

J. R. SAYLOR.
 REAMING AND TAPPING MACHINE.
 APPLICATION FILED AUG. 10, 1911.

1,129,020.

Patented Feb. 16, 1915.

3 SHEETS—SHEET 1.

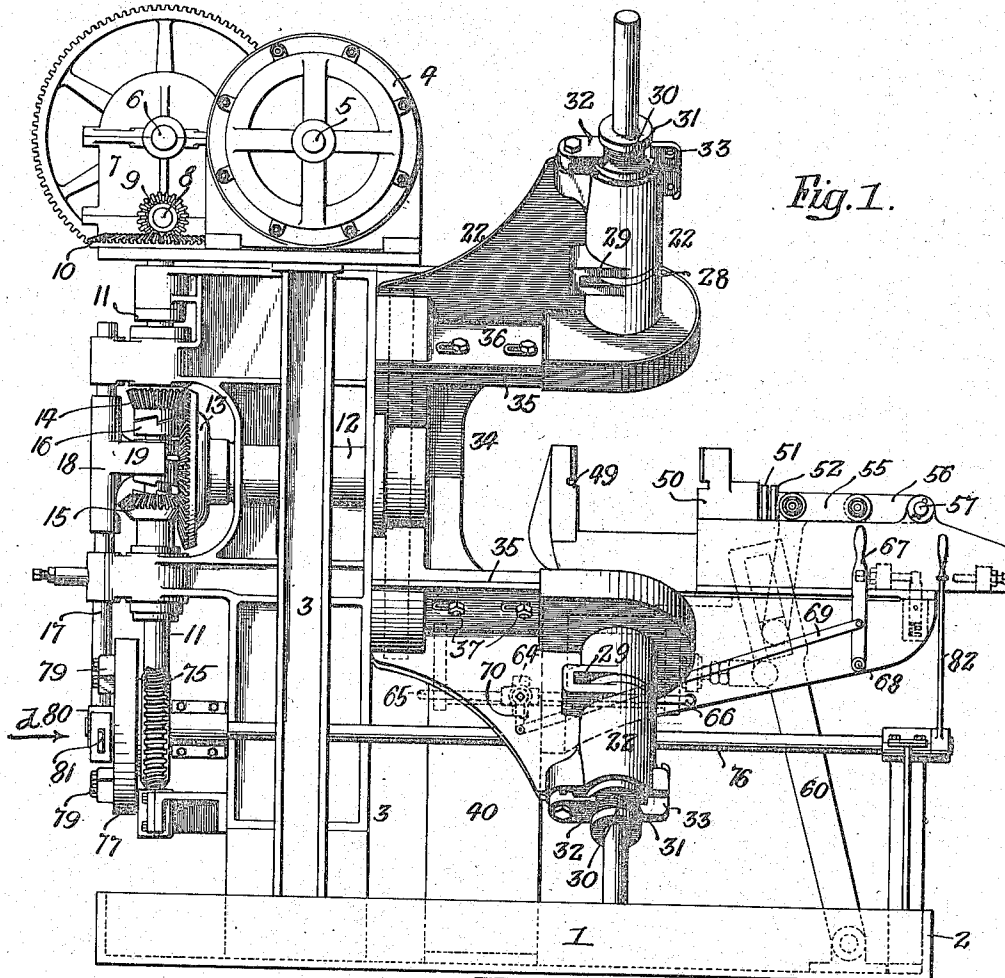


Fig. 1.

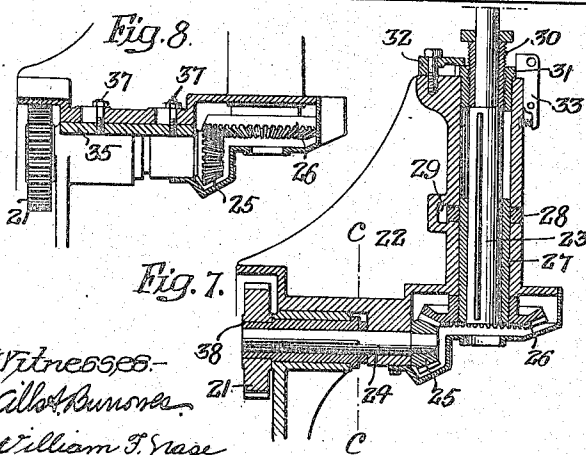


Fig. 7.

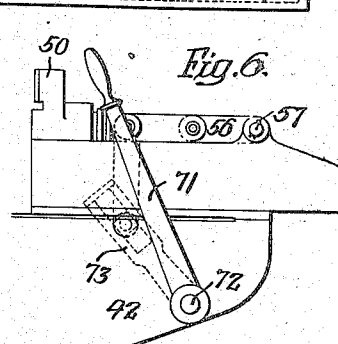


Fig. 6.

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 William F. Vase

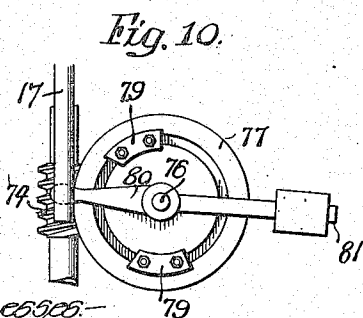
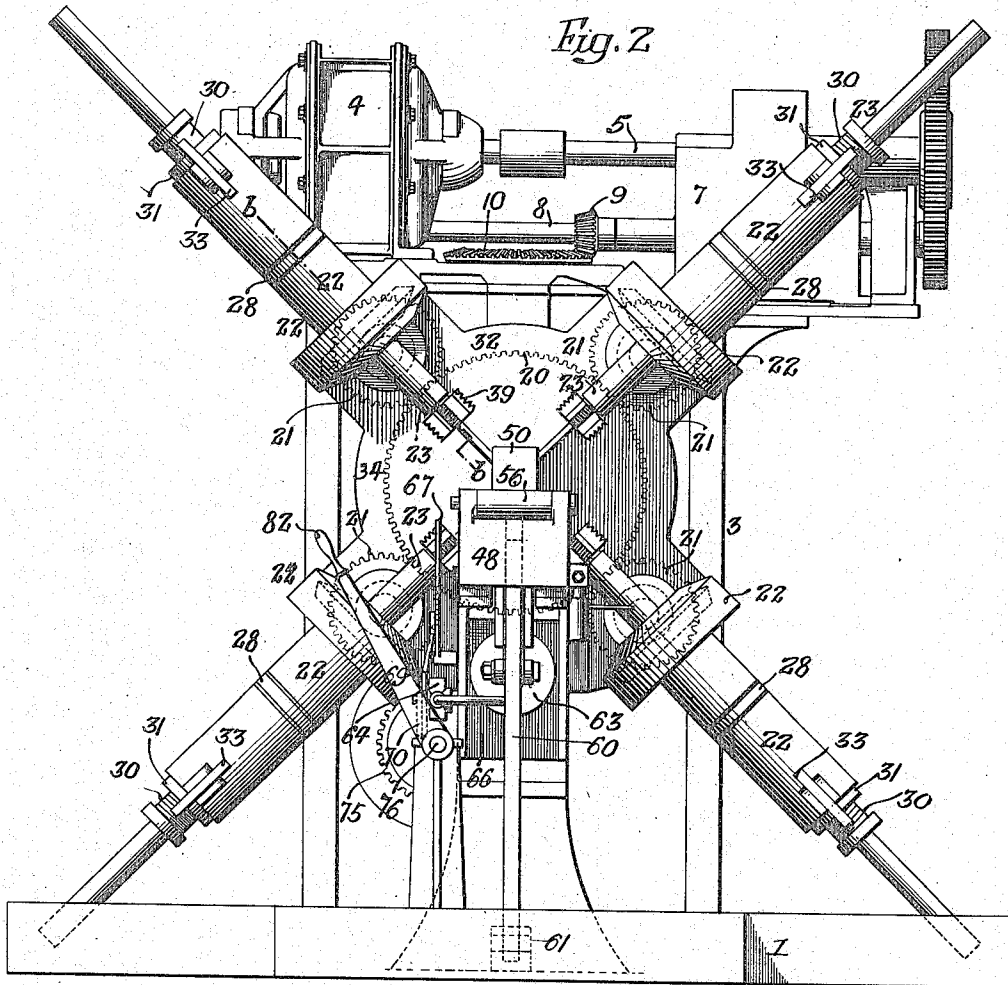
Inventor—
 John R. Saylor
 by his Attorneys—
 Brown & Brown

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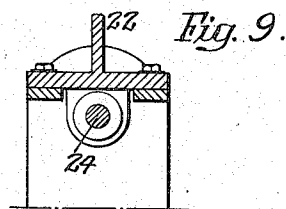
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3 SHEETS—SHEET 2.



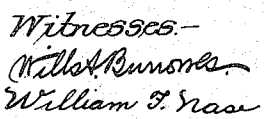
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1,129,020.

3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

JOHN R. SAYLOR, OF POTTSTOWN, PENNSYLVANIA.

REAMING AND TAPPING MACHINE.

1,129,020.

Specification of Letters Patent.

Patented Feb. 16, 1915.

Application filed August 10, 1911. Serial No. 643,298.

To all whom it may concern:

Be it known that I, JOHN R. SAYLOR, a citizen of the United States, residing in Pottstown, county of Montgomery, State of Pennsylvania, have invented certain Improvements in Reaming and Tapping Machines, of which the following is a specification.

The object of my invention is to improve the construction of machines, particularly adapted for tapping fittings; valves, etc.

Another object of the invention is to simplify the construction of machines of this class and to provide a suitable chuck for holding the work during the tapping operation.

In the accompanying drawings: Figure 1, is a side view of my improved tapping machine; Fig. 2, is a front elevation; Fig. 3, is an enlarged view, partly in section, illustrating the chuck for holding the work; Fig. 4, is a sectional view on the line *a-a*, Fig. 3; Fig. 5, is a view illustrating the chuck moved back to its full extent and in the open position; Fig. 6, is a view showing the hand-lever mechanism for operating the chuck; Fig. 7, is a sectional view on the line *b-b*, Fig. 2; Fig. 8, is a view, similar to Fig. 7, showing the exterior of the bearings for the shaft; Fig. 9, is a sectional view on the line *c-c*, Fig. 7, and Fig. 10, is a view looking in the direction of the arrow *d* Fig. 1.

1 is the base of the machine having a flange 2 and this base forms the receptacle for the lubricant, which is pumped back into the reservoir to be used over and over again.

3 are standards which support part of the overhead mechanism.

4 is an electric motor having a shaft 5, which is geared to an intermediate shaft 6, through change gearing in an ordinary change gear box 7. This shaft is in turn geared to a horizontal shaft 8, having a pinion 9, which meshes with the gear wheel 10 on the end of a vertical clutch shaft 11.

12 is a horizontal driving shaft having a bevel wheel 13, meshing with pinions 14 and 15, loose on the vertical shaft 11 and mounted between these two pinions is a clutch sleeve 16, which is free to slide, but must turn with the shaft.

Each of the pinions 14 and 15 has teeth with which the teeth of the clutch sleeve 16 engage. This sleeve is moved into engage-

ment with either of the pinions by the shifter rod 17 having a head 18 on which is an arm 19 engaging the clutch sleeve. The shifter rod 17 is actuated by mechanism, which will be described hereafter.

On the forward end of the shaft 12 is a gear wheel 20 shown by dotted lines in Fig. 2, which meshes with the gear wheels 21 on each of the heads 22 in which are mounted the spindles 23. The gear wheels 21 are mounted on horizontal shafts 24, Fig. 7, and on the end of each shaft is a bevel pinion 25 meshing with a bevel wheel 26 on a sleeve 27 through which the spindle 23 extends. The sleeve 27 is splined to the spindle 23 so that while the spindle is free to move longitudinally in the sleeve it must turn with it.

The sleeve 27 is secured to a clutch 28 which extends into a recess 29 in the frame of the head 22. The end of the spindle is reduced, as shown in Fig. 7, and on the reduced portion is a sleeve 30, having a master thread thereon. This master thread meshes with a thread in a master bushing 31 secured to the frame 22, in the present instance, by a clip 32. The flange of the bushing is notched and adapted to the notch is a spring locking pawl 33, so that while the bushing can be turned to the point desired, it can be locked in position by the spring pawl, which engages the notch. It will be noticed that the clip is made in the peculiar manner illustrated in Figs. 1 and 7, and has a reduced portion. The strength of this clip is less than any other part of the mechanism so that in the event of jamming of the work, or the strain on the mechanism being such as to cause the parts to break, the clip will be the part which will break and this clip which is inexpensive can be readily replaced when necessary.

In the present machine, it will be noticed that the heads 22 are mounted on a frame 34, rigidly secured to the standard 3 and the several heads are longitudinally adjustable on this frame. In the present instance, the frame has brackets 35 and the flanges 36 of the head 22 rest upon the brackets. These flanges are slotted for the reception of the studs 37, on which are the clamping nuts, securing the heads to the brackets, Fig. 8, so that on releasing the nuts the heads can be moved in or out to a limited extent.

In order to allow the gears 25 and 26

to always be in mesh, I mount on the shaft 24 a sleeve 38, Fig. 7, which carries the gear wheel 21 and this sleeve is splined on the shaft so that while the shaft can turn with the sleeve it may be moved longitudinally in the sleeve with the head 22. This adjustment is necessary in some classes of work having holes on offset centers, by making the heads adjustable I can bring the parts into proper alinement.

Mounted in the inner ends of the spindles 23 are the cutter heads 39 and are made in the form of tapping dies or reaming or drilling heads, as the machine is adapted for either tapping, reaming or drilling.

Mounted on a forward extension 40 of the standard 3 is a bracket 41, carrying the chuck 42. The bracket 41 is adapted to guides in the extension 40 and can be adjusted by the set screw 43. The chuck 42 has a base plate 44, provided with an undercut or dovetail rib 45, adapted to a transverse groove in the bracket 41 so that the chuck can be shifted transversely. This base plate is under-cut as at 46, Fig. 4, and fitting this undercut portion are the flanges 47 of the main frame 48 of the chuck. This frame has a fixed jaw 49 and arranged to slide in an under-cut groove in the frame is a movable jaw 50. The movement of this jaw 50 is limited by stops. This jaw 50 has a threaded recess and adapted to the recess is a threaded hollow sleeve 51. Mounted in the sleeve is a plunger 52. The outward movement of the plunger is limited by a screw 53 and between the end of the plunger and the inner wall of the sleeve is a coiled spring 54 so that the spring acts as a cushion for the clamping mechanism, after the work has been rigidly clamped between the jaws.

On the end of the plunger 52 is pivoted a bell crank lever 55 and one arm of this bell crank lever is connected by link 56 to a pivot pin 57 on the frame 48. The other arm of the bell crank lever 55 carries a block 58, which is adapted to a slot 59 in a lever 60 pivoted at 61 to the base 1. The lever 60, in the present instance, is actuated by fluid under pressure and connected to the lever is a piston rod 62, having a piston which travels in a cylinder 63. This cylinder is supplied with fluid under pressure through the valve 64 and pipes 65 and 66. The pipe 65 leads to the rear end of the cylinder and the pipe 66 leads to the forward end of the cylinder and the valve is so arranged that it can be turned to allow fluid to enter the forward end of the cylinder to retract the piston; thus moving the lever to a position to close the jaws and it can also be moved into position so as to allow fluid to enter the rear of the cylinder; moving the lever to open the jaws of the chuck.

67 is a handled lever pivoted at 68 and this lever is connected by a rod 69 to an arm 70 on the stem of the valve.

In Fig. 3, I have shown the chuck and its parts in the extreme closed position, while in Fig. 5, I have illustrated the parts in the extreme open position. In some classes of tools, the fluid pressure cylinder 63 and its connections may be replaced by a hand lever, such as illustrated in Fig. 6; the hand lever 71 being pivoted to a rock shaft 72 having its bearings in the bracket 42 and on this rock shaft is a slotted arm 73, which engages one arm of the bell crank lever 55. This construction is particularly adapted for use in light machines where the pressure exerted by hand is sufficient to hold the parts in the chuck.

The shifter rod 17 is actuated from the vertical shaft 11, which has at its lower end a worm 74, which meshes with a worm wheel 75, loose on the shaft 76 and forming part of the worm wheel, in the present instance, is a disk 77 having a slot 78 in which are adjustable blocks 79. These blocks can be adjusted to any point desired on the face of the disk.

Secured to the shaft 76, in the present instance, is an arm 80, which is connected to the shifter rod 17 and this arm is in the path of the blocks 79 on the disk 77. On the shaft is an arm 81, having a weight to balance the shifter mechanism. When the worm on the shaft 11 turns the disk in one direction, one of the blocks on the disk will strike the arm 80 and shift the clutch sleeve, throwing said sleeve into mesh with the opposite gear; reversing the movement of the shaft 11. The shaft will then turn in the reverse direction until the other block 79 comes in contact with the arm when the sleeve will be shifted so that the shaft 11 has a rotary movement, first in one direction and then in the other direction. This reverse, rotary movement is communicated to all the spindles so that during the cutting operation the spindles move in one direction and as the spindles are retracted they move in the opposite direction.

When it is wished to shift the clutch by hand, the handle 82, mounted on the forward end of the shaft 76, is operated, and as the shifter arm 80 is attached to the shaft 76 the clutch can be thrown in gear with either of the gear wheels 14 and 15 by the movement of the said hand lever. Thus, the machine is not only automatic, but is also under the complete control of the operator.

The operation of the machine is as follows:—If an elbow or T or cross is to be threaded, it is placed between the jaws of the chuck 48 and the hand lever 67 operated so as to cause the jaws to close on the article and as the jaws close the idle movement will

be taken up by the spring 54 within the head. The movable jaw 50 is set by turning the head, so that it will properly clamp the work and as this machine is intended to tap or ream a number of pieces which are of any one particular type. The chuck is once being set, will readily clamp the pieces of any one particular type. The cruck is moved forward by the operation of the pneumatic mechanism, so as to bring it in alinement with the spindles 23 after the article is clamped between the jaws, and by moving the handle 82, the clutch sleeve 16 can be thrown into mesh with one of the gears, causing the spindle to turn forward and the master screw sleeve 30 will feed the spindle to the work. If there is a tap in the spindle, the thread of the tap will be of the same pitch as the master sleeve. The blocks 79 are set on the disk 77 so as to reverse the mechanism after the spindle is moved forward a certain distance and if a certain depth of thread is required, the block is set to that depth and the machine will automatically reverse itself, traveling back to its starting position.

The machine in case of accident or other reasons can be stopped by moving the lever 82 at any time to the central position. When the taps are clear of work the mechanism can be operated through the lever 67 and the chuck moved clear of the spindles so that the work can be readily removed and another piece inserted in its place.

I claim:

1. The combination in a tapping or reaming machine, of a spindle; means for driving the spindle; a sliding chuck for holding the work; a sliding jaw on the chuck; a bell-crank lever and link forming a toggle and disposed between the chuck and the movable jaw; said bell-crank lever being pivotally connected close to the jaw with an arm depending below said pivot; a lever having a sliding connection with the depending arm of the bell-crank lever; and means for operating said lever.

2. The combination of a spindle; a base; a chuck slidably mounted on the base and having a fixed and a movable jaw; a bell crank lever and a link connecting the movable jaw with the body portion of the chuck; means for adjusting the movable jaw; yielding means between the bell crank lever and the said adjusting means; a cylinder; a piston therein; means for controlling fluid under pressure in the cylinder; a rod connected to the piston; a slotted lever pivotally

connected to said rod; and a block carried by the bell crank adapted to the slot.

3. In a tapping or reaming machine, the combination of a spindle; means for driving the spindle; a sliding chuck for holding the work; a fixed and a sliding jaw on the chuck; the lever mechanism for moving the sliding jaw toward and from the fixed jaw; single actuating means for moving the slide into and out of line with the spindle and for moving the movable jaw to and from the fixed jaw; and a stop for limiting the movement of the sliding chuck, the lever mechanism for operating the movable jaw retaining the jaw in its closed position until the chuck comes in contact with the stop and, on the continued movement of the actuating means, the jaws of the clutch will be opened.

4. The combination in a tapping or reaming machine, of a spindle; means for driving the spindle; a base; a chuck slidably mounted on the base and having a fixed and a movable jaw; a stop to limit the outward movement of the chuck; a bell crank lever connecting the movable jaw with the body portion of the chuck; a lever for sliding the jaw on its base and for operating the bell crank lever; a sliding connection between said lever and the bell crank lever so that on the first movement of the operating lever the chuck will be withdrawn until it comes in contact with its stop and then, on the continued movement of the operating lever, the jaws will be opened through the medium of the bell crank lever.

5. The combination in a tapping or reaming machine, of a spindle; means for driving the spindle; a base; a sliding chuck mounted on the base, said chuck having a fixed and a movable jaw to hold the work; a bell crank lever pivoted to the movable jaw; a link connected to the fixed portion of the chuck and forming a toggle with the bell crank lever; a stop to limit the outward movement of the chuck; and means for actuating the free arm of the bell crank lever so that the sliding chuck will be withdrawn clear of the spindles until it comes to the stop and then the work will be released by the continued movement of the bell crank lever which will break the toggle.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses.

JOHN R. SAYLOR.

Witnesses:

WM. E. SHUFFE,
WM. A. BARR.