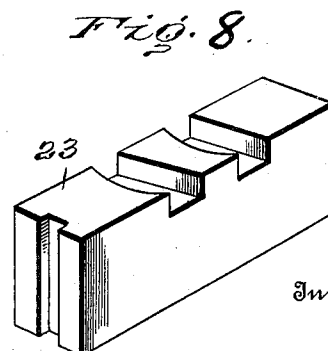
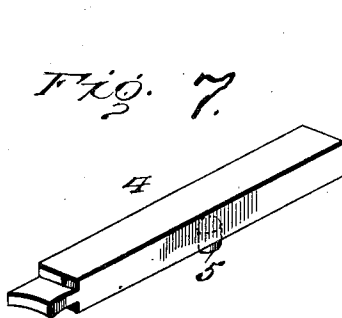
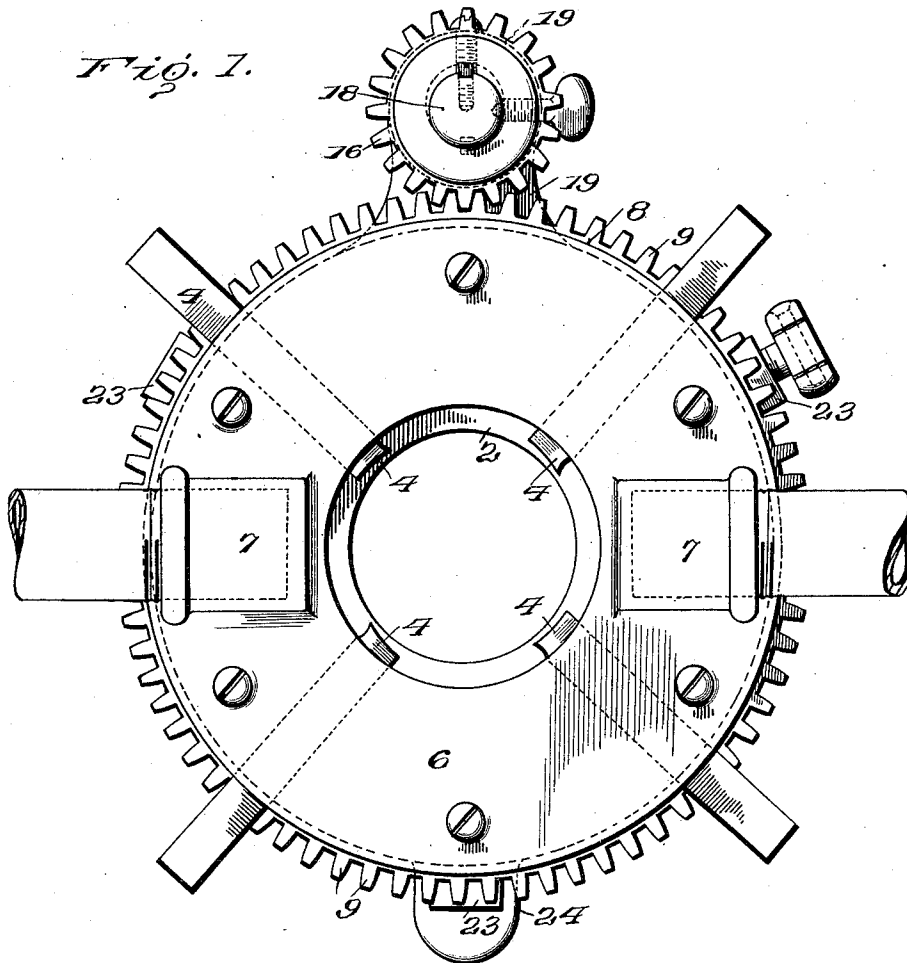


B. BORDEN.
PIPE CUTTING TOOL.
APPLICATION FILED DEC. 20, 1910.

1,029,265.

Patented June 11, 1912.

3 SHEETS-SHEET 1.



Witnesses

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John H. Murphy

Inventor

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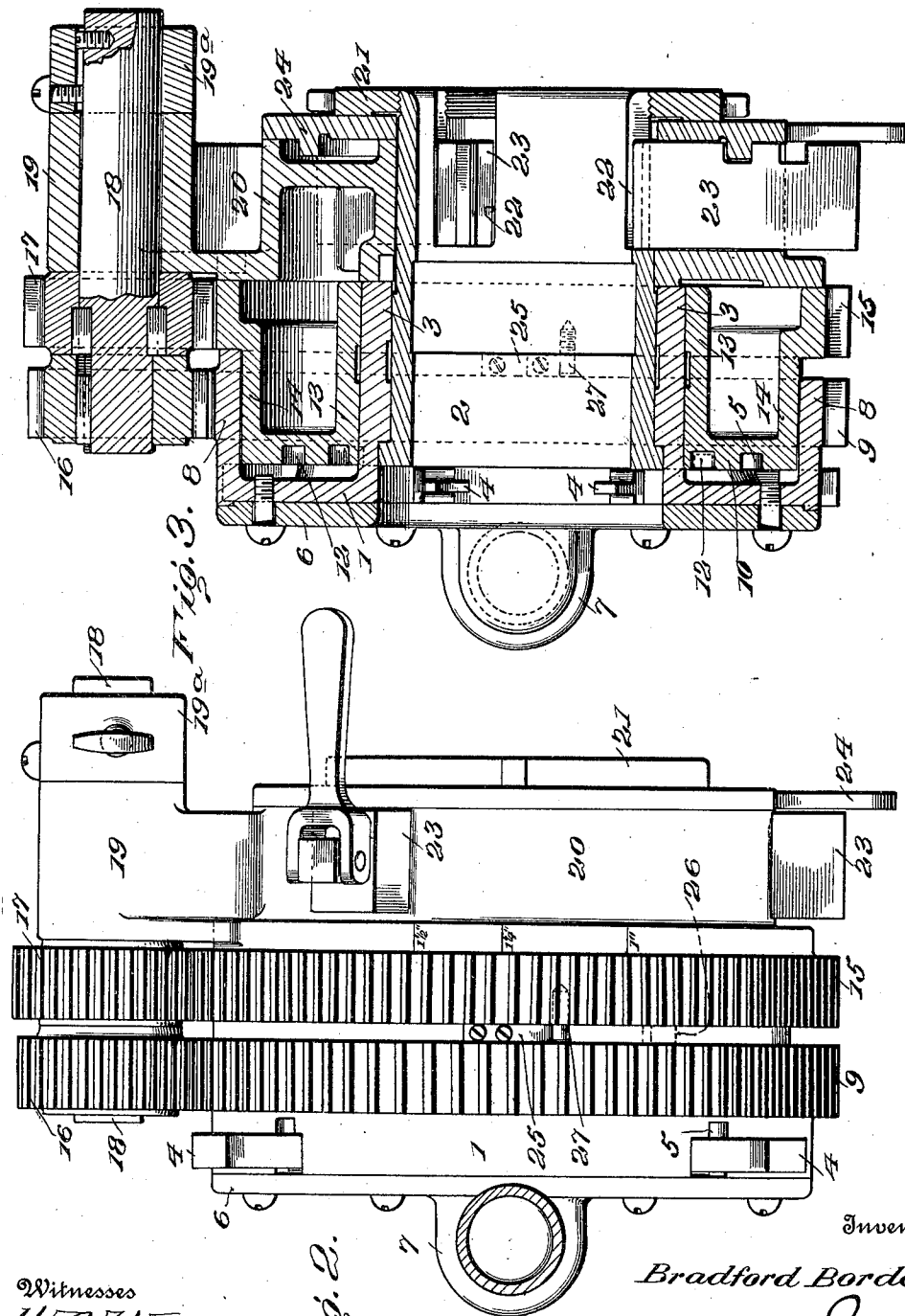
Attorney

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3 SHEETS—SHEET 2.



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Fig. 2.

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3 SHEETS-SHEET 3.

Fig. 4.

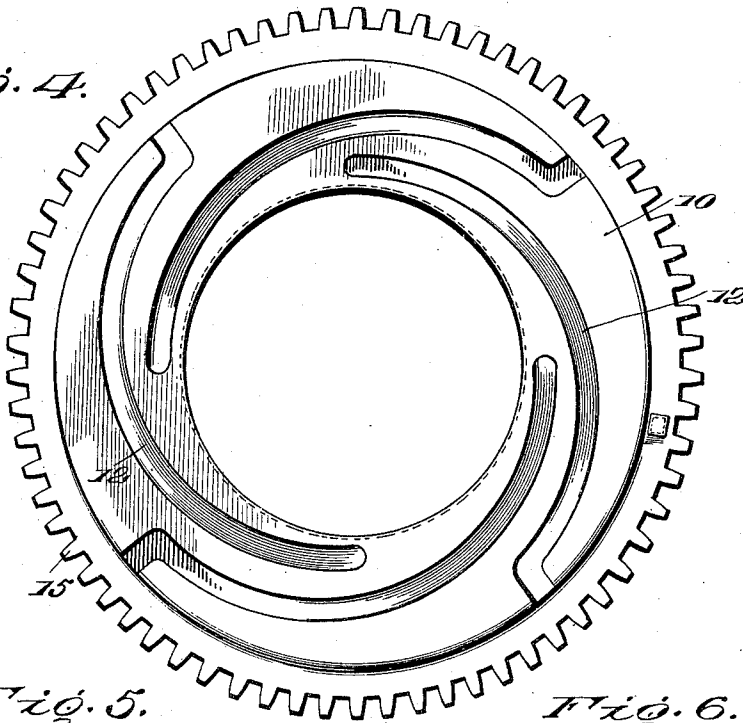


Fig. 5.

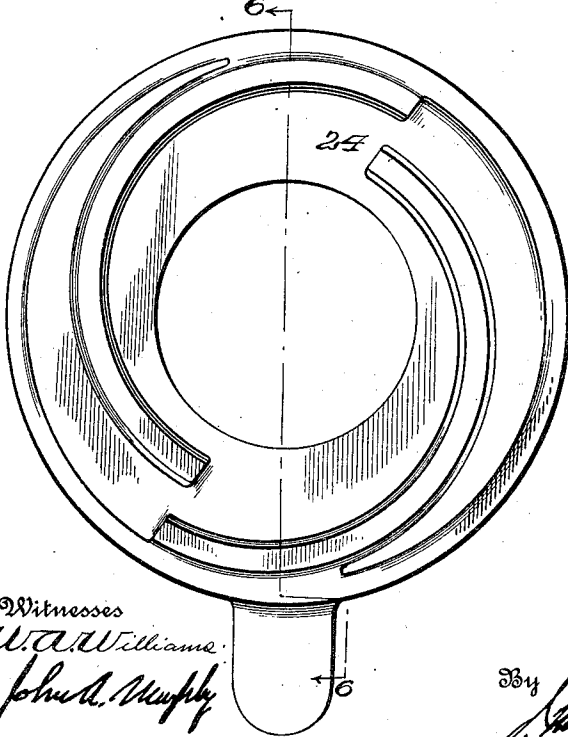
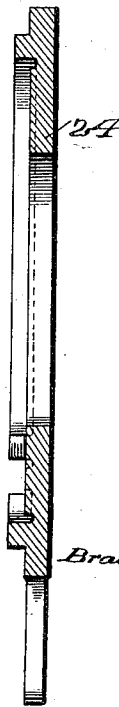


Fig. 6.



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UNITED STATES PATENT OFFICE.

BRADFORD BORDEN, OF TORONTO, ONTARIO, CANADA, ASSIGNOR TO THE BORDEN COMPANY, OF WARREN, OHIO, A CORPORATION OF OHIO.

PIPE-CUTTING TOOL.

1,029,265.

Specification of Letters Patent.

Patented June 11, 1912.

Application filed December 20, 1910. Serial No. 598,289.

To all whom it may concern:

Be it known that I, BRADFORD BORDEN, of Toronto, in the Province of Ontario and Dominion of Canada, have invented certain new and useful Improvements in Pipe-Cutting Tools; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The primary object of this invention is to provide a strong, durable pipe cutter, capable of being easily operated by hand, whereby a pipe may be severed in a comparatively short time.

The invention will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is an end elevation. Fig. 2 is a side view. Fig. 3 is a vertical longitudinal sectional view. Fig. 4 is a face view of the cutter engaging plate. Fig. 5 is a face view of the adjusting plate of the work-holder. Fig. 6 is a vertical sectional view thereof. Fig. 7 is a view of one of the cutters. Fig. 8 is a view of one of the work-holder members.

Referring to the drawings, 1 designates a cylindrical housing or carrier having a central opening wherein is fitted a suitable spindle 2 over which projects a cylindrical hub 3 of the carrier, said spindle having a flange which fits in a counterbore of the central opening of the housing. In this carrier are radially-arranged guideways for pipe cutters 4 each of which has an outwardly projecting lug 5. I have shown a front plate 6 as secured to the front of the cutter-carrier by retaining screws, but if desired this plate may be made integral with the housing or carrier, but it is preferably removable to facilitate milling. With the front of plate 6, on opposite sides of its central opening, are formed sockets 7 for receiving handles by which the tool may be turned axially. The cutter-carrier has a circular flange or wall 8, concentric with its hub 3, and this wall carries a gear wheel 9.

10 designates the cutter-engaging or cam-

plate which is formed in its forward face with a series of eccentric slots 12 for taking in pins 5 of the cutters. This cam-plate has a hub 13 which fits on hub 3 of the carrier, and it also has an outer concentric flange or wall 14 which fits within the wall 8 of the carrier. This wall 14 of the cam-plate also has an offset which carries a gear wheel 15, the latter being co-axial with gear wheel 9 of the carrier. These two gear wheels are of different pitch so that a differential motion may be obtained between the cam plate and the carrier, the former traveling at a faster speed than the latter so as to simultaneously force all of the cutters inwardly during the rotation of the tool. For the purpose of securing this differential motion I provide two gear pinions 16 and 17, the former, 16, having the lesser number of teeth, meshing with gear wheel 9 of the cutter-carrier, and the latter, 17, having the greater number of teeth, meshing with gear wheel 15 of the cam-plate. These pinions are feathered on a common shaft 18 mounted in a tubular bearing 19 formed with the housing 20 of the work-holder, which is centered on the rear end of spindle 2 and held thereon by a nut 21. In this spindle 2 are formed longitudinal slots 22 to accommodate radially-movable pipe engaging jaws 23. Between nut 21 and the rear face of housing 20 is located a cam-plate 24 having eccentric ribs for engaging grooves in the jaws so that the tool may be readily secured to the pipe to be severed. The shaft 18 is removably held in bearing 19 by a collar 19^a secured thereon. The carrier has a removable stop 25 and a shoulder 26 and the cam-plate a stop 27 for limiting the turning of the latter relatively to the former. By removing stop 25 the cam plate may be turned sufficiently to aline the radial ends of the cam grooves with the lugs of the cutters, permitting the latter to be removed to be ground and then replaced. The shoulder 26, which is more than 90° from stop 25, limits the inward movement of the cutters when stop 27 engages therewith.

In practice, the tool is slipped over the

pipe to be cut, which pipe is held in a vise or other suitable support, and the cutters being in line with that portion of the pipe where the cut is to be formed, the operator turns the cutter carrier axially by means of the handles secured in sockets 7. This turning of the cutter-carrier rotates pinion 16 fast on shaft 18, which shaft is held from partaking of the rotation of the carrier by being mounted in the work-holder which is fixedly secured to the pipe. The axial rotation of shaft 18 causes the cam plate to partake of the rotary motion of the cutter-carrier, but by reason of the differential gearing, the cam-plate travels at a greater speed than the carrier, and in consequence the several cutters are uniformly forced inwardly toward the axial center of the tool and thereby in a few revolutions effect a complete severance of the pipe. If any one of the cutters should be damaged that fact will not interfere with the operation of the remaining cutters. This is true even if all of the cutters should be injured excepting one. As soon as the pipe has been severed, the operator by imparting a reverse motion to the cutter-carrier draws all of the cutters outwardly. The tool may then be removed by releasing the work-holder or centering device.

It is manifest that pipes of different sizes may be readily and easily cut with this tool. The adjustment of the cutters for pipes of various sizes may be accomplished either by turning the tool, as in forcing the cutters inwardly or outwardly, or by releasing collar 19^a and forcing shaft 18 sufficiently forward to disengage the pinion 16 from gear wheel 9 and pinion 17 from feathers 18^a, and thus permit the cam plate to be turned to adjust the cutters to the size of pipe required.

It will be understood that changes may be made without departing from the scope of my invention.

I claim as my invention:—

1. A pipe cutting tool comprising a rotatable carrier, a series of inwardly movable pipe cutters mounted in such carrier, a cam plate engaging each of the cutters for simultaneously moving them inwardly, said carrier and cam plate having differential gear wheels, and differential pinions meshing with said gear wheel, said pinions being actuated by the rotation of the carrier.

2. A pipe cutting tool comprising a centering device for securing the tool to a pipe, a rotatable carrier, a series of inwardly movable pipe cutters mounted in such carrier, a cam plate engaging each of the cutters for simultaneously moving them inwardly, said carrier and cam plate having differential gear wheels, differential pinions meshing with said gear wheels, and a com-

mon shaft for said pinions supported by said centering device.

3. A pipe cutting tool comprising a centering device for securing the tool to a pipe, a rotatable carrier, a series of inwardly movable pipe cutters mounted in such carrier, said carrier having a central hub and a concentric gear wheel, a cam plate axially rotatable on said hub and having a gear wheel adjacent to the gear wheel of the carrier, said gear wheels being of different pitch, gear pinions engaging the gear wheels of the carrier and cam plate, and a common support for said pinions for obtaining a differential travel between the carrier and cam plate.

4. A pipe cutter comprising a centering device having a shaft bearing, a rotatable carrier having a central hub, a series of pipe cutters mounted in said carrier, said carrier having a gear wheel, a cam plate journaled on said hub, said cam plate also having a gear wheel of different pitch from that of the carrier gear wheel, a rotatable shaft mounted in said bearing, and pinions fast on said shaft meshing with said gear wheels, both of said pinions being rotated by the rotation of the carrier.

5. A pipe cutter comprising a rotatable carrier, a series of inwardly movable pipe cutters, said carrier having a central hub and an outer concentric wall carrying a gear wheel, a cam plate for simultaneously moving inwardly all of said cutters, said cam plate having a hub fitted on the hub of the carrier, and an outer wall fitting within the outer wall of the carrier, a gear wheel carried by said cam plate and located adjacent to the gear wheel of the carrier, said gear wheels being of different pitch, a fixedly-supported revoluble shaft, and pinions carried by said shaft and meshing, respectively, with said gear wheels.

6. A pipe cutter comprising a rotatable carrier, a series of inwardly movable pipe cutters, said carrier having a central hub and an outer concentric wall carrying a gear wheel, a cam plate for simultaneously moving inwardly all of said cutters, said cam plate having a hub fitted on the hub of the carrier and an outer wall fitting within the outer wall of the carrier, a gear wheel carried by said cam plate and located adjacent to the gear wheel of the carrier, said gear wheels being of different pitch, a centering device having a shaft bearing, a shaft mounted in said bearing, and two pinions carried by said shaft and meshing, respectively, with said gear wheels.

7. A pipe cutter comprising a rotatable carrier having handle-securing means, said carrier also having a circumferentially-arranged gear wheel, a series of cutters mounted in said carrier, a cam plate movable con-

centrically to said carrier and engaging said cutters, said cam plate having a gear wheel of different pitch from the gear wheel of the carrier, a centering device, a shaft supported
5 by the latter, and differential pinions fast on said shaft and in mesh, respectively, with said gear wheels.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

BRADFORD BORDEN.

Witnesses:

J. NOTA MCGILL,
FRANCIS S. MAGUIRE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents.
Washington, D. C."
