March 10, 1925. 1,529,576

C. M. COLLINS

SCREEN PIPE CUTTING MACHINE

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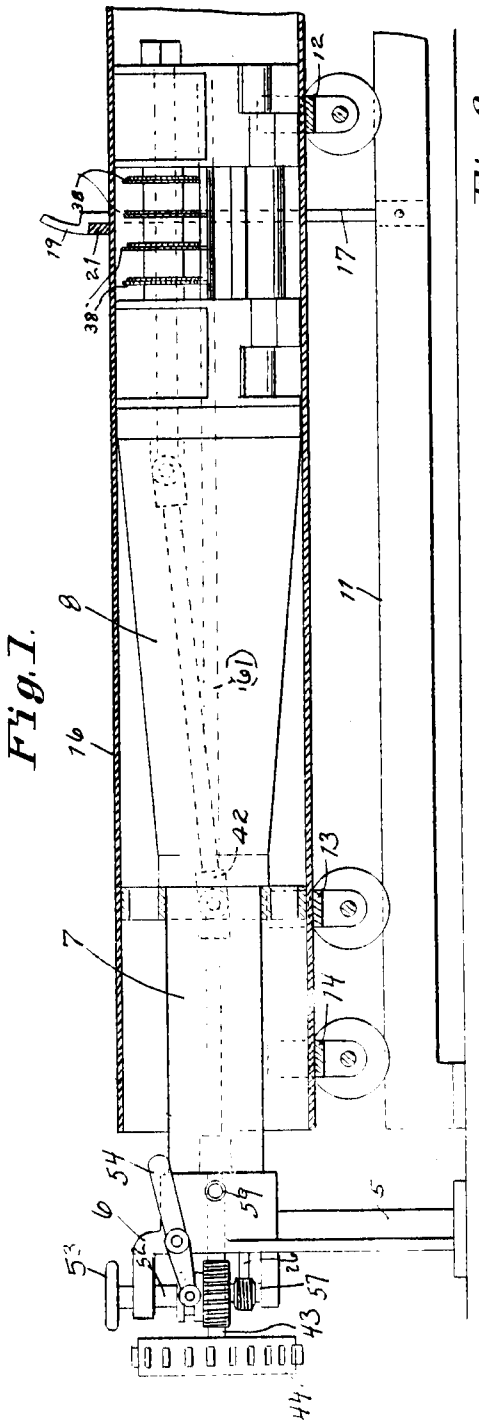


Fig. 1.

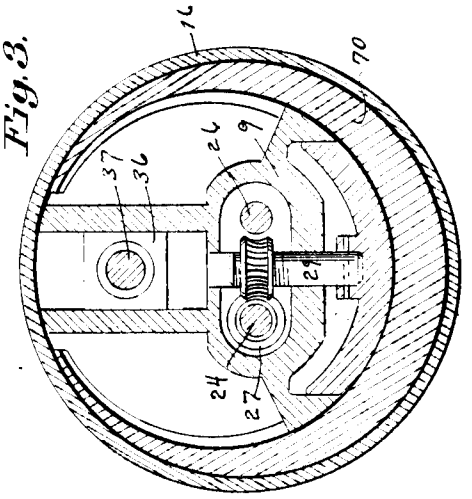


Fig. 3.

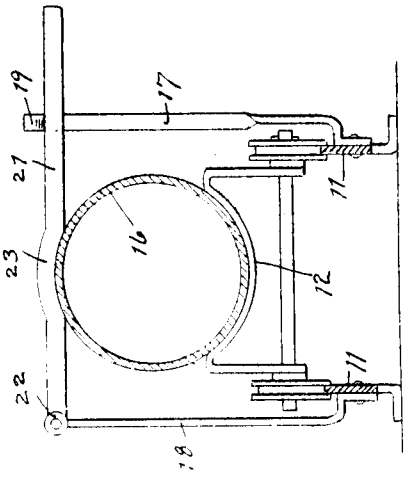


Fig. 2.

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Fig. 4.

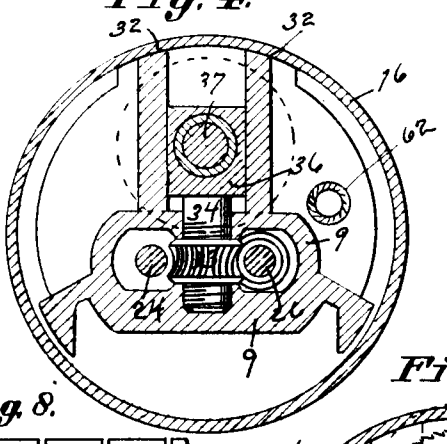


Fig. 5.

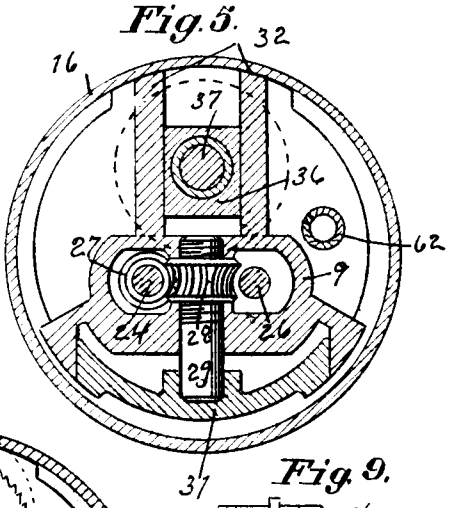


Fig. 8.

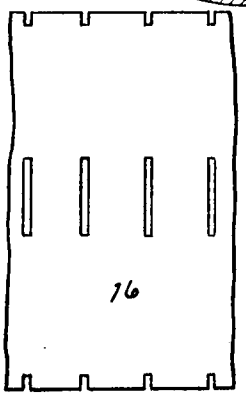


Fig. 6

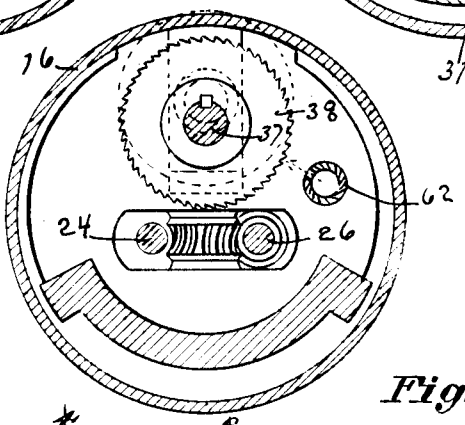


Fig. 9.

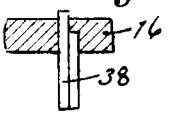


Fig. 10.

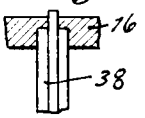
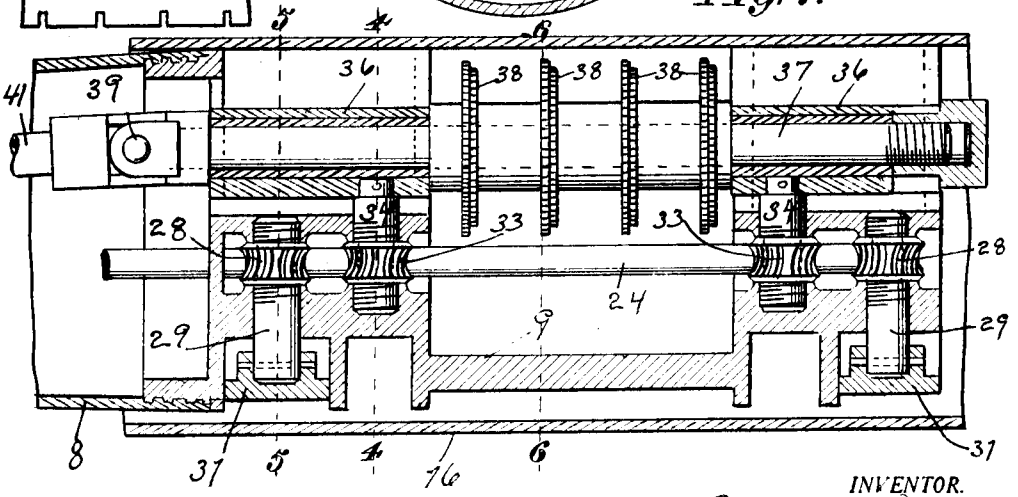


Fig. 7.



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Fig. 11.

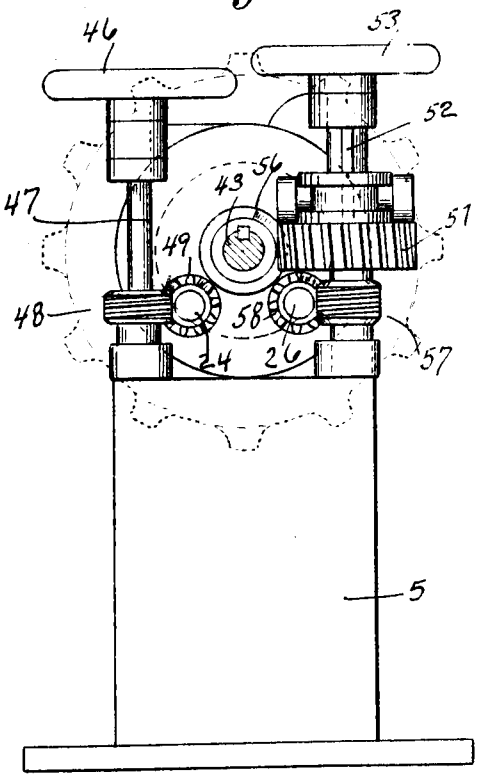
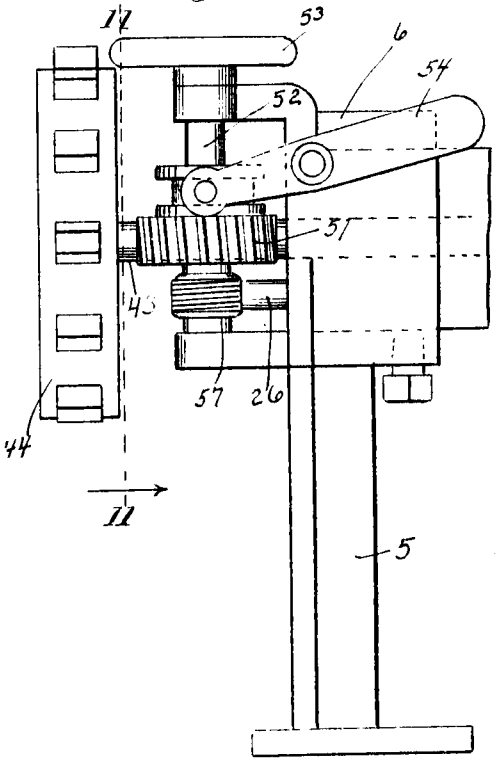


Fig. 12.



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Patented Mar. 10, 1925. 1,529,576

UNITED STATES PATENT OFFICE.

CHARLES M. COLLINS, OF LOS ANGELES, CALIFORNIA.

SCREEN PIPE-CUTTING MACHINE.

Application filed August 31, 1923. Serial No. 660,409.

To all whom it may concern:

Be it known that I, CHARLES M. COLLINS, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Screen Pipe-Cutting Machines, of which the following is a specification.

This invention relates to improvements in screen pipe cutting machines and has particular reference to the internal cutting of well casings for the purpose of forming a strainer out of the casing.

Another object is to produce a device of this character which may be employed with casings of different sizes.

A still further object is to provide means whereby the cutting elements may be accurately and automatically fed and adjusted for the proper cutting.

A still further object is to provide means whereby the pipe being operated upon may be readily shifted for the purpose of making new cuts.

Other objects and advantages will be apparent during the course of the following description.

In the accompanying drawings forming a part of this specification, and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a side elevation of my device, showing a pipe in cross section in the position to be operated upon,

Figure 2 is an end elevation of a pipe showing the manner of supporting and gripping the same,

Figure 3 is a cross section similar to the cross section shown in Figure 5, showing the manner of gripping the interior of a large pipe,

Figure 4 is a cross section taken on the line 4—4 of Figure 7, showing the cutter feed mechanism,

Figure 5 is a cross section taken on the line 5—5 of Figure 7, showing the pipe gripping mechanism,

Figure 6 is a cross section taken on the line 6—6 of Figure 7, showing the relative position of the cutters within the pipe being operated upon,

Figure 7 is a vertical cross section of my cutter head as a whole,

Figure 8 is a fragmentary detail view showing a section of casing which has been cut by my device,

Figure 9 is a fragmentary detail view showing a cutter operating upon a section of pipe to produce a shoulder cut,

Figure 10 is a similar view to Figure 9, showing the cutter producing a double shoulder,

Figure 11 is an end elevation of my device, taken on the line 11—11 of Figure 12, and

Figure 12 is a side elevation of Figure 11.

In drilling for oil in sandy countries, it is often necessary to employ a strainer at the bottom of the well in order that the fluid being pumped may pass therethrough, while the sand is held back as much as possible. Heretofore, it has been a tedious operation to perform the cutting operation on the interior of the pipe of well casings, to produce the proper type of strainer. I have therefore produced a machine which will readily perforate a long length of pipe performing the work accurately and speedily.

In the accompanying drawings wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 5 designates a standard having a casting 6 mounted thereon. From this casting projects a tubular member 7 to which is in turn secured a flared member 8. To the flared end of this last mentioned member is threadedly attached a casting 9 which casting supports the cutting mechanism and the adjusting mechanism.

Parallel spaced tracks 11 are positioned beneath the members 7, 8 and 9 and serve to support wheeled trucks 12, 13 and 14. These wheeled trucks in turn support the pipe to be operated upon which is designated by the numeral 16. This pipe is held against movement while being operated upon through the medium of bars 17 and 18 which are connected to the parallel tracks 11. The bar 17 is provided with a hook end 19, while the bar 18 is provided with a lever 21 pivoted at 22 and adapted to have its free end engaged beneath the hook 19. This brings the curved portion 23 of the lever 21 in contact with the pipe 16.

Referring now to Figures 4, 5, 6 and 7, it will be noted that the casting 9 has journaled therein parallel shafts 24 and 26 each of which have worms positioned thereon which worms are adapted to mesh with their respective gears for the purpose of accomplishing specific adjustments. The worms mounted upon the shaft 24 are designated

by the numeral 27 and mesh with worm gears 28 threadedly mounted on pusher pins 29 which pusher pins are each attached to a shoe as shown at 31, which shoe is in turn adapted to contact the interior of the pipe 16 so as to force the upper portion of the casting 9 as shown at 32 into contact with the upper interior surface of the pipe.

From this construction it will be seen that the rotation of the shaft 24 will cause the gears 28 to rotate so as to move the pins 29 either up or down depending upon the direction of rotation of the shaft 24. This movement will result in the shoes 31 being moved into or out of contact with the interior of the pipe. It is, of course, understood that the pins 29 are threadedly engaged by the gears 28 which are mounted thereon.

A hand wheel 46 is secured to a vertically disposed shaft 47 upon which a worm 48 is keyed. This worm is adapted to drive a worm gear 49 positioned upon the shaft 24, the result of this arrangement being that when the hand wheel 46 is revolved the shaft 24 will also be revolved which will cause the pusher pins 29 to either raise or lower for the purpose of clamping the casting 9 to the interior of the pipe 16. The shaft 26 has mounted thereon worms adapted to mesh with worm gears 33 mounted upon pusher pins 34. These pusher pins are in turn connected to vertically movable bearings 36, which bearings support the cutter shaft 37 upon which the cutters 38 are mounted. These cutters are spaced from each other as is common practise.

It will thus be seen that when the shaft 26 is revolved motion will be transmitted to the worm gears 33 which are screw-threadedly mounted on the pins 34. These pins are held against rotation and support bearings 36 with the result that the rotation of the worm gears will cause upward or downward movement of the bearings depending upon the direction of rotation of the shaft 26.

A universal joint 39 serves to connect the cutter shaft 37 to the drive shaft 41, which drive shaft has keyed thereto a second universal joint as shown in dotted lines at 42 (see Fig. 1). This last mentioned universal joint receives power from a shaft 43 journaled in the casting 6 and having a sprocket gear 44 attached thereto.

The upward feeding of the cutters is accomplished through a worm gear 51 slidably keyed upon a vertical shaft 52 having a hand wheel 53 secured to one end thereof. This worm gear is adapted to be vertically moved through the medium of a handle 54 for the purpose of engaging or disengaging with a worm 56 mounted upon the drive shaft 43. A worm gear 57 also keyed upon the shaft 52 meshes with a gear 58 keyed to the shaft 26, the result being that as the shaft 52 is rotated either through the medium of the hand wheel 53 or through the medium of the worm gears 56 and 51 motion will be transmitted to the shaft 26 which will cause the pusher pins 34 to move for the purpose of raising the bearings 36 thus bringing the cutters 38 into contact with the interior surface of the pipe. The ratio between the drive shaft 43 and the shaft 26 is such that the proper speed of feed will be accomplished when the gear 51 is in mesh with the worm 56. The feed, however, may be stopped at any time by disengaging the gear 51 from the worm 56 through the manipulation of the lever 54, or a very slow feeding may be accomplished by the employment of the hand wheel 53 feeding the cutters by hand.

When it is desired to make a second cut the direction of rotation of the parts is reversed, thus disengaging the cutters and the clamping mechanism after which the pipe may be moved to a new position after which a new cut may be made. In order to keep the cutters cool, I have provided a water inlet 59 in the head casting 6 which water inlet is connected through the medium of a flexible pipe 61 to a spray pipe 62 mounted adjacent to the cutter.

By referring to Figure 3 it will be noted that I have shown a filler 70 for use in pipes of a larger diameter than the machine is built for. The filler merely serves the purpose of raising the machine so that the cutters will come into contact with the interior of the pipe.

It will thus be seen that I have produced a machine which may be employed within a pipe for the purpose of cutting holes therein from the interior outwardly, a machine which will do accurate and speedy work and one which may be used by the average mechanic.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described my invention, I claim:—

1. In a pipe cutting mechanism, a standard, a tubular portion extending outwardly from said standard, a track positioned beneath said tubular portion and adapted to movably support a pipe thereabove, and means mounted on said tubular member for forming slots on the interior of a pipe, substantially as and for the purpose specified.

2. In a device of the character described, a standard, a casting supported on said

standard, a tubular portion extending outwardly from said casting, a flared portion secured to said tubular portion, a casting secured to said flared portion, a plurality of cutters supported on said casting and means for vertically raising and lowering said cutters, substantially as and for the purpose specified.

3. In a pipe cutting mechanism, comprising spaced parallel tracks, a plurality of trucks adapted to move over said tracks for the purpose of supporting a length of pipe, a standard mounted adjacent said tracks, a casting supported on said standard, a tubular portion extending from said casting and adapted to extend into a pipe to be operated upon, a flared portion secured to said tubular portion, a casting secured to said flared portion, a shaft extending from said first mentioned casting to said second mentioned casting, worms mounted on said shaft, pusher pins mounted in said second mentioned casting, said pusher pins having gears thereon, said gears meshing with said worms, a shoe secured to said pusher pins and adapted to contact the interior of the pipe being operated upon, and means mounted in said second mentioned casting for cutting slots in the interior of the pipe being operated upon.

4. In a pipe cutting mechanism, comprising spaced parallel tracks, a plurality of trucks adapted to move over said tracks for the purpose of supporting a length of pipe, a standard mounted adjacent said tracks, a casting supported on said standard, a tubular portion extending from said casting and adapted to extend into a pipe to be operated upon, a flared portion secured to said tubular portion, a casting secured to said flared portion, a shaft extending from said first mentioned casting to said second mentioned casting, worms mounted on said shaft, pusher pins mounted in said second mentioned casting, said pusher pins having gears thereon, said gears meshing with said worms, a shoe secured to said pusher pins and adapted to contact the interior of the pipe being operated upon, means mounted in said second mentioned casting for cutting slots in the interior of the pipe being operated upon, said means comprising a cutter shaft, cutters mounted thereon, and means for driving said cutter shaft.

5. In a pipe cutting mechanism, comprising spaced parallel tracks, a plurality of trucks adapted to move over said tracks for the purpose of supporting a length of pipe, a standard mounted adjacent said tracks, a casting supported on said standard, a tubular portion extending from said casting and adapted to extend into a pipe to be operated upon, a flared portion secured to said tubular portion, a casting secured to said flared portion, a shaft extending from said first mentioned casting to said second mentioned casting, worms mounted on said shaft, pusher pins mounted in said second mentioned casting, said pusher pins having gears thereon, said gears meshing with said worms, a shoe secured to said pusher pins and adapted to contact the interior of the pipe being operated upon, means mounted in said second mentioned casting for cutting slots in the interior of the pipe being operated upon, said means comprising a cutter shaft, cutters mounted thereon, and means for driving said cutter shaft, a second shaft extending from said first mentioned casting to said second mentioned casting, worms mounted on said second mentiond shaft, a second set of pusher pins mounted in said second mentioned casting, said pins having worm gears thereon, meshing with the worms of said second mentioned shaft, said second set of pusher pins being adapted to raise and lower said cutter shaft, substantially as and for the purpose specified.

In testimony whereof I affix my signature.

CHAS. M. COLLINS.