No. 653,726. Patented July 17, 1900.

# C. S. YARNELL.

## MEANS FOR OPERATING ABRADING OR POLISHING MACHINES.

(Application filed Feb. 8, 1900.)

(No Model.) 4 Sheets—Sheet 1.

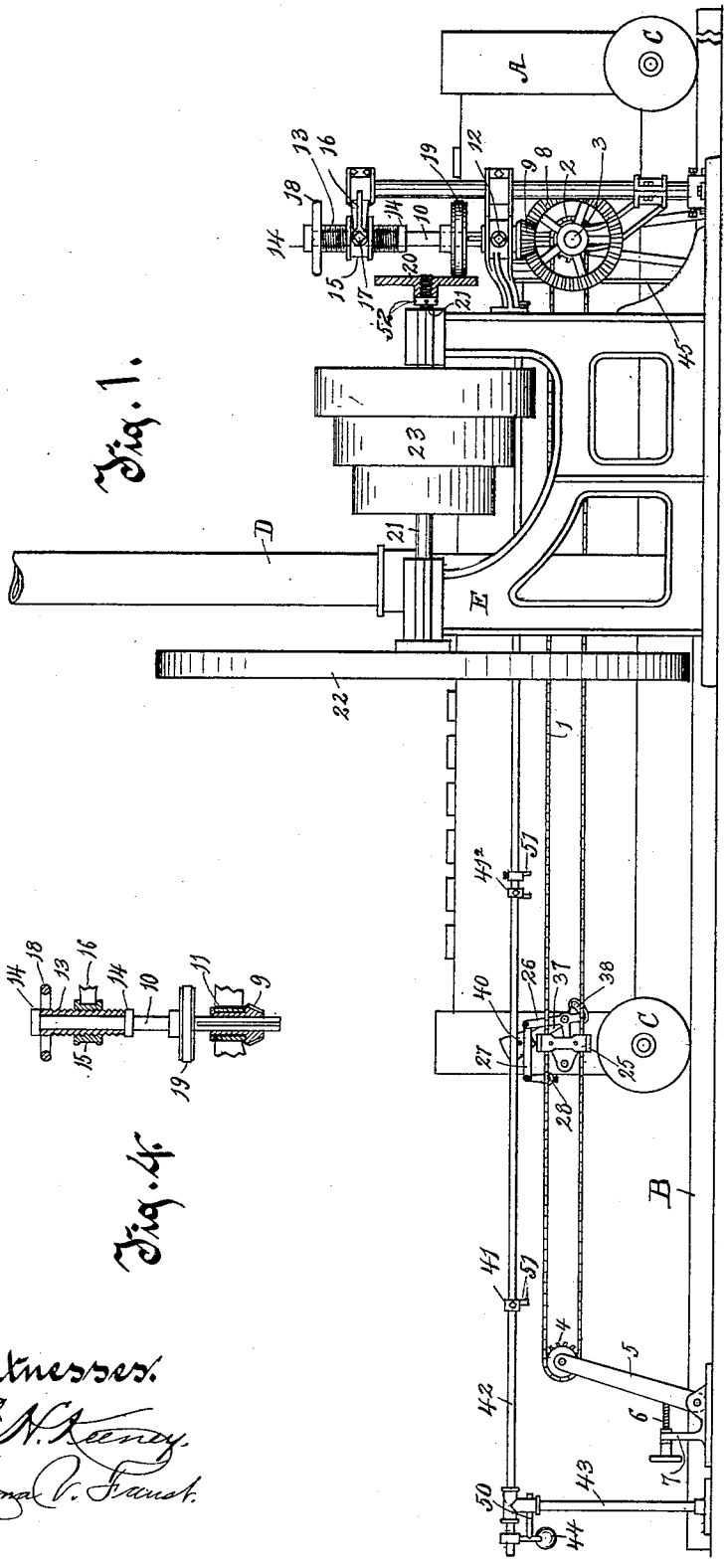



Fig. 1.




Fig. 4.

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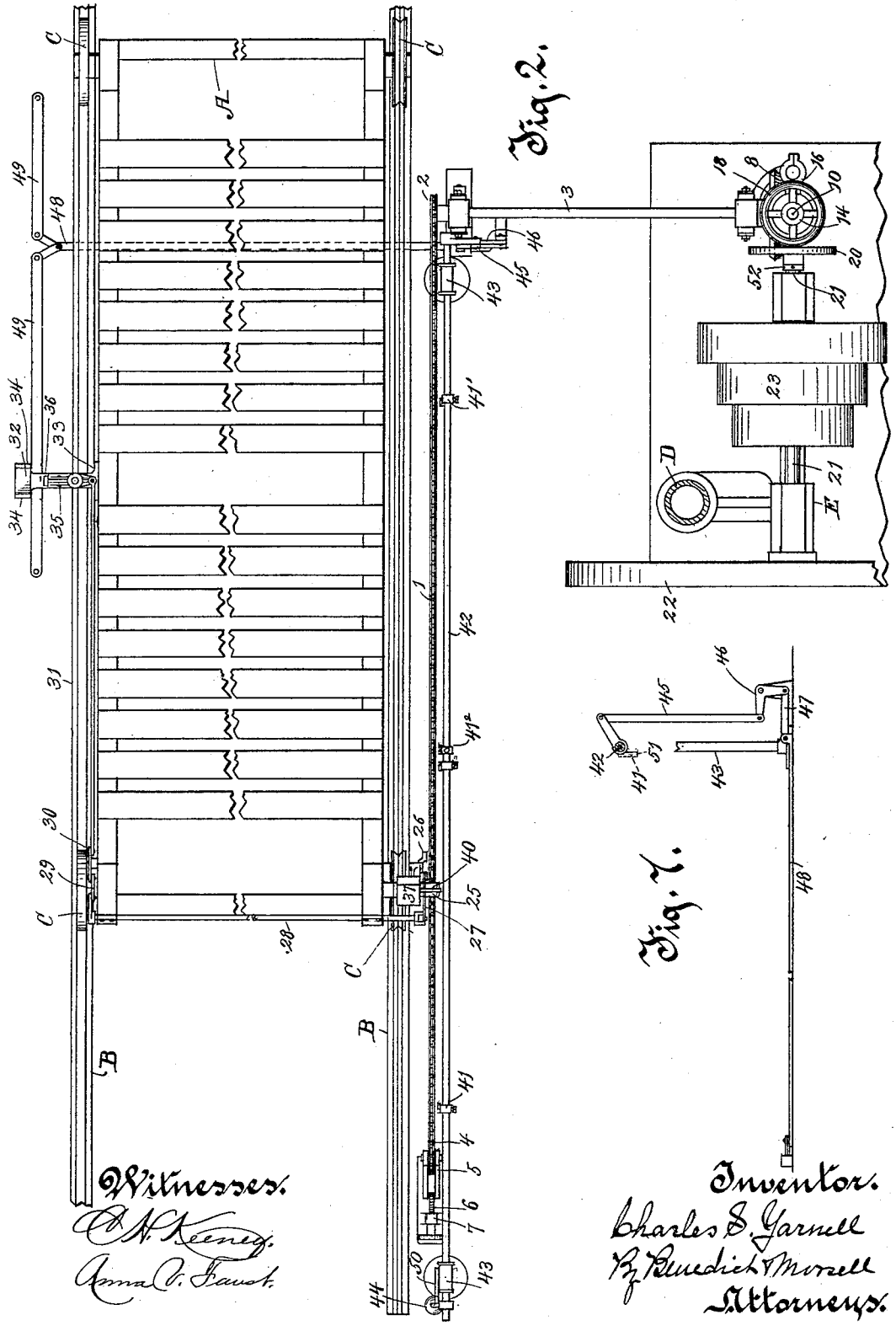


Fig. 2.



Fig. 1.

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Fig. 3.

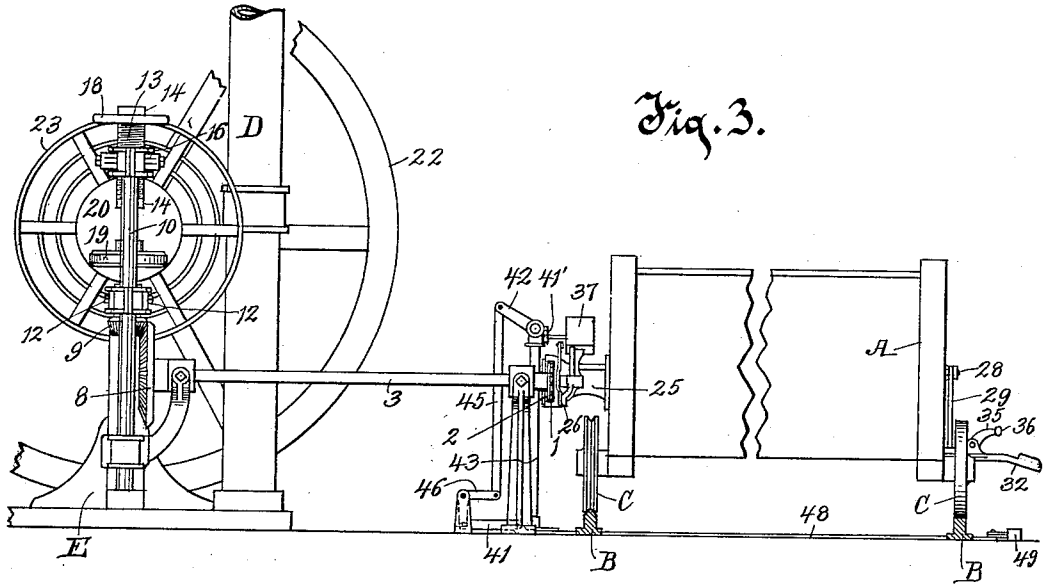



Fig. 8.

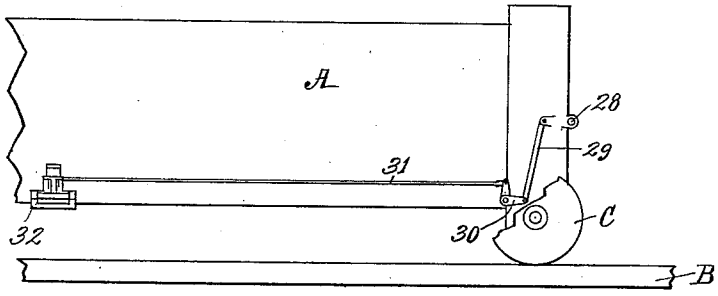



Fig. 9.

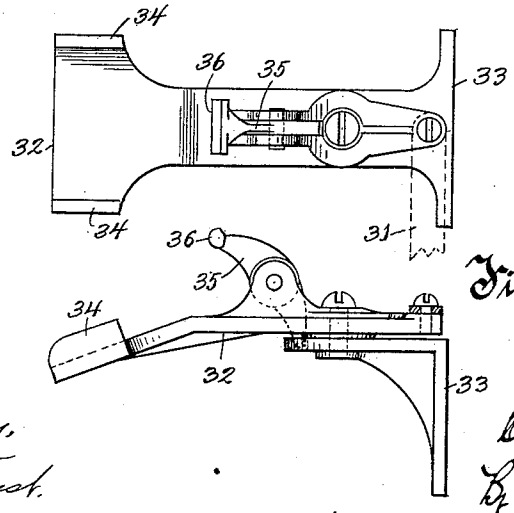



Fig. 10.

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Fig. 5.

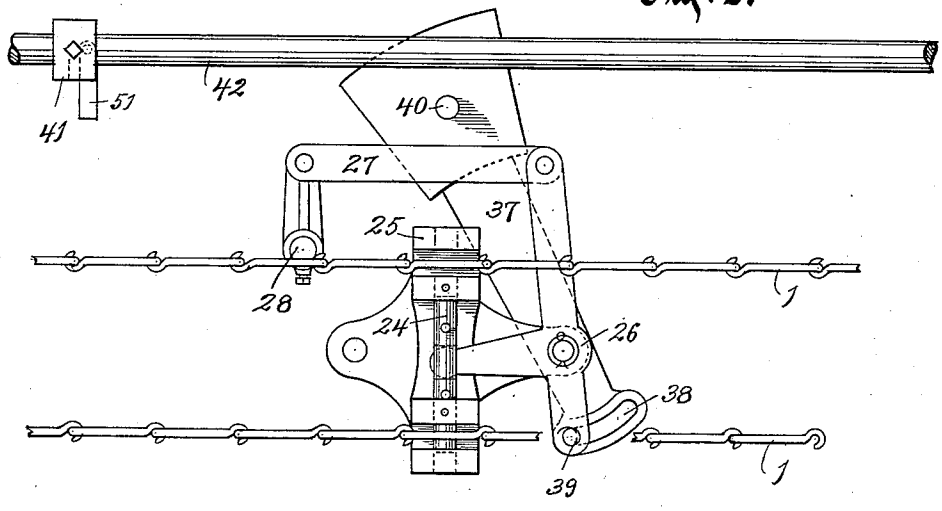
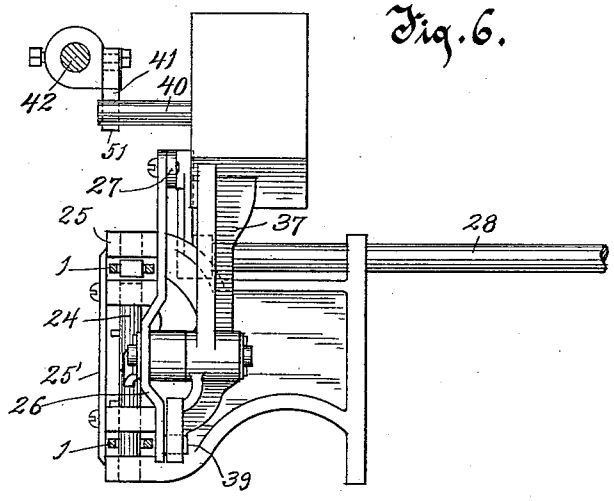



Fig. 6.




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# UNITED STATES PATENT OFFICE.

CHARLES S. YARNELL, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO THE MOORE CARVING MACHINE COMPANY, OF SAME PLACE.

## MEANS FOR OPERATING ABRADING OR POLISHING MACHINES.

SPECIFICATION forming part of Letters Patent No. 653,726, dated July 17, 1900.

Application filed February 8, 1900. Serial No. 4,436. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES S. YARNELL, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented a new and useful Improvement in Means for Operating or Driving Mechanism for Abrading or Polishing Machines, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

This invention relates to machines of a class that are adapted for abrading or polishing wood, metal, or stone surfaces and that are variously denominated as abrading-machines, sanding-machines or sanders, rubbing-machines, and polishing-machines or buffers. These machines include not only the mechanism and devices for moving the abrading or polishing block over the surface of the material, but also a suitable table or means for supporting the material and changing its position while being abraded or polished.

The present invention is directed to means for automatically reciprocating or feeding the material-holding table laterally past the moving abrading or polishing block and to regulate the speed of such reciprocation or feed.

The invention consists of the mechanism and devices and their parts and combinations, as herein shown, described, and claimed, or the equivalents thereof.

In the drawings, Figure 1 is a side elevation of a material-holding table for an abrading-machine with my improvements for reciprocating it and for regulating the speed of the reciprocation in connection with so much of the mechanism of an abrading-machine proper as is related to the present invention. Fig. 2 is a plan of the table and of the mechanism and devices involved in the present invention, the table being broken away for convenience of illustration. Fig. 3 is an end elevation of the table and mechanism shown in plan in Fig. 2, the elevation being of the end at the right in Fig. 2. Fig. 4 is a detail in section of power-transmitting and speed-regulating mechanism. Fig. 5 is a detail of clutching and reversing motion mechanism. Fig. 6 is a view at a right angle to Fig. 5 of substantially the same mechanism shown in Fig. 5. Fig. 7 is a detail of a device for throwing clutch-shifting stops out of use. Figs. 8, 9, and 10 are details of a device for putting the carriage-reversing clutch out of use.

In the drawings, A is a material-holding table, and B B are the rails of a track on which the table travels reciprocally, the table being supported thereon by the wheels C C.

D is a standard, being essentially a part of the frame E of the abrading-machine, on which standard and frame operative parts of the abrading-machine may be supported, the construction being such that the polisher-block and its carriage are arranged to reciprocate in a direction substantially across the table A or at a right angle to the direction of the travel of the table on the rails B B.

To cause the table A, on which the material that is being polished is supported, to be reciprocated or fed forward and back on the rails B B past the polisher-carriage, reciprocating transversely thereof, an endless belt or chain 1, located near to and parallel with the direction of travel of the table, runs at one extremity of its line on and about a sprocket-wheel 2 on a shaft 3, and at the other end of its line runs on and about a sprocket-wheel 4, mounted in the free extremity of a tiltable post 5. The shaft 3 is mounted in suitable permanent supports, and the post 5 is hinged to a fixed base and is adapted to be tilted away from the shaft 3, thereby tightening the endless chain 1, by means of a screw 6, revoluble in a permanent support 7 and turning by its thread into a nut having play in the post 5. The screw 6 is provided with a hand-wheel at its outer extremity for rotating it. The shaft 3, Figs. 1, 2, and 3, is also provided with a beveled gear-wheel 8, that meshes with a pinion 9, splined on a shaft 10. The hub of the pinion 9 is provided with an annular groove, in which a sleeve-box 11, Fig. 4, is fitted, and the box 11 is held in place in the frame by holding-screws 12. An exteriorly-screw-threaded sleeve-box 13 is fitted on the shaft 10 between collars 14 14 on the shaft and is a bearing for the shaft revolubly. A nut 15, in which the sleeve-box 13 turns by its exterior screw-thread, is mounted and supported in a bracket-arm 16 on the frame by means of pivoting-screws 17. The sleeve-box 13 is provided with a hand-wheel 18. The shaft 10 is also provided with a friction-wheel 19, that

meshes frictionally with the disk 20 on the driving-shaft 21. The driving-shaft 21 is mounted on the frame E and is the shaft that drives not only the mechanism involved in this invention, but also the abrading or polisher block, over the material supported on the table A. The shaft 21 is provided with a fly-wheel 22 and with a stepped speed-pulley 23. By means of the speed-pulley 23 the action of the abrading-machine may be regulated, and by means of the adjustment of the friction-wheel 19 toward or from the axis of the disk 20 the feed or reciprocation of the table A may be adjusted with reference to and differentiated from the speed of the abrading-machine driven by the shaft 21.

For causing the table A to travel reciprocally on the track B, I provide a device or mechanism mounted on the table adapted to clutch alternately the upper and the lower lines or legs of the endless chain 1. This clutching and reversing mechanism, Figs. 1, 2, 5, and 6, consists of a dog or bolt 24, slidable endwise in a bracket 25, which bracket is fixed on the side of the table and projects therefrom across the path of the endless chain 1. There are slots transversely through the bracket 25, in which slots the lines of the endless chain run through the bracket, and the bolt 24 is so located as to be adapted to be shifted endwise into and through the links of the chain, both in the upper line and in the lower line thereof, the bolt being adapted to enter any link of the chain, and thus clutch the table to the chain. A plate 25′ is secured detachably to and forms a part of the bracket 25, which plate closes the chain-slots at one side. The bolt 24 is pivoted medially on an arm of a bell-crank 26, which bell-crank is pivoted conveniently on an arm or projection of the bracket 25. Another arm of the bell-crank 26 is connected by a link 27 to the crank-arm of a rock-shaft 28, mounted on and extending across the table A. At its other extremity the rock-shaft 28 is connected through a crank-arm thereon by a link 29, Figs. 2 and 8, to a bell-crank 30, pivoted on the table-frame, which bell-crank is in turn connected through its other arm by a link 31 to a laterally-swinging foot-lever 32, pivoted medially on a bracket 33, Figs. 9 and 10, fixed on the frame of the table. The lever 32 is provided at its free extremity with side guards 34 34, between which the foot of the attendant is placed on the lever, and whereby he can shift the lever laterally, his foot bearing against a guard 34. A weight-controlled locking-latch 35, pivoted medially in the lever 32, when in the position shown in Figs. 9 and 10 at its lower end takes into a notch therefor in the bracket 33 and locks the lever 32 in the middle position the lever is shown to have in Figs. 2, 8, and 9. In such position the bolt 24 would be between the upper and lower lines of the chain 1 and out of engagement with the chain, leaving the table at rest so far as any movement thereof by the running of the chain is concerned. The weight 36 on the free end of the latch 35 is adapted to automatically hold the latch in engagement with the bracket 33, and when thrown over to the other side of the pivot of the latch 35 is adapted to hold the latch automatically out of engagement with the bracket 33, permitting the lever 32 to be swung laterally either toward the right or the left, throwing the bolt 24 into engagement with the lower or upper line of the chain 1.

The means described provide for connecting the table to the moving chain 1, and thus reciprocating it by the attendant at will; but it is desirable that the travel of the table reciprocally shall be accomplished automatically, and for this purpose I provide a tumble-bob 37, pivoted medially adjacent to and concentrically with the bell-crank 26, Figs. 1, 2, 3, 5, and 6, one arm of which tumble-bob is provided with a segmental slot 38, which receives and permits of the limited travel therein of a pin 39 on an arm of the bell-crank 26. This construction provides for a limited amount of lost motion of the tumble-bob. A pin 40 projects from the tumble-bob. Stops 41, 41′, and $41^2$ are provided in the path of the pin 40, which are adapted to contact with the pin as the table travels on the track and to shift the tumble-bob past its axis when the weight falls on the other side and shifts the bolt 24 from engagement with one line of the chain 1 into engagement with the other line of the chain, thus automatically reversing the travel of the table. As it is desirable at times to shift the positions of these stops and also at times to remove the stops entirely from the path of the tumble-bob pin, I preferably mount these stops on a rock-shaft 42, located adjacent to and parallel with the path of the travel of the tumble-bob on and with the table, which rock-shaft is supported conveniently on standards 43 43. The stops 41 41′ $41^2$ are mounted adjustably on the rock-shaft 42, being secured thereto by set-screws, whereby the stops can be moved on the rock-shaft and secured to it at such positions as are desirable for reversing the travel of the table. A weight 44 on a radial arm on the rock-shaft holds it normally in a position in which the stops are in the path of the tumble-bob pin. For oscillating the rock-shaft and tilting the stops out of the path of the tumble-bob pin a crank-arm on the rock-shaft is connected by a link 45, Figs. 2 and 7, to a bell-crank 46, the other arm of which bell-crank is connected by a link 47 and a rod 48 (of which rod the link 47 is substantially a part) to foot-pedals 49 49, which foot-pedals are pivoted on the floor adjacent to the side of the table. By this construction the attendant can oscillate the rock-shaft 42, throwing the stops thereon out of the path of the tumble-bob, thus releasing the table in its travel with the endless chain 1 from being reversed or controlled by the stops or the automatic mechanism for reversing the travel of the table. I also preferably form the stops 41 41′ $41^2$ with

a toe 51, that is hinged to the stop, so as to be capable of swinging thereon in one direction to allow the tumble-bob to pass them severally in that direction, but to engage and hold the tumble-bob when it comes thereto in the other direction. This permits of the shifting of a tumble-bob past the stops in one direction without oscillating the rock-shaft 42.

A finger 50 on the arm of the weight 44 is adapted to contact with a standard 43 and prevent the further tilting of the rock-shaft under the action of the weight 44.

The disk 20 may be made adjustable on the shaft 21 for taking up wear or adjusting it to related parts by turning the disk onto the shaft by screw-thread and locking it in position by a nut 52.

What I claim as my invention is—

1. In a machine of the class described, a reciprocable material-holding table, a traveling endless chain, a bolt slidable endwise in bearings fixed on the table adapted to be shifted into engagement severally with the reversely-running lines of the chain, a bell-crank lever articulating with the bolt adapted to throw the bolt, and a tumble-bob adapted after lost motion to engage the bell-crank and throw the bolt.

2. In a machine of the class described, a reciprocable material-holding table, a traveling endless chain, a bolt slidable endwise in fixed bearings on the table adapted to be shifted into engagement severally with the reversely-running lines of the chain, a bell-crank lever articulating with the bolt adapted to throw the bolt, a tumble-bob adapted after lost motion to engage the bell-crank and throw the bolt, and adjustable stops in the path of a pin on the tumble-bob adapted as the table advances to engage the tumble-bob and throw it over its center.

3. The combination with a reciprocable material-holding table, of an adjacent horizontally-disposed traveling endless chain, a shiftable dog on the table adapted to engage severally the reversely-traveling lines of the chain, a bell-crank adapted to shift the dog, a rock-shaft 28 mounted on the table, a crank thereon, and a link connecting the shaft-crank to an arm of the bell-crank, and a swinging foot-lever connected to and adapted to oscillate the rock-shaft.

4. The combination with a reciprocable material-holding table, of an adjacent horizontally-disposed traveling endless chain, a shiftable dog on the table adapted to engage severally the reversely-traveling lines of the chain or to be thrown out of engagement with the chain, a bell-crank adapted to shift the dog, a rock-shaft 28 mounted on the table, a crank-arm on the shaft, and a link connecting the shaft crank-arm to an arm of the bell-crank, a swinging foot-lever connected to and adapted to oscillate the rock-shaft, and a weight-controlled latch on the foot-lever adapted to lock the foot-lever in medial position and hold the dog in corresponding medial position out of engagement with said chain.

5. In a machine of the class described, a reciprocable material-holding table, a traveling endless chain, a bolt slidable endwise in bearings fixed on the table adapted to be shifted into engagment severally with the reversely-running lines of the chain, a bell-crank lever articulating with the bolt adapted to throw the bolt, a tumble-bob adapted after lost motion to engage the bell-crank and throw the bolt, a rock-shaft 42 parallel with and adjacent to the path of travel of the table, stops on the rock-shaft adapted to engage and throw over the tumble-bob, and means for oscillating the rock-shaft.

6. In a machine of the class described, the combination with a reciprocable material-holding table and a traveling endless chain to which the table is adapted to be clutched and by which it is reciprocated, of a shaft on which the chain runs and by which it is driven, an intermediate shaft 10 geared to the chain-driving shaft, a main driving-shaft 21 and a speed-pulley whereby the reciprocation or feed of the table may be varied.

7. In a machine of the class described, the combination with a reciprocable material-holding table, and a traveling endless chain to which the table is adapted to be clutched and by which it is reciprocated, of a shaft on which the chain runs and by which it is driven, an intermediate shaft 10, a pinion splined on the intermediate shaft and supported and rotatable in a non-revoluble frame-support and meshing with the chain-shaft, and a driving-shaft geared adjustably to the intermediate shaft.

8. In a machine of the class described, the combination with a traveling endless table-reciprocating chain, of a chain-driving shaft, an intermediate shaft, a pinion splined thereon and meshing with the chain-driving shaft, a main driving-shaft, a disk, a wheel on the intermediate shaft gearing frictionally with the disk on the main shaft, and means for shifting the intermediate shaft to change the contact of the wheel thereon on the disk nearer to or farther from the axis of the disk.

9. In a machine of the class described, the combination with a main driving-shaft and a disk, of an intermediate shaft, a pinion splined thereon, a wheel contacting frictionally with the disk on the main driving-shaft, an exteriorly-screw-threaded sleeve-box in which the intermediate shaft has a bearing between collars fixed thereon, and a nut supported on the frame in which the sleeve-box is supported adjustably.

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

CHARLES S. YARNELL.

Witnesses:
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GEO. M. JONES.