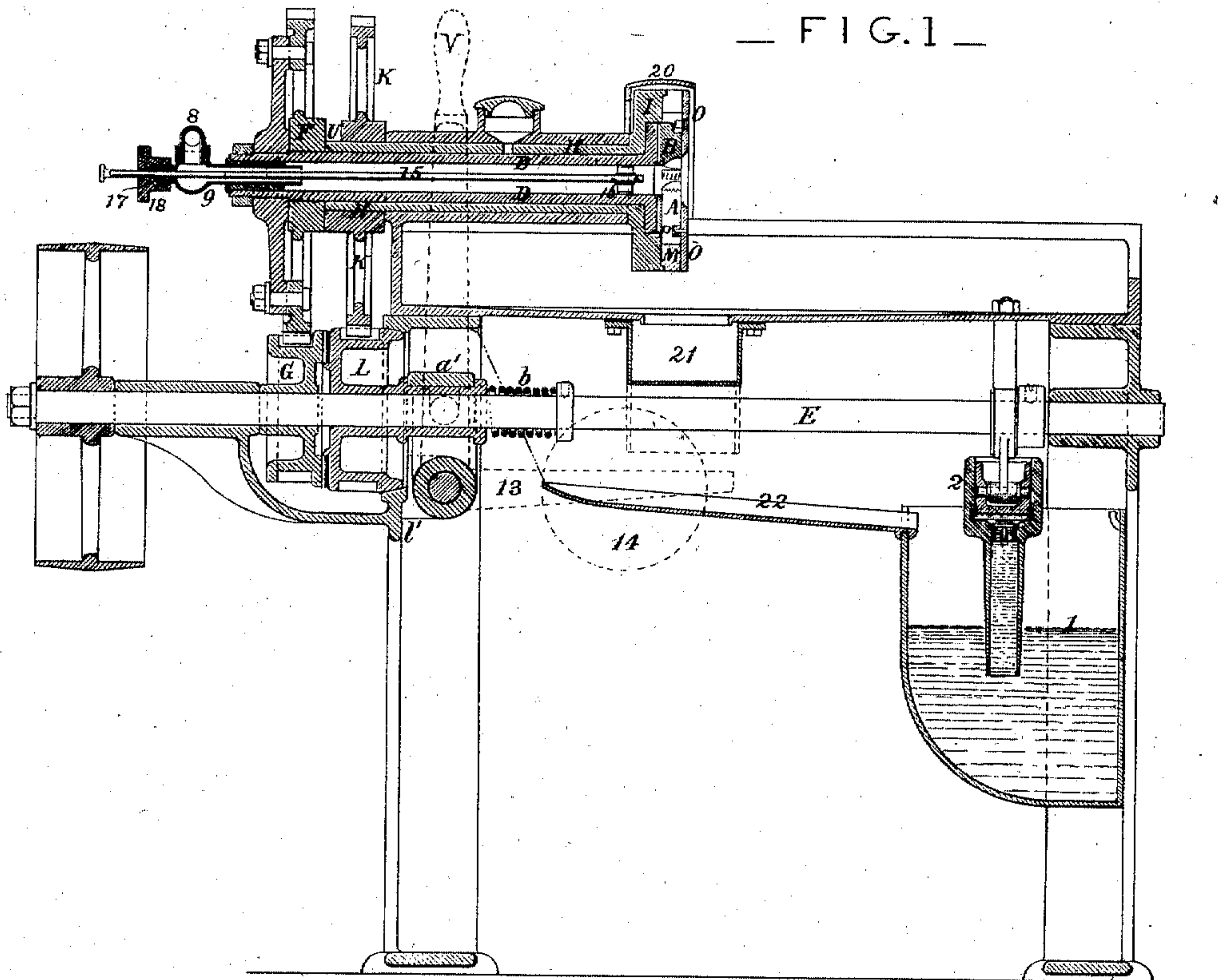


C. SELLERS.
Machines for Threading Bolts.

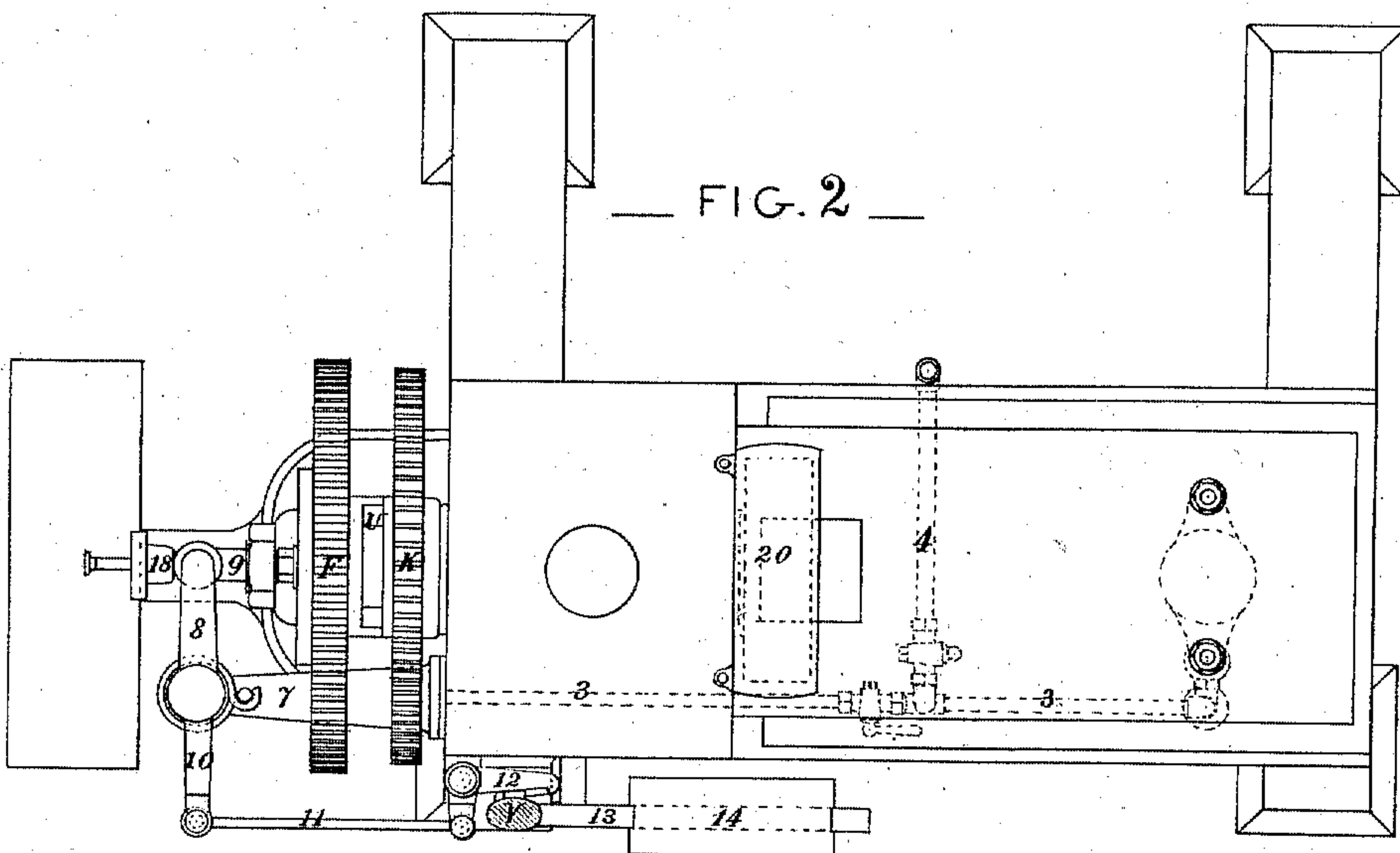
No. 157,700.

Patented Dec. 15, 1874.

— FIG. 1 —



— FIG. 2 —



WITNESSES:

Theodore Bergner.
L. Schutte

INVENTOR:

C. Sellers

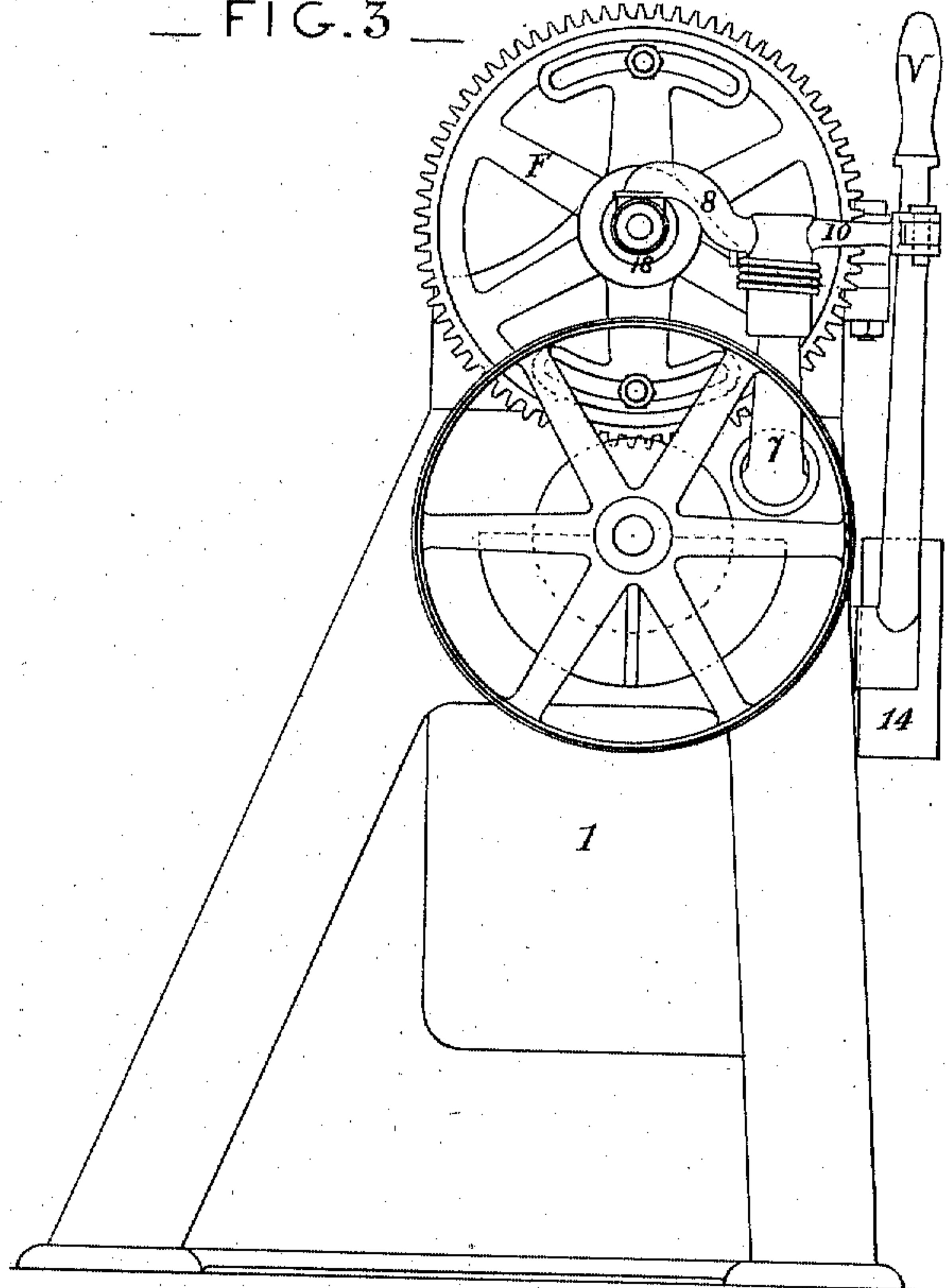
C. SELLERS.

Machines for Threading Bolts.

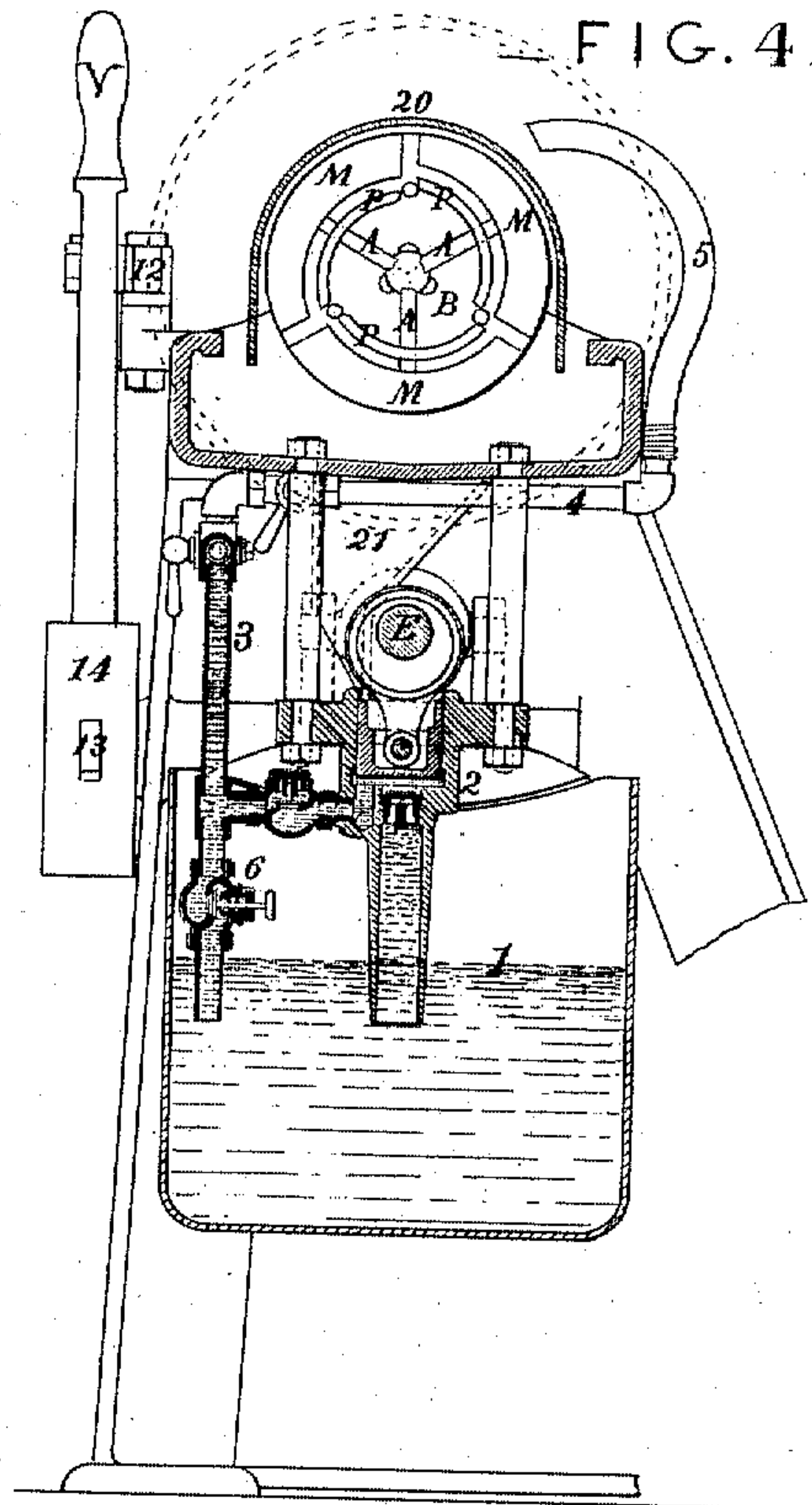
No. 157,700.

Patented Dec. 15, 1874.

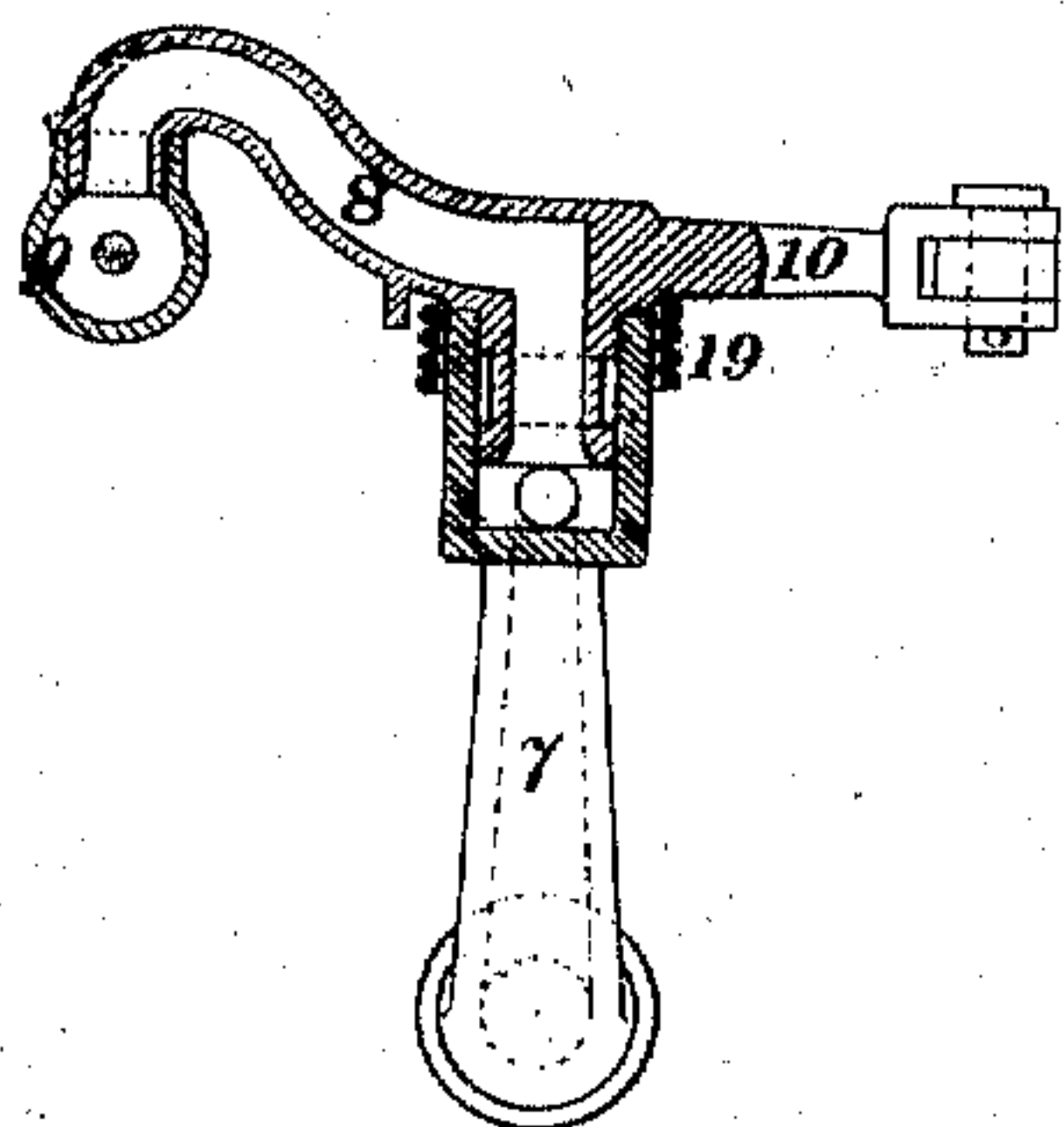
— FIG. 3 —



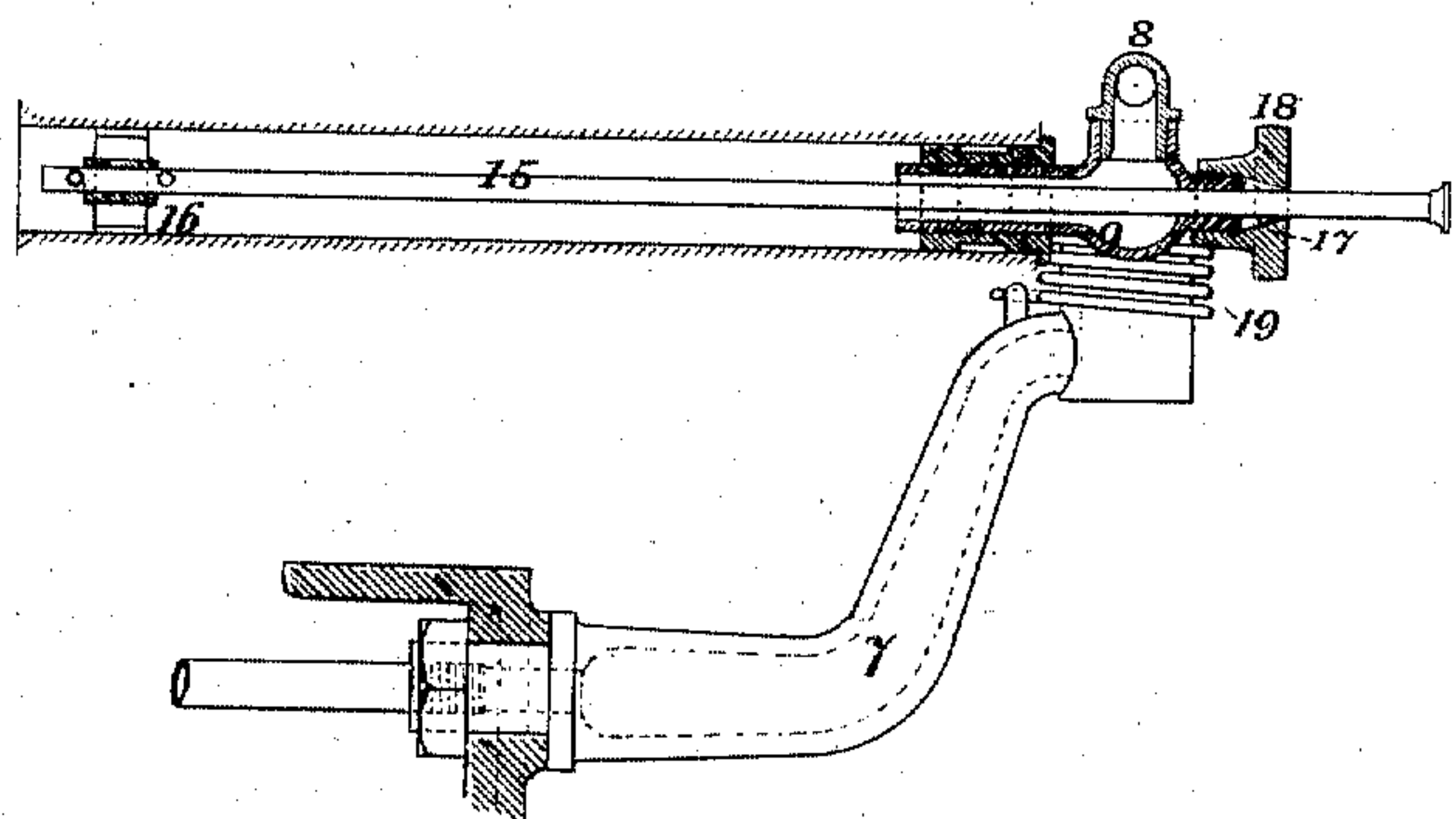
— FIG. 4 —



— FIG. 5 —



— FIG. 6 —



WITNESSES:

Theodore Bergner
L. Schutte

INVENTOR:

Coleman Sellers

UNITED STATES PATENT OFFICE.

COLEMAN SELLERS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR, BY
MESNE ASSIGNMENTS, TO WILLIAM SELLERS, OF SAME PLACE.

IMPROVEMENT IN MACHINES FOR THREADING BOLTS.

Specification forming part of Letters Patent No. **157,700**, dated December 15, 1874; application filed
June 8, 1874.

To all whom it may concern:

Be it known that I, COLEMAN SELLERS, of the city and county of Philadelphia and the State of Pennsylvania, have invented certain new and useful Improvements in Machines for Threading Bolts; and I hereby declare the following to be a full and exact description thereof, reference being had to the accompanying drawings forming part of this specification.

The object of my invention is to furnish a means of actuating the opening mechanism of the dies of bolt-threading machines automatically, when the bolt has been threaded a proper distance from the point; to provide means for causing a current of lubricating-fluid to pass through the revolving dies in the direction opposite to the motion of the bolt entering the dies, so as to wash out the chips to lubricate the cutting-edges and to keep the dies cool; and also to provide a means of regulating the supply of the fluid from a pump to the parts of the machine requiring it, as in threading bolts or in tapping, nuts and controlling or directing the force of the current so as to insure the performance of these objects; and also to provide means for conducting the lubricating-fluid from a reservoir to the rear of the dies, and from the dies back to the reservoir.

My invention, so far as the first object is concerned, is applicable to that class of bolt-threading machines in which revolving dies open to liberate the bolt when cut; and consists in providing an adjustable stop in the center of a hollow spindle to be pushed against by the end of the bolt being threaded, and by proper devices to actuate the opening machinery and liberate the bolt at the proper time; second, in the same class of machines to utilize the levers and devices required for the stop motion, as a means of conveying fluid to the back of the hollow spindle, and thus causing the flow of liquid from within outward for the purpose of washing out the chips, which otherwise tend to clog up the cutting parts; third, in providing the pump which supplies the liquid with an overflow-valve and regulating-cocks, so that, with a constant amount of delivery by the pump, such quantity of the liquid as may be required can be directed to the parts requiring lubrication;

fourth, in providing a reservoir below the cutting-dies, ducts through which the lubricant is conveyed to the rear of the cutting-dies, and a duct which conveys the lubricant, after it passes the dies, back to the reservoir.

In illustration of my invention I will proceed to describe it as applied to the improved machine for threading bolts patented by William Sellers, of Philadelphia, December 1, 1857, which patent was reissued to him February 8, 1859, having on its reissue the number 656, and afterward extended for the term of seven years from the 1st day of December, 1871.

In the annexed drawings, Figure 1 represents a sectional elevation of the Sellers bolt-threading machine with my improvements added; Fig. 2, a plan of the same; Fig. 3, a rear end elevation; Fig. 4, a sectional front end elevation, showing lubricating-pump in section; Figs. 5 and 6, enlarged views of the levers through which the stop-motion is operated, and which convey the lubricating-fluid to the dies.

Similar letters refer to similar parts on each.

In the machines the dies A A A are placed in radial grooves in a cylindrical die-holder, B. This die-holder is secured to one end of a hollow spindle, D. To the other end is attached the driving spur-wheel F. Surrounding the die-box B is what is called a cam-box, consisting of cams M M M of equal eccentricity bolted to I on the end of the sleeve H, and having other cams P of similar eccentricity secured to a cover-plate, O. The rotation of sleeve H back and forth around spindle D causes the dies A to be moved in radial directions, thus opening or closing the dies. To the sleeve H is secured a spur-wheel, K, smaller in diameter than the wheel F, and the extent of rotation of H around spindle D is limited by an adjustable stop, at U. The wheels F and K are driven by pinions G and L on shaft E, G being secured to shaft E positively. L is loose on the shaft, but, being pressed toward G by means of a spring, b, on the shaft E, is driven by friction of the surfaces of a leather disk interposed between them. By means of lever V and collar a' the wheel L may be drawn away from G and made to engage in a recess in the leg V, a beveled

collar on wheel L fitting this recess after the manner of friction-clutches. When pinion L is driven by G it tends, by reason of the difference in diameter of the two pairs of wheels, to cause the cam-box to rotate faster than the die-box to the limit allowable by the stop U. This driving ahead of the cam-box closes the dies, but when the motion of wheel L is retarded by the friction on recess in leg V it causes the dies to open.

This, in substance, explains the operation of the Sellers bolt-threading machine as now constructed under his patent, the letters referring to the various parts being the same as were used by him in describing similar parts in his original patent. The more clearly to specify my distinct invention, I will make use of numerals to indicate the addition.

To the machines, as above described, I add a tank, 1, supported on one of the legs of the machine. This tank is to contain oil or other liquid used. For convenience, I shall describe it as containing oil. A pump, 2, driven by an eccentric on shaft E, takes oil from the tank and forces it through pipes 3 and 4, either to the dies or to a hose, 5, which can be used to convey the oil to nuts being tapped. In both of these pipes are stop-cocks or valves to give direction to and control the amount of oil being delivered.

As the pump is operated by the machine, which runs faster on small bolts than on large ones, of course the pump will discharge most oil when working upon the smallest bolts, and the supply of oil must be large enough at the slowest speed, so that regulation between the pump and the dies becomes a necessity to prevent a flood of oil from being thrown out by the very rapid motion of the cutters when operating upon small work. To the pump I add an overflow-valve, 6, which is shown in the form of an ordinary check-valve of commerce, with a light spring over the valve. When both cocks in pipes 3 and 4 are closed, the oil delivered from the pump is discharged back into the tank 1. I am aware that an overflow-valve in a lubricating-pump operated by a bolt-threading machine is not new, but I am not aware that any provision has heretofore been made for obtaining the variable direction and regulated flow required in my improved system of lubricating the dies from the rear through the overflow valve 6, and when partially closed for regulation the surplus oil may be delivered into the tank. Pipe 3 communicates with a stand, 7, attached to leg V. The oil passing through this stand, which is hollow, enters a lever, 8, socketed into the top of stand 7, and then passes into a duct, 9, which fits the spindle D sufficiently tight to prevent leakage of oil under a very light pressure. This duct has a much smaller interior diameter than the hollow spindle, so that the delivery end of the duct in the hollow spindle forms a dam, which prevents the oil from flowing out at the rear of the spindle. In larger machines the duct passes through the

center of a collar, which closes the rear end of the spindle, thus avoiding any necessity for packing, even when the duct fits the collar very loosely. It will be observed the end of lever 8 dips into a recess or socket in the duct 9. This makes any packing at this point needless. Where lever 8 is socketed into the top of stand 7 a light string packing will prevent leakage. By thus carrying the duct through the lever 8 I avoid the necessity of a separate conduit for the oil to the hollow spindle. A prolongation, 10, of lever 8 connects by means of a rod, 11, with a bell-crank latch, 12, hinged to the bed of the machine, which latch, engaging with a catch on lever V, holds the lever V back in the direction it would naturally be forced by the spring on shaft E. In this position the dies remain closed. On lever V I provide an arm, 13, with counter-weight 14, of sufficient amount to draw back the spring on shaft E and force the friction-clutch on wheel L into the recess in leg V with sufficient force to cause the dies to open. This weight 14 is held up during the process of cutting by the bell-crank 12. In the center of the spindle D I provide a rod, 15, guided at one end by a loose collar, 16, the other end being held in the duct 9 by means of a split cone, 17, and clamping-screw 18. This rod can be clamped so that its end nearest to the dies may be at any required position back of the dies suited to the length the bolt is to be threaded. Thus, if it is set so that its end is one inch back of the entering-face of the cutting-dies, when the bolt has been threaded one inch from the point it will come in contact with the end of rod 15. This rod, being secured to the duct 9 by the cone-clamp 17 and screw 18, forces the duct back, and thus, through levers 8 and 10, and rod 11, and bell-crank 12, it unlatches the lever V, and thus allows the weight 14 to fall, driving back the wheel L, and causing the dies to open for the removal of the bolt. When, after the removal of the bolt, the lever V is again latched back, the dies close, ready for the next bolt to be cut. At the hub of lever 8 and stand 7 I provide a coil-spring, 19, to hold rod 15 pressed toward the dies, and cause latch 12 to engage with the catch on lever V.

To operate the machine, the dies being adjusted to the proper size of bolt to be threaded, the stop-rod 15 is fixed in such a position that the latch 12 will be loosened when the bolt has been threaded the proper distance from the point. The machine being put in motion the pump 2 forces oil up through the pipes 3 to stand 7, and then through levers 8 to the spindle, and, finally, it flows out of the die-box in a steady stream, regulated in quantity by the stop-cock in pipe 3. A blank bolt held in the usual manner, in a holder or clamp sliding on the bed of the machine, is pressed into the closed dies as the dies revolve about the bolt, cutting the thread, the oil forced by the pump through the ducts and hollow spindle to the rear of the dies floods the end of the bolt, and

the cutting-dies lubricating the parts in contact, conveying off the heat and washing out the chips by its volume of force. When the bolt end, carried on by the screwing process, reaches the end of rod 15 it actuates the opening-gear and liberates the bolt, while the oil continues to flow out through the dies. The oil flowing out of the center of spindle would accumulate in the bed or trough of the machine were not some means provided to carry it back to the tank from which the pump draws its supply. I therefore provide a spout, 21, secured to the underside of the bed, through which the oil and chips may fall, and be received on a slanting platform, 22, where the chips may gather in a pile, to be removed at leisure, while the oil will flow back into the tank 1.

It will be observed that the devices used to operate the opening machinery form part of the apparatus used to convey oil from the tank to the dies.

In tapping nuts the lubrication of the die-holder is not required, as it is customary to hold the shank of the tap in the die-box, and present the nuts to be cut to the end of the revolving tap by a proper sliding nut-holder. In this case the cock in pipe 3 is closed and the cock in pipe 4 opened, the oil being conveyed to the tap by means of a hose, 5.

The advantage of feeding the oil so that it must flow through the dies, over the plans in common use, of allowing the oil to run onto the bolt being cut, or, at best, squirting it against the face of the dies, or into the die-box from a pipe on the outside and in front, is very great. In the first place, it leaves the front of the dies wholly unobstructed by any kind of oiling device, an important consideration when very short bolts are being cut close up to the head; second, the lubricant, as applied, must flow over the whole surface of the dies, as well as of the bolt, while in any of the methods heretofore in use the portion of the bolt which has passed the front of the dies and the rear of the dies themselves are very liable to be insufficiently lubricated; third, the direction of the current washes the chips from the dies, so that bolt-threading machines arranged with this through lubrication may be run at a higher rate of speed than if oiled in the ordinary manner; and, inasmuch as the possible high rate of rotation is likely to cause the oil to be thrown off from the die-box by centrifugal force, I arrange a guard or cover, 20, to surround the die-box, which serves to catch the oil so thrown off, and directs it into the trough of the machine.

In describing my improved method of oiling I have shown it as I have applied it to the Sellers machine; but it is manifestly also applicable to all bolt-threading machines with revolving dies, whether the dies are made to open and release the bolt at the end of the cut or are arranged as solid dies to be backed off by reversing the direction of rotation. Thus I contemplate its use in connection with a

class of bolt-threading machines which I will illustrate by reference to the patent of Philetus W. Gates, May 8, 1847, describing a solid die for threaded bolts—that is, a die so made as to cut the thread upon the bolt at one operation, with once going over, but requiring to be unscrewed from the bolt when finished. As is well known in the art, these dies are usually rotated at the end of a hollow mandrel, into which mandrel the finished threaded end of the bolt passes as it is cut to a greater or less length. Oil fed into the back end of the spindle of such machines will be expelled through the die-box, so as to meet the bolt entering the dies and present all the advantages of this previous method of lubrication, as claimed for it in its application to the Sellers bolt-threading machine. The arrangement of oiler that permits the oil to gush out from the revolving dies is essentially different from all the methods of supplying the lubricating fluid, inasmuch as its tendency toward the front of the bolt, from behind, aided by the rotation of the die-box, spreads the liquid over the cutting-edges and causes them to be continually immersed in the cooling-liquid, while at the same time, as has been before said, the direction of the current expels the chips as they come from the dies.

The most common form of solid-die machine is provided with a forward and back motion, actuated by clutches, either friction or positive, and such machines have frequently been arranged in such a manner that when the bolt is threaded a proper distance, suitable devices, actuated either by the carriage which holds the bolt or the end of the bolt itself, are made to disengage the clutch from the forward motion and engage it with the back driving motion. To all such machines I contemplate the application of my central stop-rod in combination with the levers which are used to form the connection from the pump to the spindle; but in regard to this application of the stop motion as a means of accomplishing the double purpose, I wish to be understood as not limiting my claim for the application of oil back of the dies to the manner described, or to any of the devices as described, as when no stop motion is required a simple connection by pipe or hose to the back of the hollow spindle, or to any part of the hollow spindle back of the dies, whereby the oil will be made to enter back of the dies and flow around the dies and out of their mouth or holder, I consider within the scope of my invention. This outward flow of the oil, in contradistinction to the pouring it on the bolt or squirting it into the dies from the front, is what I consider an important feature of my invention.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the adjustable stop 15, the latch 12, and the weighted lever V 13, substantially as and for the purposes described.

2. The combination, in a bolt-threading ma-

chine, of a pump operated by the machine, an overflow-valve, and regulating cocks or valves, substantially as and for the purposes described.

3. The combination, with the central adjustable stop 15, of the conical clamp 17, adjusting-nut 18, duct 9, and lever 8, substantially as and for the purposes described.

4. The combination, with the releasing mechanism for opening the dies, of the duct through the lever 8, substantially as and for the purposes set forth.

5. The combination, with a hollow spindle and revolving dies, of a duct, through which the lubricant is introduced to the rear of the

hollow spindle, and thence to the rear of the dies, substantially as and for the purposes set forth.

6. The combination of a reservoir below the cutting-dies, ducts through which the lubricant is conveyed from the reservoir to the rear of the dies, and a duct which conveys the lubricant after it passes through the hollow spindle, and thence to the rear of the dies, back to the reservoir.

COLEMAN SELLERS.

Witnesses:

THEODORE BERGNER,
L. SCHUTTE.