

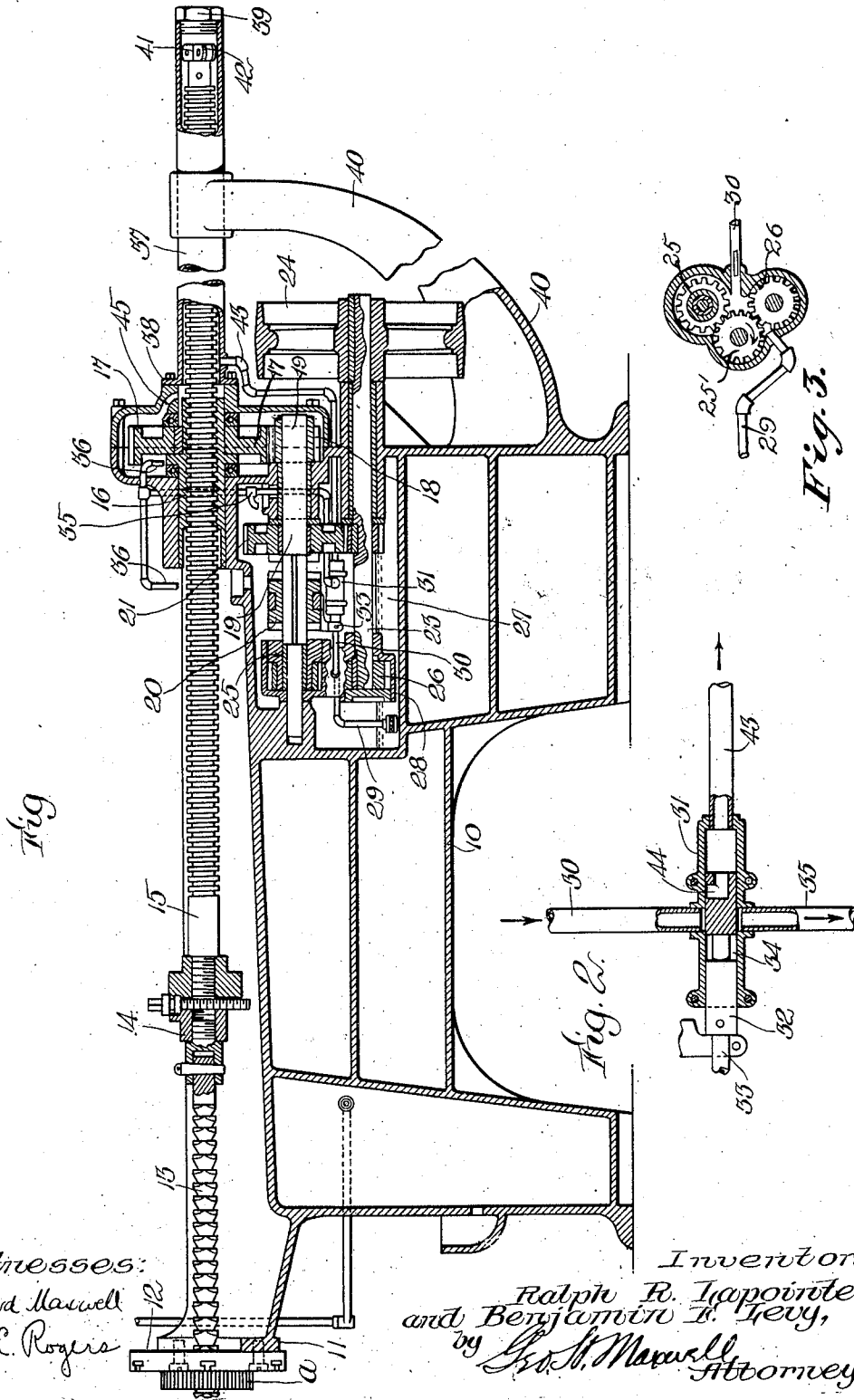
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LUBRICATING SYSTEM.

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Witnesses:

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UNITED STATES PATENT OFFICE.

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LUBRICATING SYSTEM.

1,047,819.

Specification of Letters Patent.

Patented Dec. 17, 1912.

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To all whom it may concern:

Be it known that we, RALPH R. LAPOINTE, a citizen of the United States, and resident of Hudson, county of Middlesex, State of Massachusetts, and BENJAMIN F. LEVY, a citizen of the United States, and resident of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Lubricating Systems, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to an attachment for machines employing a long heavy operating screw, and while having other and more general fields of usefulness, is well adapted for use with broaching machines, being herein shown as applied to a broaching machine of the draw-cut type.

The invention consists in a tubular housing or extension at the rear of the machine in position to receive the outer end of the screw as it is projected outward in the operation of the machine, this housing having its outer end closed and having provision for the continuous circulation of lubricant therethrough. The arrangement is such that the lubricant is given a sort of churning action or agitated movement about the convolutions of the screw in and out of the tubular housing, so that the screw is kept perfectly lubricated at all times and any grit or foreign matter is at once washed off the screw and prevented from doing damage. This tubular housing also serves as a dust guard and protector of the screw from outside dirt and preferably also constitutes an outboard bearing support for the screw.

The invention will be better understood from the following detailed description, taken in connection with the accompanying drawings, and will be thereafter pointed out in the appended claims.

Referring to the drawings, Figure 1 is a central, longitudinal, vertical section through a broaching machine, wherein the invention is embodied, a portion of the tubular housing, screw and outboard support therefor being broken away; Fig. 2 is an enlarged view partly in elevation and partly in section of the controlling valve for directing

the flow of lubricant; and Fig. 3 is a detail cross section showing the gear connection 55 which also serves as a lubricant pump.

The broaching machine herein shown for illustrative purposes is of the horizontal draw-cut type having a base frame-work 10 extended at the front to form a vertical face 11 to which a work holding face-plate 60 12 is fixed, a work piece *a* being shown fixed thereto. The broach 13 is suitably fixed to a crosshead 14 guided in ways at the top of the machine framework, this crosshead having 65 fixed to its other side a long heavy screw 15, held from rotation and reciprocated by a sleeve nut 16, suitably journaled in the upper rear portion of the machine framework. This nut is driven by a gear 17 fixed 70 thereto and in driven engagement with a pinion 18 on a shaft 19 journaled in the framework. The shaft 19 has splined or otherwise slidably fixed thereon a double faced clutch sleeve 20, slidable in one direction 75 for engagement with clutch teeth on a gear 21 loosely mounted on shaft 19 and directly driven by a pinion 22 on a driving shaft 23, journaled in the framework and having a usual driving pulley 24 or the like, 80 the drive through pinion 22 and gear 21 being the operative movement of the machine for drawing the broach through the work. The clutch sleeve 20, upon movement in the opposite direction or to the left 85 in Fig. 1, is engageable with teeth formed in a gear 25 loosely mounted on shaft 19 and driven through an intermediate idler 25' from a pinion 26 fixed on the shaft 23, this connection constituting means for causing 90 the return movement of the broach, and being more fully shown in Patent No. 1,028,825, granted June 4, 1912, to Ralph R. Lapointe, one of the present applicants.

All the driving gearing thus far described 95 is preferably inclosed in a housing formed with the machine framework, as shown, and the framework is fashioned to provide an oil pan or receiver 27 underneath this gearing for receiving the lubricant as it drips there- 100 from. The driving gear connection 25, 26 with the intermediate idler is inclosed in a housing 28 and is adapted to constitute a rotary force pump device, having an inlet pipe 29 for drawing up lubricant from the receiv- 105 ing pan 27 and a pipe connection 30 for de-

livering the oil therefrom to the driving gearing and the tubular housing surrounding the screw. The flow of oil through the delivery pipe 30 is controlled by a valve 31 shown as having its controlling piston 32 connected as at 33 for operation by the clutch sleeve 20. The construction of the controlling piston 32 is such that when it is moved to the right by the clutch 20, as said clutch is connected to drive the broach for its operative movement, the lubricant is permitted to flow past a reduced neck portion 34 of the piston into a pipe 35 which, by suitable branches, delivers the oil to the various parts of the driving gearing requiring the same, as seen at 36.

Our improved sleeve housing or tubular extension for inclosing the outer end of the screw is designated 37 and is suitably clamped to the machine framework, as shown, by means of a flange at its inner end, as seen at 38. The outer end of this tubular extension is closed, as shown, by a screw plug 39 and it is supported at its outer portion by an arm 40 extending up from the machine framework. The screw 15 fits within this tube with some little play, and its outer end is provided with a spider support 41 preferably having rollers 42 or like anti-friction means on its arms for engagement with the walls of the tube 37. A pipe 43 leads from the valve 31 up into the annular space between the tubular extension 37 and the screw, and the piston 32 has a passage 44 in its outer portion adapted when it is moved to the left, *i. e.* when the clutch sleeve is connected with the reverse or return drive to make connection so that the oil at this time is delivered up through the pipe 43, to thus fill the tubular extension 37 with oil as the screw is withdrawn therefrom. Upon the return of the screw into the tubular extension on the next operative stroke, the oil is forced out of the tube through a passage 45 into the housing around the driving gearing, and thence back into the pan 27. It may thus be observed that the oil is given a vigorous agitation or churning action around the screw, as it is projected into the tubular extension, the pump filling the tubular extension as fast as the screw is withdrawn therefrom on the return stroke, and the screw forcing the oil out of the outer portion of the tube past the threads of the screw through the annular space between it and the walls of the tube with considerable force as the screw is moved back into the tube on the operative movement, *i. e.* the movement of the screw to the right in Fig. 1 which draws the broach through the work. In this way the threads of the screw are not only kept perfectly lubricated at all times, but grit, dirt, and other foreign matter which might otherwise lodge in the threads of the screw and cut it and the nut bearings, are

washed away and the driving connection between the screw and nut kept at all times in condition for the highest and most effective serviceability. The tubular extension 37 not only has this prime function of keeping the screw perfectly lubricated and clean, but it also serves as an outboard support for the outer end of the screw, by reason of its spider formation 41 having a bearing and being guided by the walls of the tubular support so that by reason of this support and the support of the other end of the screw in the cross head 14, any binding of the screw in its driving nut is avoided and the most effective transmission of power is attained. The tubular extension 37 is also of great advantage in serving as a dust guard to effectively shield and protect the outer end of the screw from outside dirt and grit, which would otherwise adhere thereto as it is projected rearward from the machine.

It is to be understood that the particular form of broaching machine as herein disclosed is merely illustrative, to show one form of apparatus to which our improved screw lubricating, supporting and protecting tubular extension may be applied, and we therefore do not desire to be limited to the specific details of construction shown, or in any other way, except as set forth in the appended claims.

Having described our invention, what we claim as new and desire to secure by Letters Patent is:

1. An apparatus of the kind described, comprising a framework, an operating screw mounted thereon, means for moving said screw endwise, means for lubricating said screw, and a protecting housing inclosing the outer end of said screw extending out from said framework with its walls in proximity to the threads of said screw and with a closed outer end, whereby the supply of lubricant is conserved in the reciprocation of said screw, said protecting housing for the screw opening into a housing portion of the framework at its inner end.

2. An apparatus of the kind described, comprising a framework, an operating screw mounted thereon, means for reciprocating said screw having an inclosing housing formed with the framework, a protecting tube for said screw extending out from said framework and forming a continuation of said housing, said tube having a closed outer end and with its walls in proximity to the threads of the screw, and means for lubricating said screw, said protecting tube being adapted to conserve the supply of lubricant and cooperating with said screw to return the same to said housing while also serving as a protector from dirt.

3. An apparatus of the kind described, comprising a framework, an operating screw mounted thereon with provision for recip-

rocating the same, a housing extending from said framework with a closed outer end in position for said screw to be projected therein and of a size to loosely fit the same, and means for pumping lubricant into said housing.

4. An apparatus of the kind described, comprising a framework, an operating screw mounted thereon with provision for reciprocating the same, and a tubular housing extending from said framework in position to have said screw projected therein and of a size to fit the same loosely, the outer end of said housing being closed, and said housing having connection for returning oil therefrom as the screw is projected thereinto.

5. An apparatus of the kind described, comprising a framework, an operating screw mounted thereon, driving gearing for reciprocating said screw, said framework having an oil pan beneath said gearing, and a tubular housing extending from said framework in position to have said screw projected thereinto, said housing having a closed outer end and circulatory connections for receiving oil from said pan as the screw is withdrawn, and for returning the oil as the screw is projected thereinto.

6. An apparatus of the kind described, comprising a framework, an operating screw mounted thereon for reciprocation with provision for reciprocating the same, said framework being formed with an oil container, and a tubular housing with a closed outer end extending from said framework in position to have said screw projected thereinto, said housing being adapted to catch drippings of oil from said screw and

to return the same, and being also formed as a dust protector for said screw.

7. An apparatus of the kind described, comprising a framework, an operating screw mounted thereon for reciprocation, gearing for driving said screw, said framework being formed with an oil container beneath said gearing, a tubular housing extending from said framework in position to have said screw projected thereinto, said housing having a closed outer end, and means for forcing lubricant into said housing as the screw is withdrawn therefrom, said housing having a connection for the return of lubricant as the screw is projected thereinto.

8. An apparatus of the kind described, comprising a framework, an operating screw mounted thereon for reciprocation, reversible driving gearing for moving said screw in opposite directions, an oil container beneath said gearing, a tubular housing extending from said framework in position to receive said screw, and lubricant forcing means having controlling connections to deliver lubricant over said driving gearing during operative movement of the screw and as it is projected into said tubular housing, said connections being arranged to divert the flow of lubricant to said tubular housing upon the return movement of the screw in the opposite direction.

In testimony whereof, we have signed our names to this specification, in the presence of two subscribing witnesses.

RALPH R. LAPOINTE.
BENJAMIN F. LEVY.

Witnesses:

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CLYDE L. ROGERS.