the chains should be rotated in opposite directions, so that certain cutter-chains will act upon the work in one direction and the other chains will operate thereon in an opposite direction, whereby the cutting-thrusts of said chains will be neutralized and all danger of splitting or splintering will be obviated, and while any suitable mechanism may be employed for accomplishing this result I have found the following arrangement to be useful.

As above stated, each chain-driving shaft 13 is provided with a pulley 14, and to rotate said shafts alternately in opposite directions, sets of endless belting are employed said sets being driven in opposite directions by mechanism next to be described.

Journaled in bearings 55 on the left hand end frame of the machine is a shaft 56 having a driving-pulley 57, a pulley 58 adjacent to said driving-pulley outside of the frame, a cone-pulley 59, and pulley 60, the end frame being cut away at 60′ to receive said pulley 60, as shown in Fig. 2. An endless belt 61 passes over said pulley 60 which is driven in the direction of the arrow thereon in Fig. 1, under an idler 62, over the first cutter-shaft actuating pulley 14, under a belt-tightener pulley 63, over the third shaft-actuating pulley 14, under an idler pulley 64 and back to said pulley 60, and it will thus be seen that every alternate cutter-chain is driven in the same direction by said belt. To drive the other cutter-shafts in an opposite direction, a crossed belt 65 connects the pulley 58 with a pulley 66 on a shaft 67 journaled in bearings 68 on the right-hand end of frame 10, and this shaft also carries a pulley 69 over which an endless belt 70 travels first under an idler pulley 71 then over the pulley 14 of the shaft for rotating the extreme right-hand cutter-chain, then under a belt-tightener pulley 72 then over the pulley 14 of the alternate cutter-actuating shaft 13, then under an idler 73, in axial alinement with the idler 64 and finally back to the pulley 66.

To raise and lower the work-support T, the cone-pulley 59 on driving-shaft 56 is connected by belting 75 with a cone-pulley 76 on a shaft 77 threaded into a short shaft 78 supported in a bearing 79 of a housing 80 held on the frame. The shaft 78 carries a worm 81 in engagement with a worm-gear 82 carried by a sleeve 83, which is journaled in bearings 84, and loosely mounted on a shaft 85. This sleeve 83 is provided with a friction-clutch head 83′ with which a clutch-collar 86, splined to the shaft 85, is adapted to be engaged by a sliding-cone 87 in the usual manner.

For actuating the cone 87, an angle-lever is provided, said lever being pivoted at 90′ to an inwardly-extending bracket 91 and its short arm 90 having a fork in engagement with the clutch-actuating cone 87. To the long arm 92 of said lever is articulated one end of a rod 93 connected at its other extremity to an arm 94 (see dotted lines Fig. 1) projecting from a rock-shaft 95 journaled in bearings 96 and carrying a treadle 97, and also an angle lever 98, to the long arm of which a rod 99 is connected, while its short arm is attached to the end of a spring 100.

Mounted for sliding movement on the rod 99, is a sleeve 101, to an ear 101′ of which is connected a rod 102 depending from the back-plate 15; and on the rod 99 is an adjustable stop 103 adapted to be engaged by the upward movement of the sleeve 101, the upper and free end of the rod 99 being guided by a plate 104 perforated to receive and slide upon the rod 102. Carried by the clutch-shaft 85, is a pinion 105 in mesh with an idler 106, the latter intermeshing with a gear 107 carried by a shaft 108 extending longitudinally of the machine. This shaft carries a pinion 110 at each end, and each of said pinions is in engagement with a toothed segment M, (see Fig. 2) carried by weighted levers 112 pivoted to the end frames at 112′, and connected by links 113 to the knees 18 sliding upon the ways 19 of the end frames 10.

It is important in this class of machines to raise the work-support with constant and unvariable speed, in order that the mortising-tools may not enter the stile at variable speed and hence tend to fracture the wood.

In constructions heretofore known to me the heads carrying the mortising-tools have been actuated by cranks and pitmen, and, therefore, owing to this arrangement of ac-

tuating mechanism, said heads will move rapidly at one stage of the revolution of the crank, and more slowly at another stage. In my invention, as stated, the work-support is raised at uniform speed throughout its entire stroke, and, consequently, there can be no sudden advance movement of the work upon the tool during the formation of a mortise.

After a stile has been placed upon the blocks 50 and clamped against the back-plate 15 by the means described, the machine is started by depressing the treadle 97, thereby rocking the shaft 95 and the angle lever 94, depressing the rod 93 and actuating the lever 92 to slide the cone 87 along shaft 85, and thus clutch the sleeve 83 (carrying worm-wheel 82) to said shaft, and said worm-wheel, which is continuously driven by worm 81, will now drive the shaft 85, and, through the gearing described, will rock the levers 112 to elevate the knees 18 and the work supporting and clamping devices carried thereby, until the cutter-chains C have entered the stile or other work to the desired depth. As the work-support rises with uniform speed, the rod 102 attached to back-plate 15, moves with it and slides the sleeve 101 along the rod 99, until said sleeve comes into contact with the adjustable stop 103, lifts rod 99 against the pressure of the foot on treadle 97, and, through the rod and lever mechanism described, shifts the cone 87 to the right, thus releasing the worm-wheel 82, and permitting said work-support to descend to its normal position. As will be observed, the spring 100 normally tends to rock the shaft 95 to shift the cone 87 to the right, so that, should the foot be withdrawn from the treadle 97, the cone will immediately be shifted to release the clutch 86, and stop the further upward movement of the work-support; and the extent of this upward movement may be regulated by adjusting the stop 103 along the rod 99, and then clamping said stop in place.

To check the descent of the work-support, any suitable means may be employed, but I prefer to use a dash-pot designated in a general way by D, and illustrated in Figs. 1 and 3. This dash-pot is similar to the one described in my former patent and consists of a hollow, stationary piston 120 pivoted at 121 to a bracket 122 rising from the floor at a point about midway the length of the machine, and capable of a slight transverse movement upon its pivot 121. On the top of the hollow piston 120, is a packing-ring 123 and a plate 124 and upon this plate is placed a rubber cushion or bumper 125, these parts being secured in place by a screw-bolt 126. Surrounding the piston 120 is a cylinder 130 having a hollow, internally-threaded split stem 131 for the reception of a screw-threaded rod 132, the upper end of which has a collar 133, and above said collar a reduced portion 134 which enters a slot 134′ in a flange of the back-plate 15, said rod being secured in place by a tubular collar 135.

To enable the cylinder to be adjusted on its piston, the rod 132 is provided with a hexagonal portion 132′ for the application of a wrench, and after the desired adjustment has been made the split part of the stem 131 is clamped firmly around said rod by screw-bolts 136. In the top of the cylinder is an air-admission port 140, normally closed by a valve 141 having a stem 141′ protected by dust-excluding gauze 142 inclosed in a chamber 143, and between the top of the chamber and a washer 144 on said stem is a spring 145 which holds the valve normally against its seat. Also in the top of the cylinder 130 is a vent 150, the emission of air through which may be regulated by a screw-valve 151. I sometimes form another vent 152 in the cylinder, but this may be omitted if desired. Inasmuch as the action of the dash-pot is similar to that set forth in my former patent, it is deemed unnecessary further to describe its mode of operation.

In the operation of my improved machine, the work, such as a stile or other article in which mortises are to be cut, is placed upon the blocks 50, and against back-plate 15, after which the lever 43 is manipulated to rock the shaft 42 and its clamping-arms 24 and force the yielding clamps 32 against said work, the lever being locked against return movement by ratchet 41 and pawl 44. Pressure is now applied to the treadle 97 and, through the connections described, the segments 111 are actuated to raise the blank-support and force the work vertically against the cutter-chains C, until said chains have cut thereinto for the desired extent, whereupon the parts will be automatically disconnected, as set forth, and the work support will, under the influence of the dash-pot, gradually fall until it assumes a normal position, when the completed work will be removed, new work inserted, the operation repeated and so on.

Many of the details of the invention may be employed in other relations, the invention not being limited to their use with gang machines.

Changes may be made in the form, proportion, and arrangement of the parts, and different kinds of driving-gearing and clutch-mechanism may be substituted for those shown and still be within the purview of the invention.

Like the machine of my former patent either one or two pieces of work may be mortised, the adjustable heads carrying duplicate cutter-chains, one at each end thereof, and the frame being adapted to receive a work-support and its actuating devices on each side if desired.

No claim is made herein to the mortising mechanism proper, for it constitutes the sub-

ject-matter of my application filed Sept. 3, 1903, Serial No. 171,766, of which the present case is a division.

Having thus described my invention, what I claim is—

1. The combination, with a work-support, of levers connected thereto, and proportioned and arranged to impart substantially uniform motion to the work-support; segments carried by the levers; gears engaging the segments; and means for actuating said gears.

2. The combination, with a work-support, of levers connected thereto, and proportioned and arranged to impart substantially uniform motion to the work-support; segments carried by the levers; gears engaging the segments; a rotary shaft carrying said gears; gearing for driving said shaft; a clutch in said gearing; means for actuating said clutch; a treadle; and means for connecting said treadle with an element of the clutch-actuating means.

3. The combination, with a work-support, and with means for actuating the same, of a rock-shaft having arms; clamps carried by the arms; a pivoted lever; a pawl carried by said lever; means for actuating said pawl; a toggle-link connecting an arm of said lever extending beyond its pivot with one of the arms of the rock-shaft; and a toothed segment over which the pawl travels and with which it engages.

4. The combination, with a work-support comprising a back-plate and blocks, of a rock-shaft; frames having bearings in which said rock-shaft is journaled, one of said frames having a toothed extension; arms projecting from the rock-shaft; clamps carried by the arms; a link connected with one of the arms; a lever having a short arm to which one end of the link is connected; and a pawl carried by said lever and adapted to be thrown into and out of engagement with the toothed extension.

5. The combination, with a work-support comprising a back-plate and blocks, of frames having bearings; a rock-shaft journaled in said bearings; arms projecting from the rock-shaft; yielding clamps carried by the free ends of the arms; a toggle-link pivoted to one of the arms; a lever having a short arm to which the other end of said toggle-link is articulated; and means for locking and releasing said lever.

6. The combination, with a work-support comprising a back-plate against which the work bears and blocks upon which it rests, of a pair of frames adjustable longitudinally of the back-plate, said frames having bearings; a rock-shaft mounted in said bearings; arms projecting from the rock-shaft; yielding clamps carried by the arms; a lever pivoted to one of the frames; a pawl carried by said lever; a toggle-link connecting the lever and one of the arms of the rock-shaft; and a toothed-surface carried by one of the frames, and with which the pawl is adapted to engage.

7. In a gang-mortising machine, the combination, with a series of heads, of mortising-tools carried by said heads; a work-support; pivoted levers connected to said work-support, and proportioned and arranged to impart substantially uniform motion to the work-support; racks on the free ends of said levers; a transverse shaft journaled in bearings of the frame; gears carried by said shaft for simultaneously actuating said racks; gearing for rotating said shaft; a clutch in said gearing; a sleeve movable on a shaft of the gearing, and operating the clutch; and means for actuating said sleeve.

8. In a mortising machine, the combination, with a mortising-tool, and with means for operating said tool, of a work-support; pivoted levers for actuating said support, and proportioned and arranged to impart a substantially uniform motion thereto; gearing for actuating said levers; a shaft for driving said gearing; gearing for driving the shaft; a clutch for locking said driving-gearing to the shaft; a clutch-actuator on said shaft; a pivoted lever for operating the clutch-actuator; a treadle connected to said lever; and means for automatically shifting the clutch-actuator to release the clutch when the work-support reaches the limit of its advancing movement.

9. The combination, with a work-support, of levers connected to, and proportioned and arranged to impart substantially uniform motion to, the work-support; gearing for simultaneously operating the levers; a shaft; a gear-wheel loose on said shaft; means for continuously driving said gear-wheel; a clutch for engaging the gear-wheel with, and disengaging it from, the shaft; a clutch-actuator slidable along the shaft; a treadle; and means controlled by said work-support for shifting the clutch-actuator, when the work-support reaches the limit of its forward movement.

10. The combination, with a work-support and with mechanism for actuating the same, said mechanism being proportioned and arranged to impart substantially uniform motion to said work-support, of a shaft for actuating said mechanism; a gear-wheel loose on said shaft; means for continuously driving said gear-wheel; a clutch for connecting said gear-wheel to, and disconnecting it from, the shaft; a clutch-actuator movable along the shaft; a lever for shifting the clutch-actuator; a treadle; means for connecting the treadle with said lever; and means controlled by the work-support when it reaches the limit of its forward movement for withdrawing the clutch-actuator and releasing the clutch.

11. The combination, with a work-support, and with mechanism for actuating the

same, of a mortising-tool; means for actuating said tool; a shaft for driving the mechanism for actuating said work-support; a worm-wheel loose on the shaft; means for continuously driving said worm-wheel; a clutch; a clutch-actuator in sliding connection with the shaft; a treadle; devices controlled by the treadle for advancing the clutch-actuator; and means controlled by the work-support for withdrawing the clutch-actuator when said work-support reaches the limit of its forward movement.

12. The combination, with a work-support, of pivoted levers connected to said work-support, and proportioned and arranged to impart substantially uniform motion to said work-support; gearing for simultaneously actuating said levers; a shaft for driving said gearing; a continuously-driven gear loose on the shaft; a treadle; means controlled by the treadle for throwing the loose gear into engagement with the shaft; and means controlled by the work-support at the limit of its forward movement for disconnecting said loose gear from the shaft.

13. The combination, with a work-support, of a rod projecting therefrom; a sleeve secured to the rod; a guide for said sleeve; mechanism for actuating the work-support; a treadle; means connecting the treadle with the sleeve-guide; a stop adjustable on the sleeve-guide; a rod actuated by the treadle; a pivoted lever connected to said rod; a shaft constituting part of the work-support actuating mechanism; a continuously-driven gear loose on said shaft; a clutch for coupling said gear to the shaft; and a clutch-actuator slidable on the shaft, and operated by the pivoted lever.

14. The combination, with a work-support, and with means for actuating the same, of a pivoted piston; a cylinder surrounding said piston, and having an air-vent; a spring-actuated valve in said cylinder; a threaded rod adjustable in a nut of the cylinder; and means for securing the head of said rod to the work-support.

15. The combination, with a work-support, and with means for actuating the same, said work-support having a slotted projection, of a piston; a pivot for said piston, and upon which it has a slight lateral movement; a cylinder surrounding the piston, and having an air-vent; a valve in said cylinder; a rod projecting from the cylinder; and means for connecting said rod with the slotted projection of the work-support.

16. The combination, with a movable work-support having a lateral projection, of a pivoted piston; a cylinder surrounding said piston, and having an air-vent; a valve in said cylinder; a split, internally-threaded stem projecting from the cylinder; a rod threaded into said stem; and means for securing said rod to the lateral projection of said work-support.

17. The combination, with a work-support, and with means for actuating the same, of a pivoted piston; a cylinder surrounding said piston, and having a pair of air-vents; a valve in said cylinder; an internally-threaded stem projecting from the cylinder; a rod threaded into said stem, and having a portion shaped to receive a wrench; and means for securing said rod to the work-support.

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

ROBERT S. BROWN.

Witnesses:
FRANCES E. BLODGETT,
F. E. ANDERSON.