J. B. LADD.

PIPE CUTTING-OFF MACHINE.

APPLICATION FILED NOV. 1, 1918.

1,419,936.

Patented June 20, 1922.

4 SHEETS—SHEET 1.

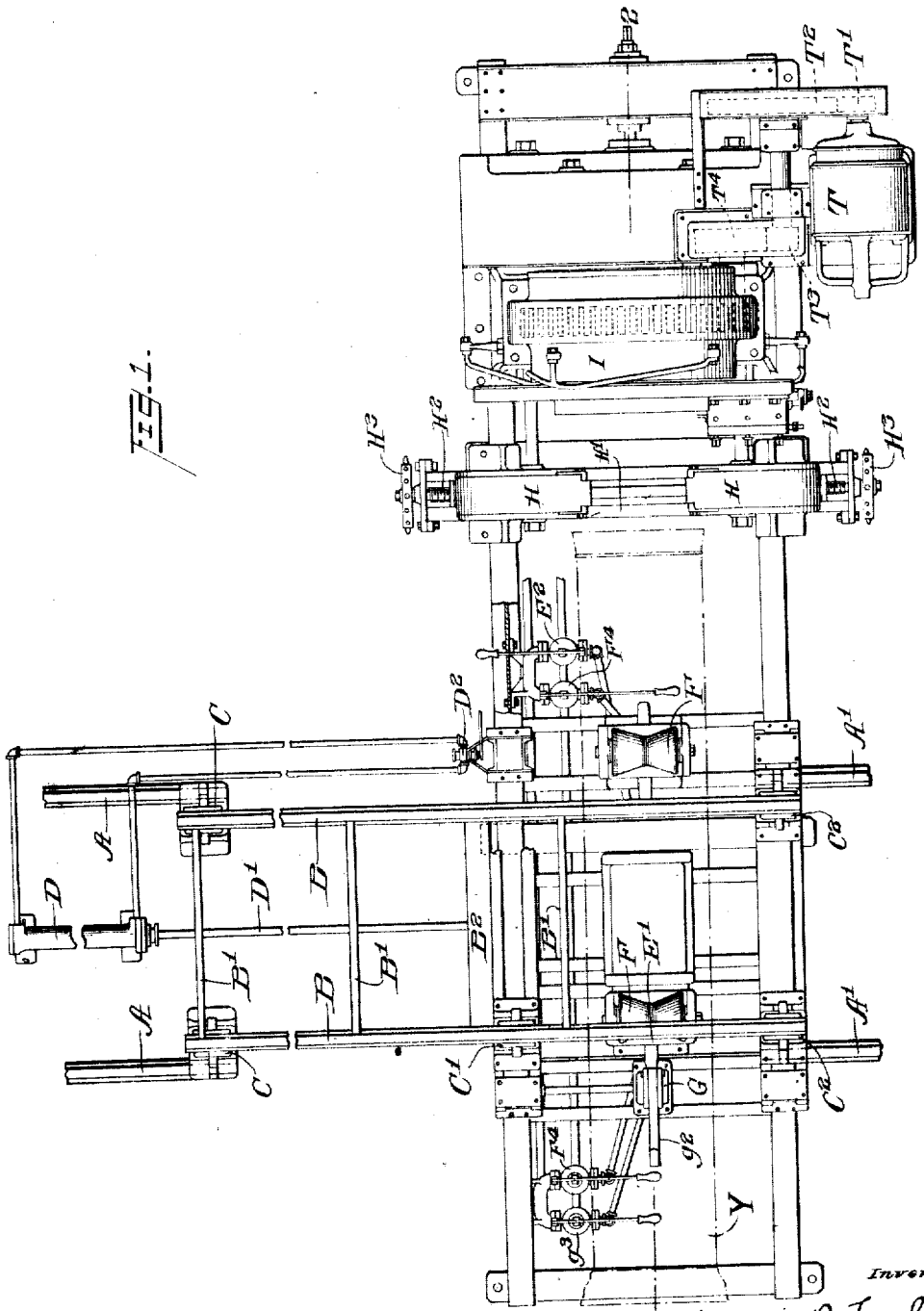


Fig. 1.

Witness:

Harold Stearns

Inventor

James B Ladd

By Francis D Chambers

His Att'y

J. B. LADD.

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4 SHEETS—SHEET 2.

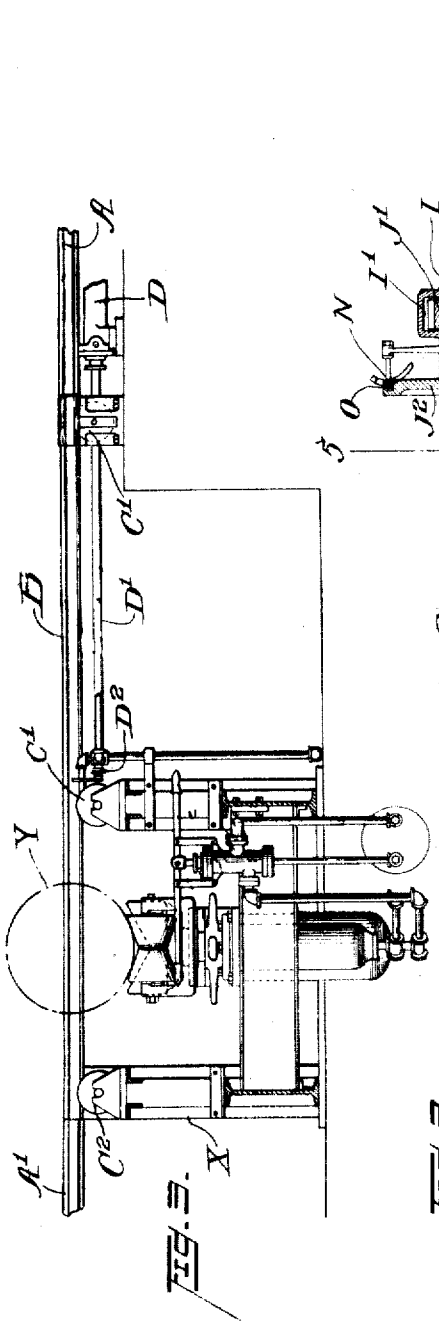


Fig. 3.

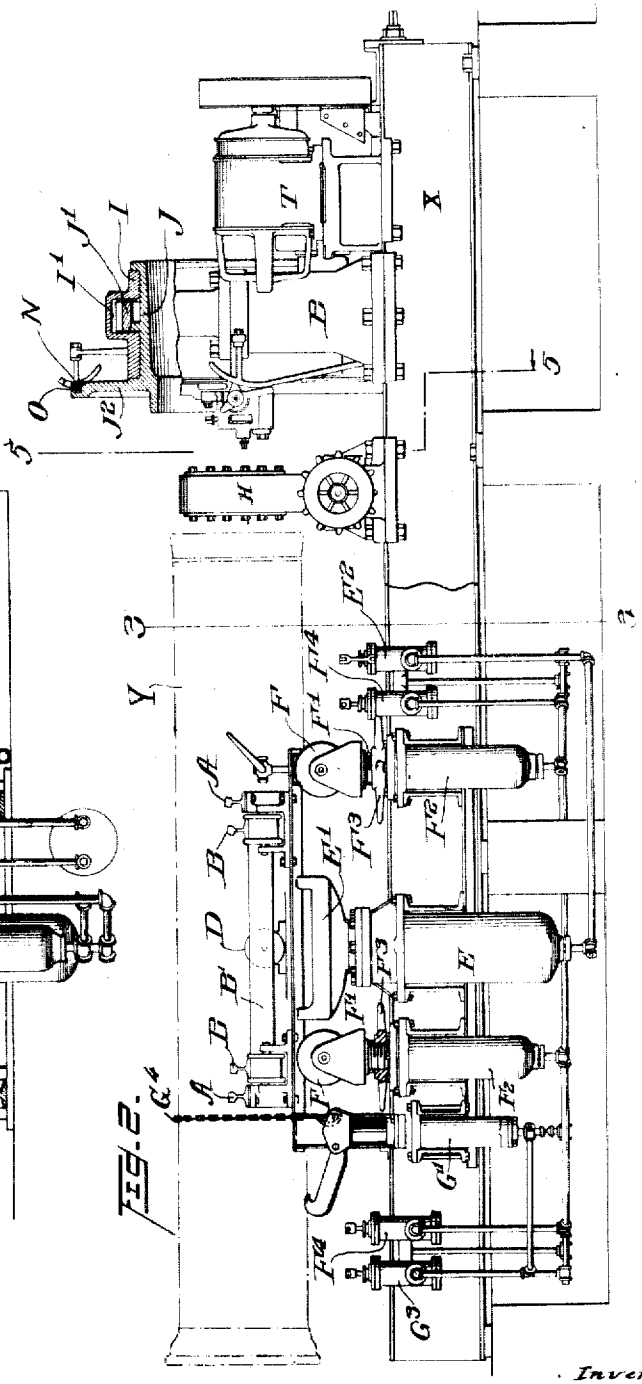


Fig. 2.

Witness:
Harold S. Strauss

Inventor
James B. Ladd
By Francis D. Chamberlain
His Atty.

J. B. LADD.

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4 SHEETS—SHEET 3.

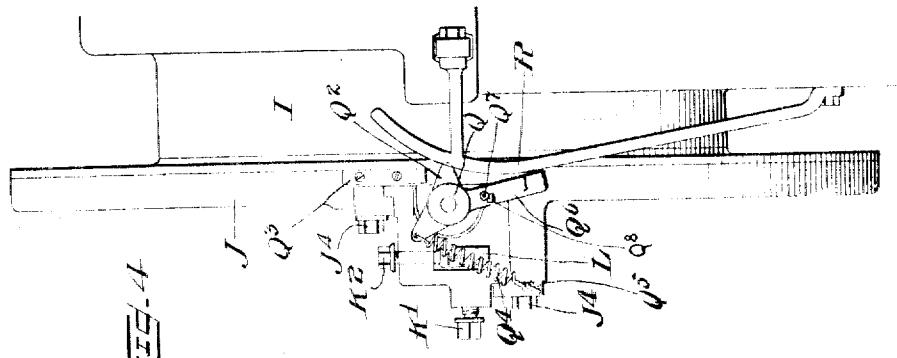


FIG. 4.

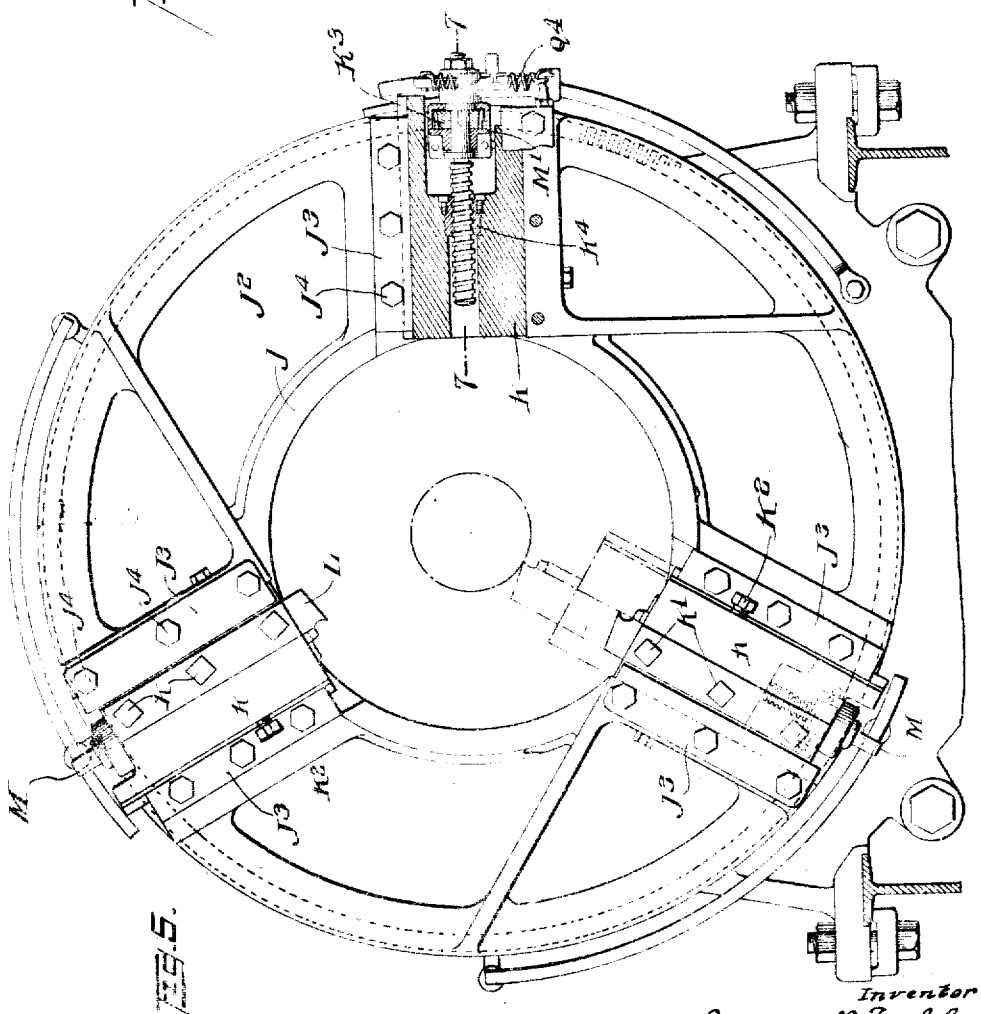


FIG. 5.

Witness:

Harold B. Evans

Inventor

James B. Ladd

By Francis D. Chamberlain

His Att'y

J. B. LADD.

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Patented June 20, 1922

4 SHEETS-SHEET 4.

FIG. 6.

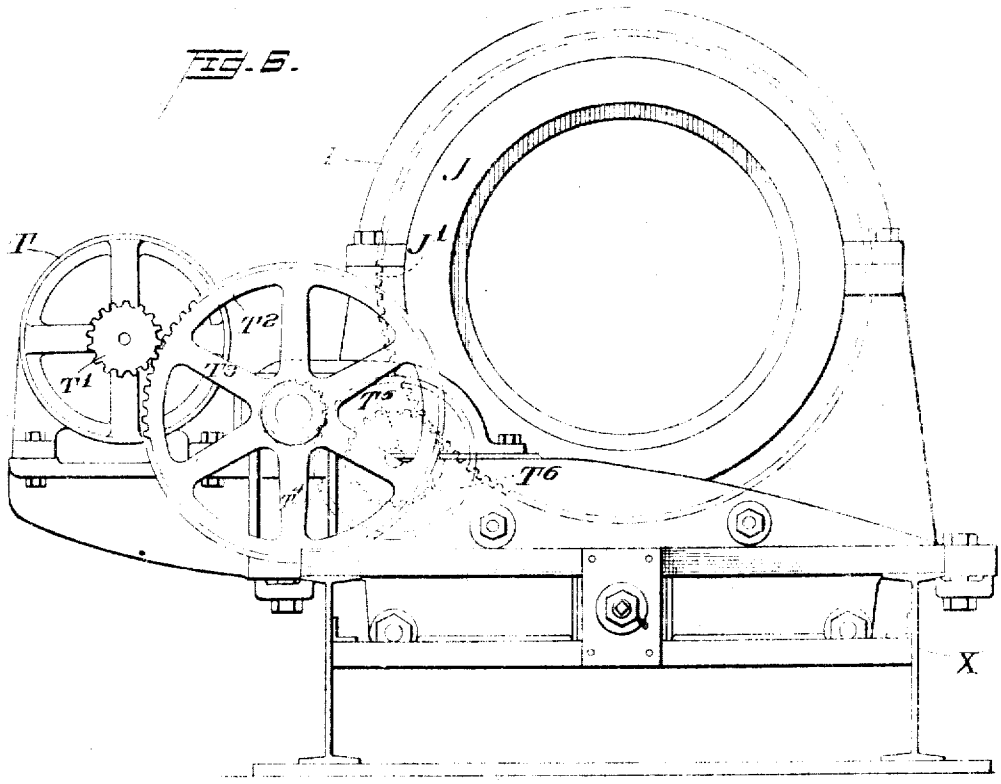


FIG. 7.

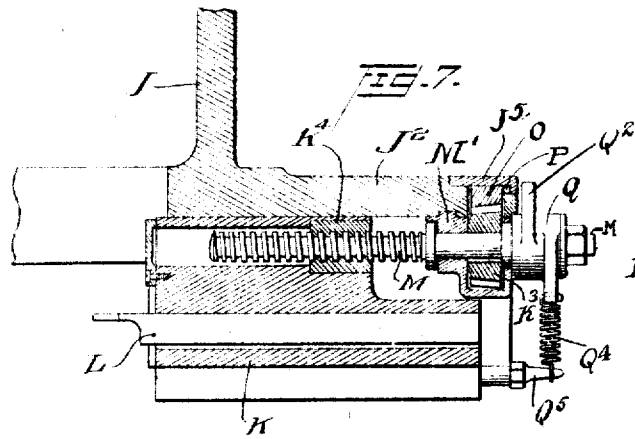
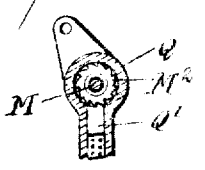


FIG. 8.



Witness:

Harold Stearns

Inventor

James B Ladd

By Francis C Lambert

His Attorney

UNITED STATES PATENT OFFICE.

JAMES B. LADD, OF ARDMORE, PENNSYLVANIA, ASSIGNOR TO UNITED STATES CAST IRON PIPE & FOUNDRY COMPANY, OF BURLINGTON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

PIPE-CUTTING-OFF MACHINE.

1,419,936. Specification of Letters Patent. Patented June 20, 1922.

Application filed November 1, 1918. Serial No. 260,654.

To all whom it may concern:

Be it known that I, JAMES B. LADD, a citizen of the United States of America, and resident of Ardmore, in the county of Montgomery, in the State of Pennsylvania, have invented certain new and useful Improvements in Pipe-Cutting-Off Machines, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My present invention comprises improved mechanism for cutting off pipes, and particularly for cutting off the crop ends of large cast metal pipes, and comprises an improved cutter mechanism proper, and improved means for manipulating the pipes and presenting them to the cutting mechanism, all devised with the general object of expeditiously and economically performing the cutting off operations.

The various features of novelty which characterize my invention are pointed out with particularity in the claims annexed to, and forming a part of this specification. For a better understanding of the invention, however, and the advantages possessed by it, reference should be had to the accompanying drawings and descriptive matter in which I have illustrated and described a preferred embodiment of my invention.

Of the drawings:

Figure 1 is a plan view of the complete cutting-off mechanism.

Figure 2 is an elevation partly in section on the line 2—2 of Figure 1.

Figure 3 is a section on the line 3—3 of Figure 2.

Figure 4 is an elevation of a portion of the apparatus, the view being taken similarly to Figure 2 but on a larger scale.

Figure 5 is a section showing a portion of the apparatus, the view being taken mainly on the line 5—5, but one of the cutter blocks being in section along a plane back of that indicated by line 5—5.

Figure 6 is an end view of the apparatus.

Figure 7 is a section on the line 7—7 of Figure 5, and

Figure 8 is a section of a portion of the apparatus shown in Figure 7.

In the drawings, and referring first to Figs. 1, 2 and 3, AA represents a pair of rails at one side of the cutting mechanism proper along which the pipes to be operated on may be rolled to or away from the cutting mechanism. A′ represents similar rails used for the same purpose arranged at the other side of the cutting mechanism. Associated with the rails A and A′ are longitudinally adjustable rails B, which in the consideration of the apparatus shown in Fig. 1 bridge the gap between the rails A and A′. The two rails B form part of a longitudinally sliding frame or carriage, the rails B being connected by cross braces B′ and B². The rails B are mounted on roller guides C, supported by the stationary frame work of the mechanism. D represents a fluid pressure motor, the piston rod D′ of which is connected to the cross piece B² shown as connecting the rails B near their centers. D² represents a valve for controlling the admission to, and exhaust from the ends of the cylinder D, of the motive fluid for moving the rails B into the position shown in Fig. 1, and to draw them back alongside of the rails A, so that they may then clear a pipe Y occupying the position shown in dotted lines in Figs. 1, 2 and 3. In operation, with the rails B in the position shown in the drawings, the pipe Y may be rolled along either the rails A or A′ into the position shown in Figs. 1, 2 and 3. In this position the pipe Y lies above a cradle or pipe support E′, carried by the piston of a vertically disposed fluid pressure piston and cylinder motor E.

Pressure fluid is admitted to, and permitted to exhaust from the lower end of the cylinder E by means of a valve E². The motor E is employed to lift a pipe previously supported by the rails or skids B off the latter, and thus permit the retraction of the skids B, after which the piston of the motor E is lowered to drop the pipe on to roller supports F, arranged one on each side of the cylinder E. These rollers F are carried by vertically adjustable posts F′, which are shown as externally threaded to receive adjusting nuts F³, which rest on the upper ends of cylinders F⁴. The latter form guides for the threaded posts F′, and valves F⁵ form means for regulating the admission to and exhaust from the lower end of the cylinders of pressure fluid to facilitate the vertical adjustment of the rollers F′. Ordinarily the rollers F need to be vertically adjusted only to accommodate pipes of different diameter.

After a pipe is thus deposited on the roll-

ers F, the pipe may be readily advanced axially to present the end to be cut off to the cutter mechanism mounted in the housing I. Between the housing I and the adjacent roll F is a clamp for the corresponding end of the pipe. This clamp comprises clamping jaws H mounted on a transverse guide H′ and independently adjustable along the latter by means of the adjusting screws H and the hand wheels H^3.

Fluid pressure means are provided for positively holding the opposite end of the pipe to prevent displacement and chattering of the pipe during the cutting off operation. As shown, these means comprise a vertically disposed cylinder G′, a piston G working therein, a valve G^3 controlling the admission to and exhaust from the cylinder G′ of a motive fluid, and a hook G^2 pivoted to the piston G and adapted to catch in the open end of a pipe of normal length when the latter is in the cutting off position. In handling pipes of extra length, such as the pipe Y shown, a chain G^4 is thrown about the pipe and has its ends connected to the piston G. In either case on lowering the piston G, the pipe is securely clamped against the adjacent roller support F.

The cutting-off mechanism proper comprises a hollow cutter head J rotatably mounted in the housing I, which is formed in separate upper and lower sections to permit the ready insertion and removal of the cutter head J. The hub or body of the cutter head has secured to it an encircling spur gear J′, which is received in a channel I′ formed in the housing I and meshes with a driving gear T^6 hereinafter referred to, and employed to rotate the cutter head J. The latter is formed at its end adjacent the pipe with a radial flange J^2 provided with guides for radially adjustable cutter holders K. J^3 represents portions of the cutter holder guides which are detachably secured in place by bolts J^4. Each of the cutter holders K, which may be similar in construction to one another, is formed with a radial passage to receive a threaded adjusting shaft or rod M which works in a nut K^4 shown as forming a detachable part of the sliding cutter holder. The cutters L are detachably secured to the cutter holders K by clamping screws K′ and K^2. At its outer end each of the threaded adjusting shafts M is rotatably mounted in and held against axial movement by a bearing member M′ secured to the cutter head flange J^2. This bearing member is chambered to receive a bevel gear K^3 secured to the corresponding adjusting rod M. The various bevel gears K^3, carried by the adjusting rods M, are all in mesh with a crown gear O in the form of an annulus surrounding the periphery of the flange J^2 proper and held in place by the flanged detachable cover ring J^5. To reduce the frictional resistance to the adjustment of the cutters, antifriction balls P are located in the runway provided between the periphery of the gear annulus O and the adjacent flange portion of the cover ring J^5.

Automatic means are provided for positively rotating one or more, and thereby, through the gears O and K^3, simultaneously rotating all of the adjusting rods M as the member J is revolved. As shown, means are provided for thus directly rotating but one of these rods. The means employed for this purpose comprises a ratchet lever Q journalled about one of the shaft members M and carrying a spring pressed sliding pawl Q′ adapted to engage the teeth of a ratchet wheel M^2 secured to the corresponding shaft member M, which is elongated for this purpose. The ratchet lever Q is provided with an arm Q^2 which normally engages a stop Q^3 carried by the cutter and serving to limit the throw of the lever Q in one direction. A spring Q^4 has one end secured to a hook Q^5 carried by the cutter head and the other end secured to an arm carried by the ratchet lever. This spring normally holds the ratchet lever Q with its arm Q^2 against the stop Q^3. Once during each revolution of the cutter head the arm Q^6 of the ratchet lever Q engages a stationary cam R and thereby oscillates the ratchet lever Q. The amount of oscillatory movement thus imparted to the ratchet lever depends upon the normal position of the ratchet lever, which, as before explained depends in turn upon the setting of the stop Q^3. Each oscillatory movement thus imparted to the ratchet wheel gives a corresponding angular movement to the adjusting shaft M on which the ratchet lever is journalled, and since all of the adjusting shafts M are connected through the gears O and K^3, all of the cutter holders are correspondingly moved inward. The sliding pawl Q^1 is provided with a projection Q^7 working in a suitably shaped slot Q^8 in the portion of the ratchet lever in which the pawl is mounted, and by adjusting the projection Q^7 in the slot Q^8, the pawl Q′ may be locked out of operation. This is done when it is desired to retract the sliding cutters at the end of a cutting-off operation. The retraction of the sliding cutters is actually effected by means of a socket wrench applied to the square outer end of either of the two shafts M on which the ratchet lever Q is not mounted.

While in accordance with the provisions of the statutes I have illustrated and described the best form of my invention now known to me, it will be apparent to those skilled in the art that changes may be made in the form of my invention without departing from its spirit, and that some fea-

tures of my invention may sometimes be used to advantage without a corresponding use of other features.

Having now described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a pipe cutting-off machine, the combination with a rotary cutter head, of means for moving a pipe into and out of an operative position relative to said cutter head, comprising supports on which said pipe may rest in axial alignment with the cutter head and along which the pipe may be adjusted longitudinally of said axis, a pipe carriage horizontally movable transversely to the cutter head axis and comprising arms located at a higher level than said supports and moved by the horizontal movement of the carriage into and out of a position in which they cross the vertical plane including the cutter head axis, and a vertically acting jack adapted to move a pipe between one position in which it rests upon said roller support and a second position in which it is located above said arms.

2. In a pipe cutting-off machine, the combination with a rotary cutter head, of means for moving a pipe into and out of an operative position relative to said cutter head, comprising a pair of supports on which said pipe may rest in axial alignment with the cutter head and along which the pipe may be adjusted longitudinally of said axis, a vertically acting jack located between said supports and having pipe engaging provisions at its upper end for moving said pipe between one position in which it rests upon said supports and a second more elevated position, and arms horizontally movable transversely to the cutter head axis between one position in which they straddle said jack and extend beneath a pipe supported in said elevated position and a second position in which they clear a pipe in the movement of the latter between said two positions.

3. In a pipe cutting-off machine, the combination with a rotary cutter head, of means for moving a pipe into and out of an operative position relative to said cutter head comprising supports on which said pipe may rest in axial alignment with the cutter head and along which the pipe may be adjusted longitudinally of said axis, a vertically acting jack adapted to move a pipe between one position in which it rests upon said supports and a second more elevated position, stationary track rails running toward the cutter head axis but terminating a substantial distance at one side of the latter, and a pipe carriage horizontally movable transversely to the cutter axis for transferring the pipe from said rails to said jack at a level between the levels of said two pipe positions.

4. In a pipe cutting-off machine the combination with a rotary cutter head, of means for moving the pipe into and out of, and for holding it in an operative position relative to said cutter head, comprising vertically adjustable roller supports for the under side of the pipe only on which pipe may rest in axial alignment with the cutter head and along which the pipe may be adjusted longitudinally, and means engaging the pipe and holding the latter stationary in operative relation with said cutter head, said means comprising a jaw clutch engaging the end of the pipe adjacent the cutter head, and a fluid pressure motor for clamping the pipe against the roller support which is more remote from the cutter head.

JAMES B. LADD.