I. W. NONNEMAN.

PIPE CUTTER.

APPLICATION FILED NOV. 8, 1920.

1,393,156.

Patented Oct. 11, 1921.

3 SHEETS—SHEET 1.

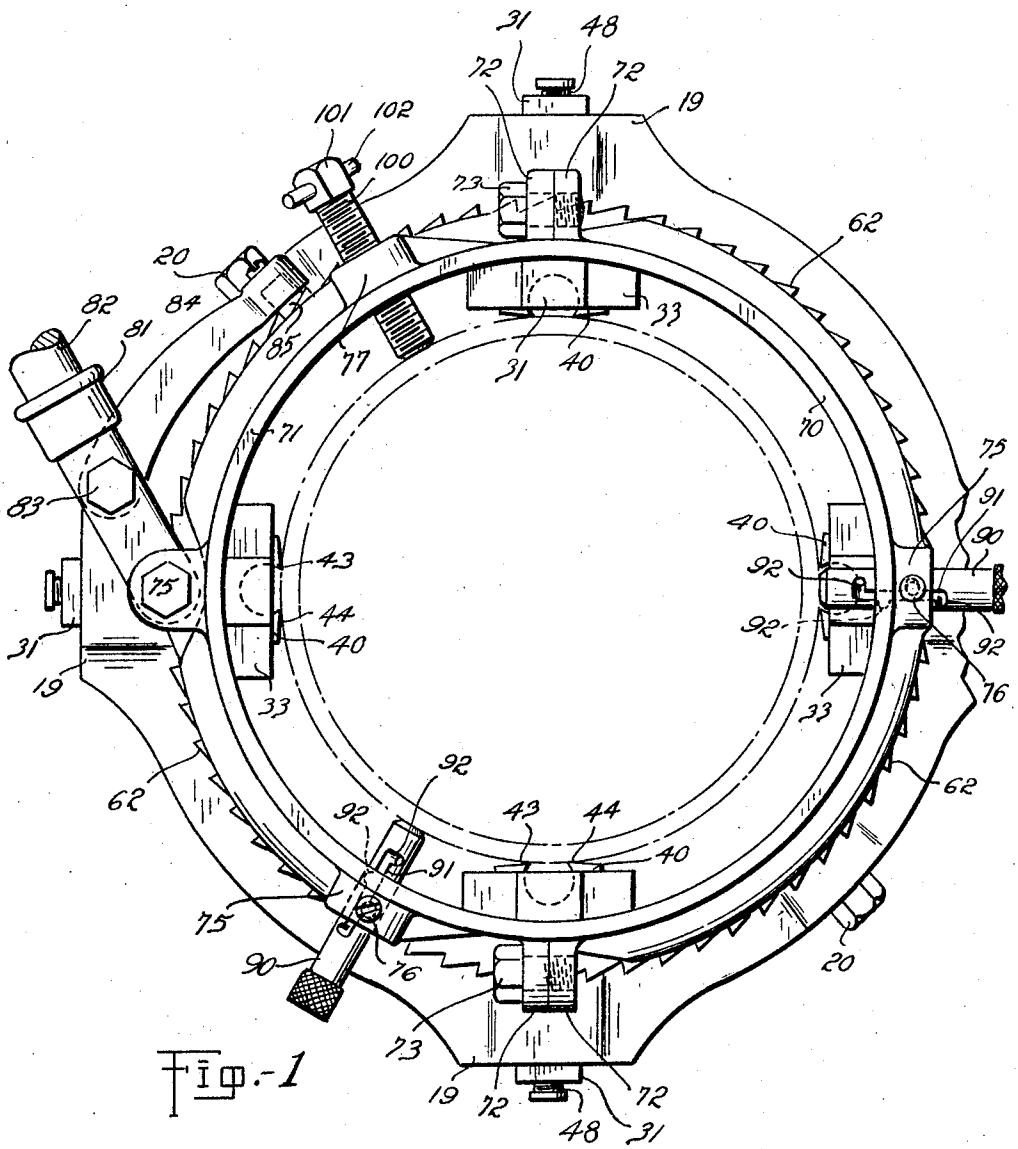


Fig.-1

Inventor

Ira W. Nonneman,

By Baker & Macklin,

Attorneys

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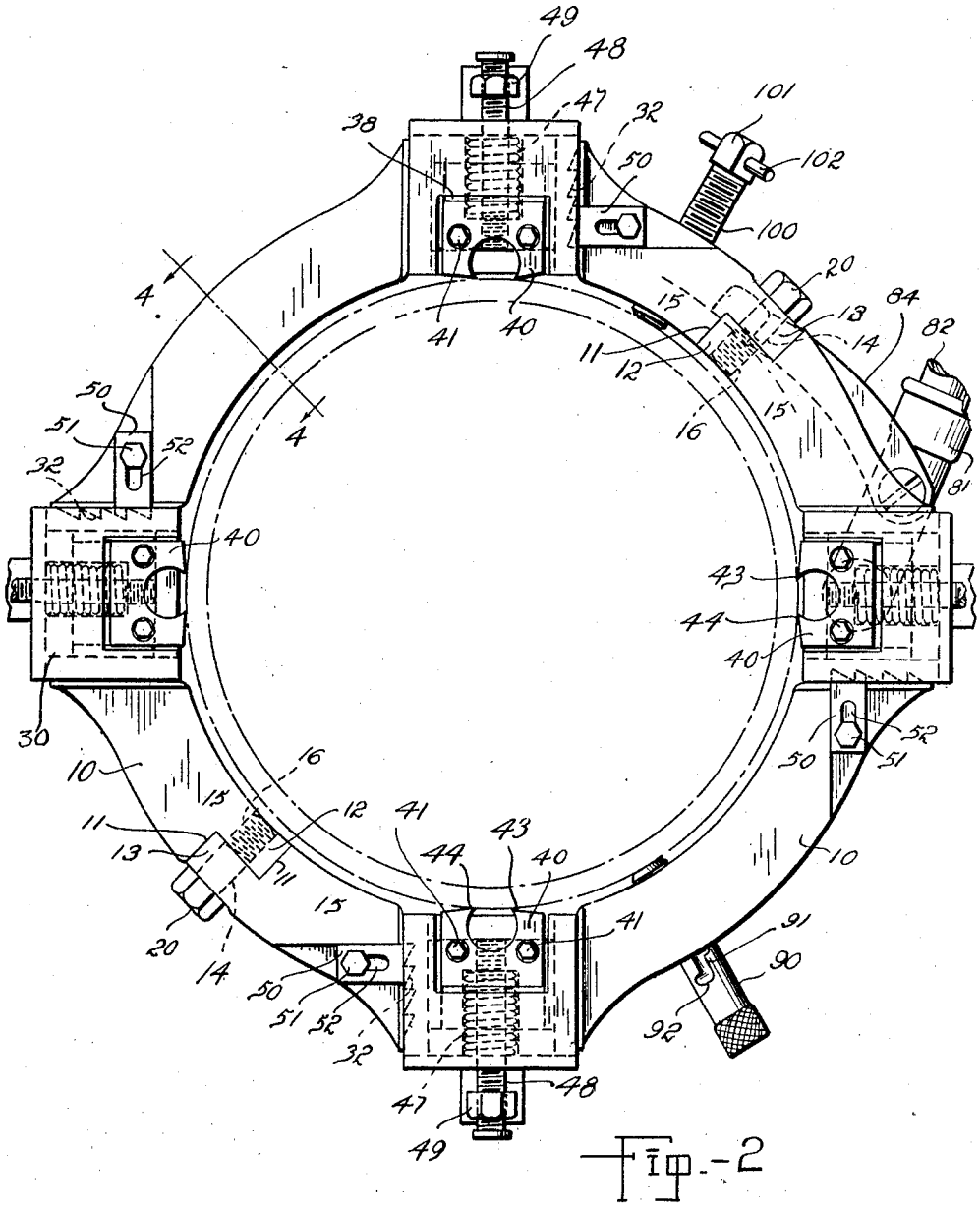


Fig.-2

Inventor

Ira W. Nonneman,

By Parker & Mackin,

Attorneys

I. W. NONNEMAN.

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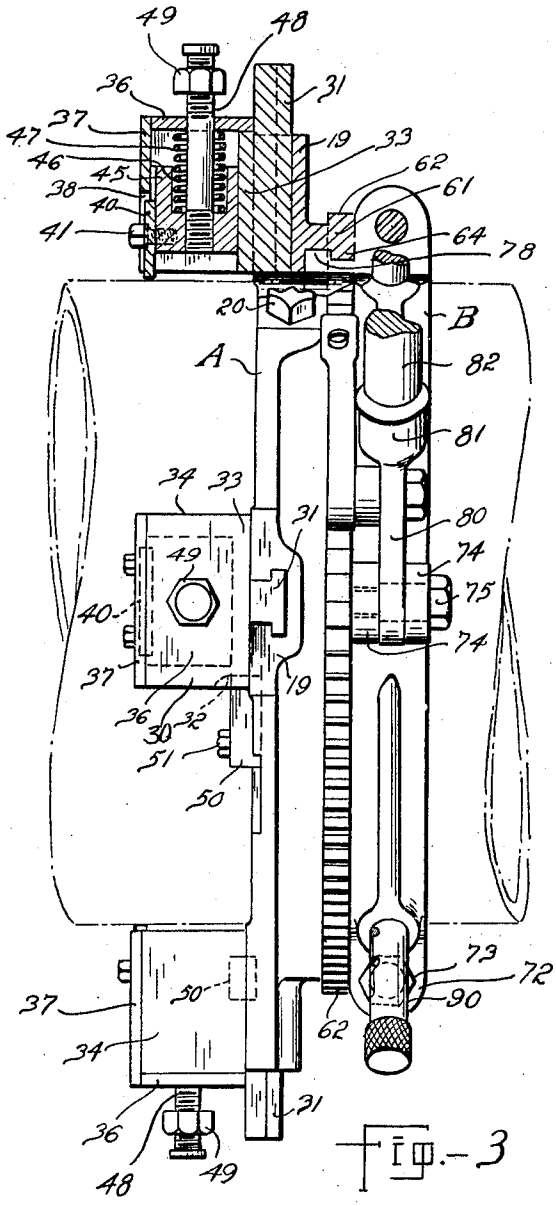


Fig.- 3

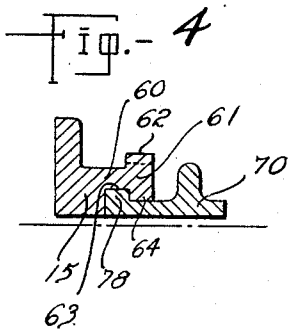


Fig.- 4

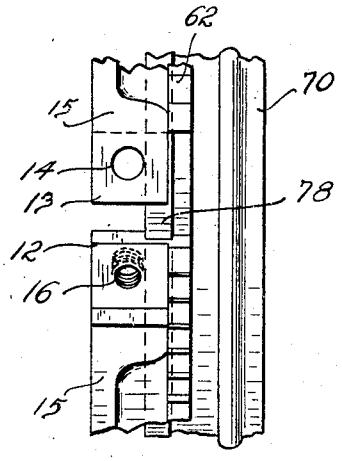


Fig.- 5

Inventor
Ira W. Nonneman
By Baker & Macklin,
Attorneys

UNITED STATES PATENT OFFICE.

IRA W. NONNEMAN, OF WARREN, OHIO, ASSIGNOR TO THE BORDEN COMPANY, OF WARREN, OHIO, A CORPORATION OF OHIO.

PIPE-CUTTER.

1,393,156. Specification of Letters Patent. Patented Oct. 11, 1921.

Application filed November 8, 1920. Serial No. 422,411.

To all whom it may concern:

Be it known that I, IRA W. NONNEMAN, a citizen of the United States, residing at Warren, in the county of Trumbull and State of Ohio, have invented a certain new and useful Improvement in Pipe-Cutters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to pipe cutters particularly adapted for cutting pipes of different sizes from large sizes down to the smaller sizes, and wherein the cutting members are carried by an annular rotary frame adapted to surround a pipe and in which as oscillatory feeding device is provided to rotate this frame step by step. The general object of the invention is to provide a pipe-cutting tool of this type which shall be simple, effective and durable. More specifically, among the objects of the invention, may be mentioned the provision of a ready demountable frame, sections of which are adapted to be rigidly connected so as to form a compact rigid frame.

Another object of the device is to provide means for the definite and quick adjustment of the pipe holding and cutting means for the different standard sizes of pipe.

The invention is hereinafter more fully described in connection with the preferred embodiment thereof shown in the drawings.

In these drawings, Figure 1 is a front elevation of the pipe cutter; Fig. 2 is a rear elevation thereof; Fig. 3 is a side view thereof, one of the knife carrying means being shown in section; Fig. 4 is a section taken on line 4—4 of Fig. 2; Fig. 5 is a fragmentary view showing the manner in which the rotary frame sections are connected at the joints.

The device in general consists of a non-rotary or stationary frame B and a rotary frame A. As shown the frame B comprises two arcuate members 70 and 71, which are detachably connected to form a rigid annular frame, said frame having projecting members, forming a bearing on which the rotary frame A is adapted to rotate. The stationary frame B also carries means for holding it against rotation on a pipe and means consisting of an oscillatory lever and pawl adapted to coöperate with a ratchet on the rotary frame A, to rotate the latter. The frame A carries spring pressed knives 40 for cutting the pipe as the frame revolves.

Referring more specifically to the rotary frame A and to the various parts by numerals, this frame comprises two sections 10, which are identically formed and are therefore interchangeable. Each section 10 has a cylindrical arcuate portion 15, extending for a distance of 180° so that when the sections are connected, a complete annular frame is formed. On the end of the sections are formed the tongues 12 and 13, the tongue 12 on one section overlapping the tongue 13 on the other and vice versa. Said overlapping tongues are connected by means of the radially extending bolts 20, each of which passes through the opening 14 in one of the tongues 13 and is threaded in the registered threaded opening 16 of one of the tongues 12. The ends of the tongues then lie in abutting relation with the shoulder 11, formed by the end of the other section of the frame, whereby the joint between the sections is made rigid and proof against all tendency toward radial collapse.

Formed on each of these portions 15 there are also two radially extending bosses 19 preferably integral with the respective sections, and having a radial groove with undercut sides. In the device illustrated the bosses are arranged so as to bring the knife frames diametrically opposite to each other in the assembled frame. These grooves provide ways for the cutter housings. The cutter housings are designated 30 and are box-like devices carrying the knives 40, by means hereinafter specifically described, and they have ribs 31 (see Fig. 3) on their backs which slidably occupy the ways in the frame sections. Formed on the side of each of the housings is a series of teeth 32, and coacting with these teeth are the fingers 50, which are slidably mounted in recesses or slots in the bosses 19 and held in operative position by means of the bolts 51, threaded in the frame sections and passing through an elongated slot 52 in each finger.

The holding connection described enables the housing to be readily adjusted for different sizes of pipe, it being only necessary to push the housings radially inward or outward to adjust the cutter to the size of pipe on which it is desired to operate, after having first released the fingers 50 from engagement with their teeth. In Fig. 2 the

dot and dash lines indicate the diameter of the largest pipe with which the device can be used, and it will be seen that the outer diameter of this pipe is practically the same as the inner diameter of the rotary frame.

The knife housing 30 is a rectangular box-like structure, having a rigid back plate 33 and rigid side walls 34, a removable outer end 36 and a removable front plate 37, the end and front plates being normally rigidly secured by screws. Within the housing is a block 45 somewhat shorter than the interior of the housing, so that it is capable of radial adjustment therein but guided by the side walls and front and back of the housing. To the face of this block is secured the knife or cutter 40 by means of screws 41. The cutter is preferably of the type having a cutting edge 43 and an abutment shoulder 44, in advance of such edge engaging the pipe and limiting the cut. This cutter freely occupies an opening 38 in the housing cover plate.

Within the block 45 is a central cylindrical recess 46, which is occupied by a compression spring 47 bearing at its opposite ends respectively against the base of the recess and the end cover 36 of the housing. To retain the block within the cutter housing I provide means such as the bolt 48, which extends within the recess 46 and screws into the base of the block 45 and extends out through the end plate 36 of the housing. A nut 49 screwing onto this bolt is adapted to abut the end plate of the housing and limit the inward movement of the knife block and knife and prevent the separation of the parts. Except for the arrangement of the means for holding the housing in position the knife carrying housing is substantially the same as shown in my copending application Serial No. 264,917, filed Dec. 2, 1918.

The arcuate members 15 carry on one face a semi-cylindrical flange 60, having an enlarged portion 61, forming both an outwardly and inwardly extending rib upon the periphery of which ratchet teeth 62 are formed, the inner part forming the rib 64. The inner portion of the flange 60 is undercut, forming a groove 63, the part 61 forming a rib 64. When the sectional portions of the rotary frame are united, flange 60 and the members 61 connect to form a cylindrical member having an inwardly extending rib, and a groove adjacent thereto on the inner face, these parts interlocking with complementary rib 78 formed on the stationary frame; and the teeth 62 form an annular ratchet.

The stationary frame comprises the arcuate sections 70 and 71, each of which form an arc of 180°. At each end of these sections there are radial projections 72, which are connected together in pairs by the bolts 73, to cause the sections to form a rigid annular frame. The section 71 carries centrally thereof ears 74 between which a lever 80 projects. The bolt 75 passing through registering openings in said ears and lever serves as a pivot for the lever. The lever 80 has a socket 81 at the other end thereof to receive the operating handle 82. Pivoted on the lever 80 by means of the bolt 83 is the member 84 carrying a pin 85 adapted to coöperate with the annular ratchet formed by the teeth 62.

In order to clamp the stationary frame in position on the pipe there may be provided a plurality of holding devices, three of such devices being shown in the present instance, and consisting of two radially adjustable members 90 and the threaded bolt 100. The members 90 are cylindrical in form and pass through radial openings in the annular frame. Bosses 75 are formed on said annulus and have an opening therethrough registering with the opening through the annulus proper. The members 90 each have a longitudinal slot 91 formed therein with which are connected transverse slots 92 at spaced points in said longitudinal slot, which extend transversely from the slot 91 for about 90° circumferentially on the surface of the cylinder, and in opposite directions alternately so as to avoid undue weakening of the metal of the cylinder. A pin 76 carried by each of the bosses 75 projects into the slot 91, and by this means it is apparent that the members 90 may be held at any one of several predetermined positions corresponding to the spacing between the transverse slots, and these slots may be readily properly spaced so as to accommodate the standard sizes of pipe.

The third adjusting member 100 comprises a bolt threaded through the annular section 71 and the boss 77 formed thereon. It has been found in practice that there is danger of applying too great force on the pipe by means of the bolt, if a wrench is used in connection therewith, and I therefore prefer to pass a pin 102 through the head 101 of this bolt, and to operate the bolt by hand. The securing members 90, 90 and 100 are so placed on the sections 70 and 71 as to be equally spaced on the stationary frame, that is, they are 120° apart. The side of the sections 70 and 71 which are adjacent the rotary frame, are provided with semi-cylindrical flanges, having the circumferential ribs 78 formed thereon. When the sections are connected these flanges and ribs abut to form a complete cylindrical member with a circumferential rib 78, the rib 78 fitting into the groove 63 in the member 60 of the rotary frame and the rib.

By this means the frames are locked together and the rotary frame may be turned upon its axis about the stationary frame by manipulation of the handle 82.

It will be seen that my cutting tool is simple of construction and readily separable, both as to the cutter frame and the stationary frame, for the oscillatory mechanism, so that it may be placed laterally on pipes, and is readily adjustable for different sizes of pipes, simply by pushing in the knife housings and moving the gripping members of the stationary frame. It will also be seen that although the sections of the rotary frame are readily separable, they are connected in such a manner that the frame formed is rigid and has no tendency to collapse radially at the joints. The knives are spring fed as in my co-pending application above mentioned, but the arrangement for the adjustment of the knife housings which I here show is an improvement over that shown in my former application on account of its ready accessibility and firm holding properties.

While I have described a specific preferred embodiment of my invention, it is to be understood that many different embodiments thereof may be made, and the foregoing description should therefore be understood to be illustrative and not restrictive.

Having thus described my invention, I claim:

1. In a pipe cutter, an annular frame comprising detachable sections, each section having a portion cut away at its inner circumferential edge at one end and at its outer circumferential edge at the other to form tongues, the outer tongue of each section overlapping the inner tongue of the adjacent section, and means for securely fastening said overlapping tongues together, said sections being adapted to be separated radially when the connecting means is removed.

2. In a pipe cutter, an annular knife carrying frame comprising identical arcuate sections, each section having a shoulder and tongue at one end and a complementary shoulder and tongue on the other, and each tongue on one section overlapping a complementary tongue on the other section and abutting the adjacent shoulder, and means for rigidly connecting said tongues.

3. In a pipe cutter, an annular frame, a housing slidably carried on the face of said frame, said housing having teeth formed in the side thereof, a knife carried by said housing, and a finger on said frame adapted to engage said teeth.

4. In a pipe cutter, an annular frame, a housing slidably carried on the face of said frame, said housing having teeth formed in the side thereof, a knife carried by said housing, and a finger on said frame movable in a plane parallel to the plane of the face thereof and adpted to engage said teeth.

5. In a pipe cutter, an annular frame, a housing slidably carried on the face of said frame, said housing having teeth formed in the side thereof, a knife carried by said housing, and a finger slidable on the face of said housing to engage said teeth.

6. In a pipe cutter, an annular frame, a housing radially slidable on the face of said frame, said housing having teeth formed in the side thereof, a knife carried by said housing, and a finger slidable on the face of said housing to engage said teeth.

7. In a pipe cutter, an annular frame, a housing slidably mounted on the face of the frame, a guideway, ribs on the back of said housing extending into said guideway, teeth on the side of the housing, a finger slidable on the face of said frame and adapted to engage said teeth, and a knife carried by the housing.

8. In a pipe cutter, an annular frame, means for positioning a pipe therein and comprising a plurality of radially movable pipe engaging members, one of said members having threaded adjustment with said frame, and the other members each having a longitudinally extending slot and alternately oppositely directed slots communicating therewith, whereby the members may be held in a limited number of predetermined positions.

9. In a pipe cutter, an annular frame, radially movable positioning members mounted on said frame comprising a member extending through a radial opening in said annular frame, and having a longitudinally extending slot therein, a plurality of alternatively oppositely directed slots connected with said first named slot, a pin carried by said frame and extending into said slot, whereby said member may be adjusted in one of several predetermined positions.

In testimony whereof, I hereunto affix my signature.

IRA W. NONNEMAN.