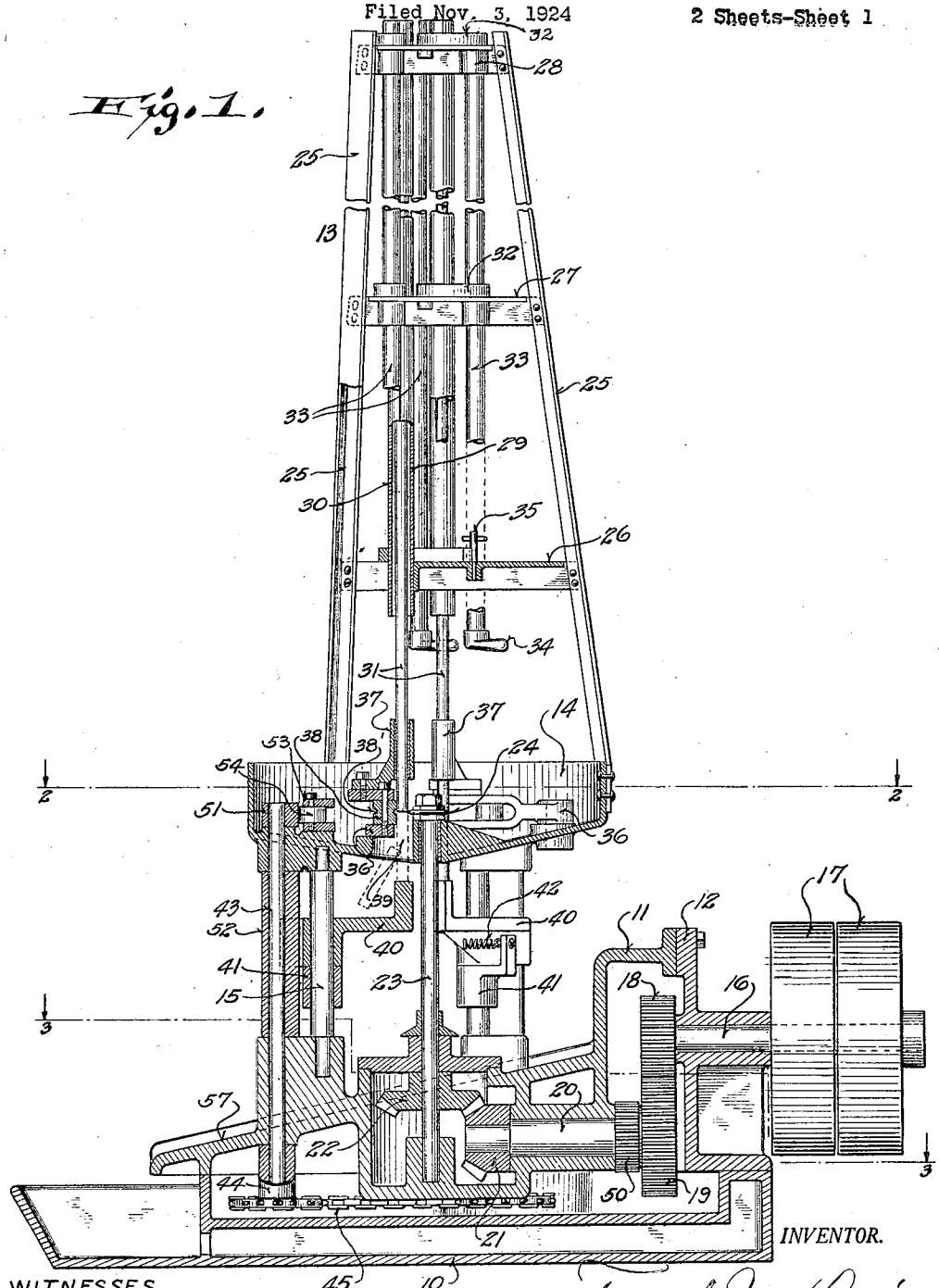
Dec. 20, 1927. 1,653,257

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PIPE CUTTING-OFF MACHINE

Filed Nov. 3, 1924 2 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

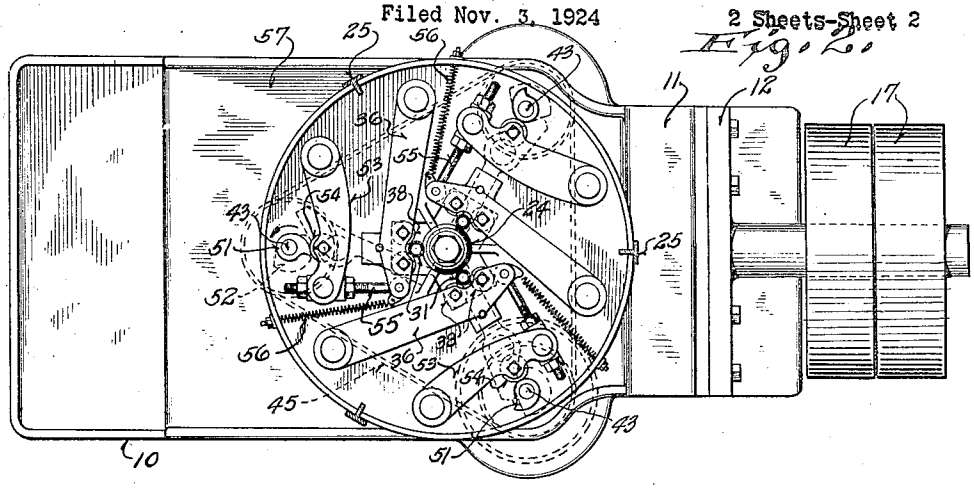


Fig. 3.

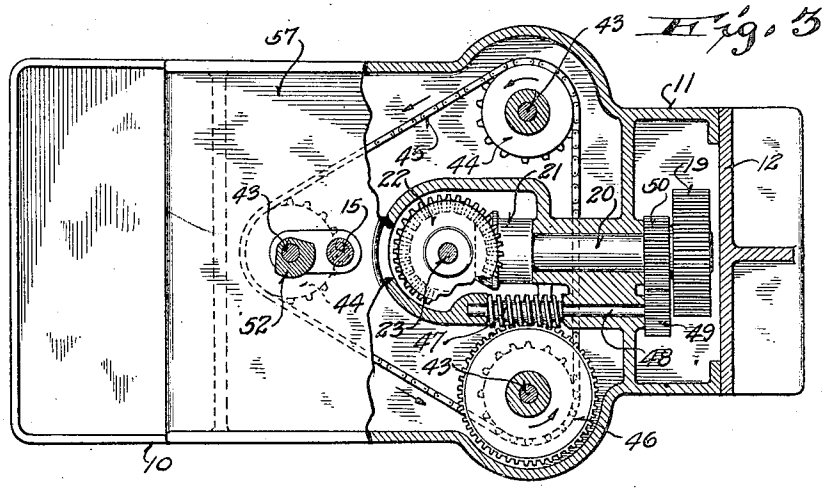
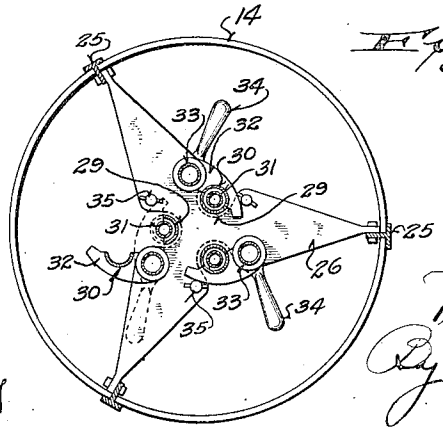


Fig. 4.



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UNITED STATES PATENT OFFICE.

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PIPE-CUTTING-OFF MACHINE.

Application filed November 3, 1924. Serial No. 747,526.

The invention relates to pipe cutting-off machines for cutting pipes into nipples or other desired lengths in large quantities.

An object of the invention is to provide a pipe cutting-off machine for this purpose in which the pipes are vertically disposed for gravity feed to cutting-off position.

Another object of the invention is to provide a machine of this character in which a plurality of pipes are cut at different points on a single cutting member.

A further object is to arrange the cycles of operation on a plurality of pipes to avoid excessive peak loads.

A further object is to provide means for gauging the work as it descends into cutting position and for releasing the gauging member at the beginning of the cutting operation to avoid interference during the cutting operation and separation of the pieces.

A further object is to provide novel means for the placement and support of the pipes during the cutting operations.

The invention further consists in the several features hereinafter set forth and more particularly defined by claims at the conclusion hereof.

In the accompanying drawings: Fig. 1 is a sectional elevation of a pipe cutting-off machine embodying the invention;

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1; and

Fig. 4 is a horizontal sectional view through the pipe-supporting tower.

In these drawings, 10 indicates a base forming an oil sump on which is mounted a gear housing 11 and a cover 12 which encloses one end of the housing. A pipe supporting tower 13 is secured to an upwardly flanged casing 14 receiving the cutting-off mechanism, the casing being mounted above the gear housing by cylindrical spacing members 15 to form a supporting frame therewith.

A drive shaft 16 is journalled in the cover 12 and carries pulleys 17 on its outer end and a gear 18 on its inner end within the housing meshing with a gear 19 secured to the outer end of a shaft 20 journalled in the gear housing. The inner end of the shaft 20 carries a bevel gear 21 meshing with a similar gear 22 secured to a vertically disposed shaft 23 journalled in the gear housing and extending upwardly into the casing 14 in which it is also journalled. A cutting wheel 24 is secured to the upper end of the shaft 23 within the casing with its cutting edge projecting beyond the bearing in which the shaft is journalled.

The pipe supporting tower 13 comprises a number of upwardly converging T-bars 25 or other suitable structural members secured at their lower ends to the flange of the casing 14 and held in spaced relation by a series of horizontally disposed and vertically spaced tie plates 26, 27, 28. Vertically disposed semi-tubular pipe supporting members 29 are secured to the plates and are closed by complementary movable semi-tubular members 30 to form tubular supports adapted to receive pipes 31. The movable members 30 are each mounted on a series of levers 32 secured to common vertically disposed operating shafts 33 journalled in the tie plates at a distance from the semi-tubular members and having hand levers 34 at their lower ends by which they are turned. The movable members 30 are held in their closed position by removable plugs 35 inserted in the lowest tie plate 26 and bearing against the levers 32 to prevent their outward movement.

A series of levers 36 are pivotally mounted near the outer portion of the casing 14 and extend inwardly adjacent the edge of the cutting wheel 24 below the tubular pipe-receiving members. Each of the pipes is guided at its lower end through a tubular guide bracket 37 secured to and extending above each lever 36, which is provided with a pair of rollers 38 to bear on the pipe opposite the edge of the cutting wheel, each roller being provided with an annular groove 38′ directly opposite the cutting edge of the wheel.

The pipes are inserted from above through the guide brackets 37 after the pipe supporting members 30 have been swung out on their levers by the hand levers 34 to permit the placement of the pipes in the stationary semi-tubular members 29, whereupon the movable semi-tubular members 30 are swung inwardly to cooperate with the members 29 in forming tubular housings for the pipes, being held in place by the plugs 35 which are inserted into their openings in the tie plates to bear against the levers 32. The pipes are then permitted to descend past the cutting

wheel through openings 39 in the bottom of the casing 14 and against swingable gauge members 40 pivotally mounted on the cylindrical spacing members 15 and vertically adjustable to obtain pieces of desired length by subjacent collars 41 on the spacing members, the gauging members being urged to gauging position by springs 42 connecting them and the collars.

A series of vertically disposed cam shafts 43 are journalled near opposite ends in the casing 14 and gear housing 11 and carry sprockets 44 at their lower ends connected by a driving chain 45 by which they are rotated at the same rate of speed. A worm wheel 46 is secured to one of the cam shafts and meshes with a worm 47 on a shaft 48 horizontally journalled in the gear housing and having a gear 49 mounted on one end. The gear 49 meshes with a gear 50 on the shaft 20 and thus effects the rotation of the cam shafts.

The cam shafts 43 carry cams 51 at their upper ends within the casing 14 and cams 52 extending between the casing 14 and the gear housing 11. Levers 53 are pivotally mounted in the casing 14 to swing horizontally in approximately parallel relation to the levers 36 and carry rollers 54 against which the cams 51 bear to move the levers. The levers 53 and 36 are connected by links 55, which are adjustable to vary the distance from the edge of the cutting wheel to the rollers on the levers 36 and thereby accommodate different pipe diameters. The lever assemblies comprising the levers 53 and 36 and their links are held retracted away from the cutting wheel and against the respective cams 51 by springs 56 connected between the free ends of the levers 36 and the outer flange of the casing. The cams 52 serve to swing the gauge members 40 out of gauging position at the proper time in the cycle of operation and are of sufficient length to act upon the gauge members in any of their vertically adjusted positions.

In operation, after the pipes have been placed in their tubular supports with their lower ends resting on the gauge members, as hereinbefore described, the cutting wheel shaft and cam shafts are set in rotation. The cams 52 press on the rollers 54 to swing the levers 53 which through the links 55 swing the levers 36 towards the cutting wheel. The rollers 38 on the levers 36 then press the pipe into the cutting wheel which rotates the pipe and gradually cuts through the wall, the annular grooves 38′ on the rollers affording relief space for the burrs which are produced. The gauge members 40 are swung out of gauging position by the cams 52 as soon as the cutting wheel has a purchase on the pipes, the pipe being then supported by the cutting wheel and permitting the severed pieces to drop onto an incline 57 on the gear housing along which they roll out of the way. The pipes being completely enclosed through most of their length are restrained against excessive lateral movement which would cause bending, especially in the smaller pipe sizes.

The cutting-off operation proceeds simultaneously on all the pipes, but the individual cycles of operation on the pipes overlap in order to avoid an excessive peak load on the machine, as indicated in Fig. 2 of the drawings, where the cams 51 are shown to be one-third of a revolution apart with respect to identical events in the cycle. However, in some instances it is desirable to have the individual operations placed in synchronism since the radial load on the cutting wheel shaft will then be substantially reduced by balancing the inward pressure on the cutting wheel.

The vertical disposition of the machine permits a gravity feed of the pipes to cutting-off position and effects a saving of floor space. After the pipes have been placed in position in the tower and the operator has made adjustments for the pipe diameter and length of pieces to be cut, the cutting-off proceeds automatically and rapidly, which makes it possible to produce large quantities of pieces in a short period of time.

What I claim as new and desire to secure by Letters Patent is:

1. In a cutting-off machine, the combination of a rotatable cutting member, work-supporting means disposed above said cutting member for gravity feed of the work to cutting position, means for limiting the downward movement of the work past the cutting member, means for effecting engagement of the work with the cutting member for successively severing pieces from the work and means for moving said work-limiting means out of engagement with the work during the cutting-off operation.

2. In a cutting-off machine, the combination of a rotatable cutting member, work-supporting means disposed above said cutting member for gravity feed of the work to cutting position, means for limiting the downward movement of the work past the cutting member, and means for urging the work against said cutting member for successively severing pieces from the work.

3. In a cutting-off machine, the combination of a rotatable cutting member, work-supporting means disposed above said cutting member for gravity feed of the work to cutting position, a gauge member for limiting the downward movement of the work past the cutting member, and means for urging the work against said cutting member for successively severing pieces from the work, said gauge member being movable out of engagement with the work during the cutting-off operation.

4. In a cutting-off machine, the combination of a rotatable cutting member, complementary work-supporting members disposed above said cutting member and adapted to be closed about the work for gravity feed of the work to cutting position, means for limiting the downward movement of the work past the cutting member, and means for urging the work against said cutting member for successively severing pieces from the work.

5. In a cutting-off machine, the combination of a rotatable cutting member, complementary semi-tubular members disposed above said cutting member and adapted to form a work-supporting tube, one of said members being movable relative to the other to permit lateral placement of the work within said members for gravity feed of the work to cutting position, means for limiting the downward movement of the work past the cutting member, and means for urging the work against said cutting member for successively severing pieces from the work.

6. In a cutting-off machine, the combination of a rotatable cutting member, work-supporting means disposed above said cutting member for gravity feed of a plurality of work lengths to their respective cutting positions adjacent said cutting member, means for limiting the downward movement of the work lengths past the cutting member, and means for urging the work against said cutting member to successively sever pieces from the work.

7. In a cutting-off machine, the combination of a rotatable cutting member, work-supporting means disposed above said cutting member for gravity feed of the work to cutting position, an adjustable gauge member disposed below said cutting member for limiting the downward movement of the work by its impingement thereon, means for urging the work against said cutting member for successively severing pieces from the work, and cam means for moving said gauge member out of engagement with the work during the cutting-off operation.

8. In a pipe cutting-off machine, the combination of a rotatable cutting member, work-supporting means disposed above said cutting-member for gravity feed of the work to cutting position, an adjustable gauge member disposed below said cutting member for limiting the downward movement of the work by its impingement thereon, a lever movable relative to said cutting member and having rollers adapted to bear against the work, and means operatively connected to said lever for urging the work against said cutting member to successively sever pieces from the work.

9. In a pipe cutting-off machine, the combination of a rotatable cutting member, work-supporting means disposed above said cutting-member for gravity feed of the work to cutting position, an adjustable gauge member disposed below said cutting member for limiting the downward movement of the work by its impingement thereon, a lever movable relative to said cutting member and having rollers adapted to bear against the work, a guide member movable with said lever and adapted to receive the work therethrough, and cam means operatively connected to said lever for urging the work against said cutting member to successively sever pieces from the work.

10. In a pipe cutting-off machine, the combination of a rotatable cutting member, work-supporting means disposed above said cutting-member for gravity feed of the work to cutting position, an adjustable gauge member disposed below said cutting member for limiting the downward movement of the work by its impingement thereon, a lever movable relative to said cutting member and having rollers adapted to bear against the work, a guide member movable with said lever and adapted to receive the work therethrough, cam means operatively connected to said lever for urging the work against said cutting member to successively sever pieces from the work, and cam means for moving said gauge member out of engagement with the work during the cutting-off operation.

11. In a pipe cutting-off machine, the combination of a power-driven cutting member, work-supporting means disposed above said cutting member for gravity feed of the work to cutting position, an adjustable gauge member disposed below said cutting member for limiting the downward movement of the work by its impingement thereon, a lever movable relatively to said cutting member and having rollers adapted to bear against the work, cam means operatively connected to said lever for urging the work against said cutting member for successively severing pieces from the work, and cam means for laterally moving said gauge member out of engagement with the work, whereby the work is supported by the cutting member during the cutting-off operation.

12. In a pipe cutting-off machine, the combination with a supporting frame, of a power-driven rotatable cutting member disposed thereon, pipe-supporting means disposed above said supporting frame for gravity feed of the pipe to cutting position, an adjustable gauge member disposed below said cutting member for limiting the downward movement of the pipe by its impingement thereon, a lever pivotally mounted on said supporting frame and having pipe-engaging rollers adjacent said cutting member, a second lever pivotally mounted on the frame and having an adjustable link con-

nection with said first-named lever for communicating movement thereto, and cam means operatively connected to said second lever for urging the pipe against said cutting member to successively sever pieces from the pipe.

13. In a pipe cutting-off machine, the combination of a supporting frame having spaced upper and lower portions, a shaft extending upwardly into said upper portion and journalled therein, a cutting wheel secured thereto at said upper portion, a pipe-supporting tower secured to said frame, tubular pipe-enclosing elements secured to said tower for gravity feed of the pipe to cutting position, an adjustable gauge member disposed below said cutting member and between the upper and lower portions of the frame, a lever pivotally mounted in the upper portion of the frame and movable relative to said cutting wheel and having rollers adapted to bear against the pipe, a cam shaft extending between the upper and lower portions of the frame and journalled therein, a cam at the upper end of the shaft operatively connected to said lever for urging the pipe against said cutting wheel to successively sever pieces from the pipe, and a second cam on said shaft between the upper and lower portions of the frame for laterally swinging the gauge member in any of its adjusted positions out of engagement with the pipe during the cutting-off operation.

14. In a cutting-off machine, the combination of a rotatable cutting member, means for supporting a plurality of rotatable work pieces in different spaced cutting positions adjacent and about said cutting member, and means for concurrently urging the work pieces against said cutting member to sever sections from the work pieces.

15. In a cutting-off machine, the combination of a rotatable cutting member, means for supporting a plurality of rotatable work pieces in respective spaced cutting positions adjacent and about said cutting member, and means for concurrently urging said work pieces against said cutting member in asynchronous cycles of operation to sever sections from the work pieces.

16. In a cutting-off machine, the combination of a rotatable cutting member, means for supporting a plurality of rotatable work pieces in respective cutting positions adjacent said cutting member and about its axis of rotation, and means for concurrently effecting the engagement of the work pieces with said cutting member.

17. In a cutting-off machine, the combination of a rotatable cutting member, means for supporting a plurality of work pieces in different spaced cutting positions about said cutting member, and means for urging the work pieces inwardly against said cutting member along different angularly related paths to sever sections from the work pieces.

18. In a cutting-off machine, the combination of a rotatable cutting member, means for supporting a group of work pieces in respective cutting positions adjacent said cutting member, said group of work pieces surrounding said cutting member, and means for independently urging said work pieces inwardly into engagement with said cutting member to sever sections from the work pieces and to at least partially offset radial thrusts on said cutting member.

In testimony whereof, I affix my signature.

FRANK M. DAVIS.