G. GORTON.

ROTARY METAL CUTTING OFF DEVICE.

APPLICATION FILED JULY 16, 1914.

1,171,430.

Patented Feb. 15, 1916.

2 SHEETS—SHEET 1.

Fig. 1.

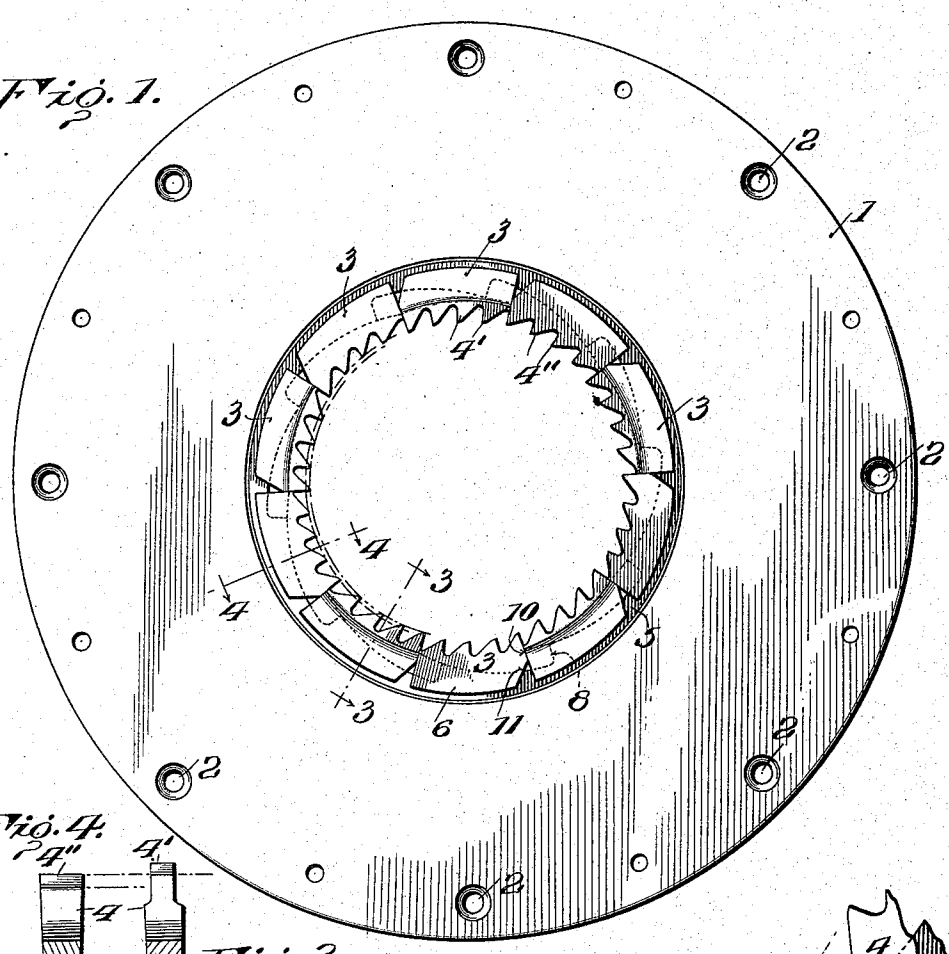


Fig. 4.

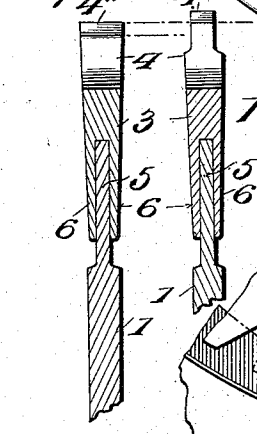
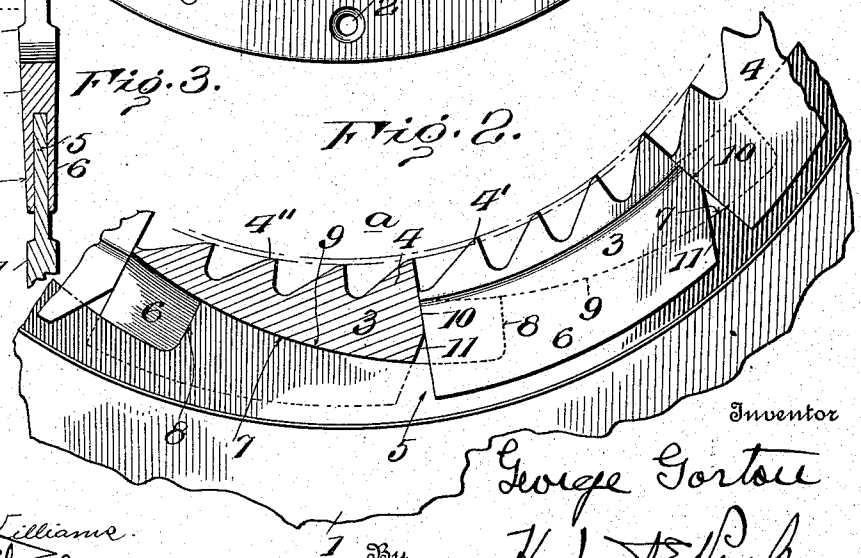


Fig. 3.

Fig. 2.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 5.

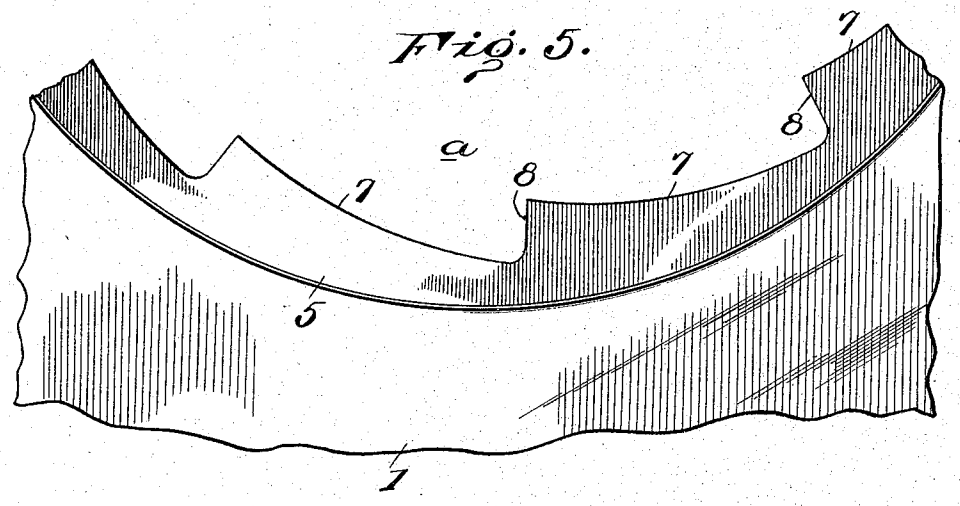


Fig. 6.

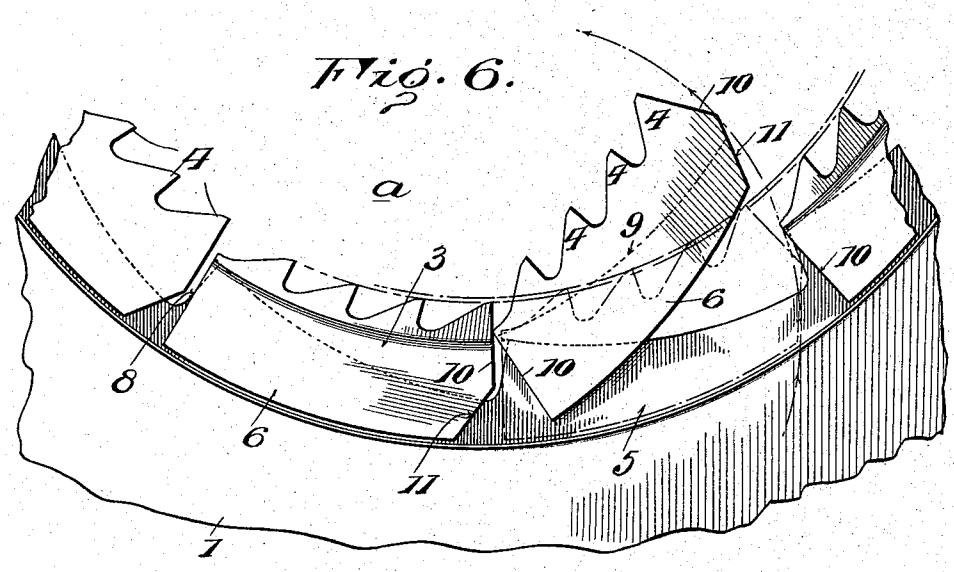
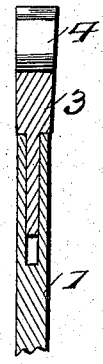


Fig. 7.



Witnesses

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UNITED STATES PATENT OFFICE.

GEORGE GORTON, OF RACINE, WISCONSIN.

ROTARY METAL-CUTTING-OFF DEVICE.

1,171,430. Specification of Letters Patent. Patented Feb. 15, 1916.

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To all whom it may concern:

Be it known that I, GEORGE GORTON, a citizen of the United States, residing at Racine, in the county of Racine and State of Wisconsin, have invented certain new and useful Improvements in Rotary Metal-Cutting-Off Devices, of which the following is a specification.

This invention relates to certain improvements in cutting off saws and the like; and the objects and nature of my invention will be readily understood by those skilled in the art in the light of the following explanation of the accompanying drawings illustrating what I now believe to be the preferred embodiment or mechanical expression of my invention from among other formations, arrangements and constructions within the spirit and scope thereof.

The invention consists in certain novel features of construction and in combinations and arrangements as more fully and particularly set forth and specified hereinafter.

Referring to the accompanying drawings;—Figure 1, is a side view of a saw blade and cutters involving my invention, dotted lines indicating the formation of the edge portion of the blade surrounding the work receiving opening. Fig. 2, is a detail side view (on a larger scale than Fig. 1) showing the portion of the blade and cutters thereon in locked or operating positions one of the cutters being shown in longitudinal section approximately in the plane of the saw blade. Fig. 3, is a section on line 3—3, Fig. 1. Fig. 4, is a section on the line 4—4, Fig. 1. Fig. 5, is a side view of a portion of the inner edge of the blade, the cutters being removed to clearly show the cam or wedge surfaces of the blade. Fig. 6, is a side view approximately corresponding to the view of Fig. 2, but showing the cutters in unlocked position in full lines, one of the cutters being shown in the act of being swung into the saw opening and removed. Fig. 7, is a sectional view corresponding to Fig. 4, but showing a modification.

In the drawings, I show a flat circular saw body, disk, or blade 1, adapted to be secured at its peripheral or edge portion to any suitable rotary driving drum or other holder for supporting and driving the saw. In the example illustrated, the blade is provided with perforations 2, at its outer edge portion to receive means for removably securing the blade to its operating and supporting holder (not shown). The blade is formed with a central work receiving opening *a*, and the annular inner edge of the blade, *i. e.* the edge of the blade surrounding said opening, is formed to removably receive an annular series of similar separate removable cutter blocks or plates 3, abutting end to end so as to form an endless row or ring of cutters around said opening.

In the particular example illustrated, I show ten cutter blocks 3, each of which forms a segment of a circle concentric with the axis of rotation of the saw, and is formed at its inner or concaved longitudinal edge with any suitable number of cutters 4. These blocks are formed to interlock with the inner edge of the saw against lateral play or looseness and yet so as to permit longitudinal and radial movement of the blocks on the blade to and from operative and inoperative positions.

If so desired, the annular inner edge portion 5, of the saw blade 1, can be reduced in thickness at both side faces of the blade, and the blocks can be longitudinally slotted to receive and fit on said reduced edge of the blade. When so formed, each block will be slotted throughout its length with the slot open at the outer longitudinal convexed edge of the block with comparatively deep or wide parallel side flanges 6, forming the walls of the slot and facing the opposite sides of the annular portion 5, of the blade, and protecting the same.

The portion 5, of the blade is formed to draw the cutter blocks together into operative position with their ends abutting when a relative rotary movement is imparted to the blade or to the ring of blocks thereon, and to permit the blocks to separate from each other for removal from the blade when relative rotary movement in the opposite direction is imparted to the blade or the row of blocks. For instance, I show the inner annular edge of the blade cut or otherwise formed to provide an annular series of similar peripherally curved or inclined cam or wedge edges, faces, or seats 7, surrounding the work receiving opening, and each constituting a segment eccentric with respect to the axis of the blade and also with respect to each other. These cam edges 7, are separated by the shoulders 8, radially arranged with respect to the axis of the blade. The outer longitudinal edge 9, of each cutter block is longitudinally inclined or curved

at the same angle or radius as the blade edges 7, to correspond thereto and throughout its length to seat thereon. The number of blade edge segments 7, corresponds to the number of cutter blocks, and each blade edge 7, is slightly longer than each cutter block.

The end edges of the cutter blocks are preferably radially arranged with respect to the axis of the saw blade to provide the blocks with end faces 10, that squarely abut when the circle or ring of blocks is contracted to operative position. The outer corner of the front end of each block is preferably beveled off at 11, to provide openings between the blocks for the insertion of suitable implements and to enable the blocks to swing on their opposite ends as centers, during application and removal. A cutter block is provided for each blade edge 7, and the blocks are assembled by being slipped onto the blade around the work receiving opening with each block at the front end of its edge 7, and with its front end approximately abutting the radial shoulder 8, between the lower front end of said edge and the high rear end of the next edge 7, in front. Forward rotation of the saw blade, or rearward movement of the cutter blocks on said blade, will cause the blocks to slide rearwardly on their respective edges 7 of the blade and said blocks will thereby be moved bodily inwardly toward the center of the saw blade, moving radially of said blade so that the circle of blocks is contracted and the blocks are caused to tightly abut at their ends while the working points of their cutters are all brought into operative working position with respect to the axis on which the blade rotates. Forward rotation of the blade and the cutting action of the cutters on the work constantly tend to maintain the cutter blocks locked in operative position and tightly abutting each other, while each block is backed and supported by its edge or seat 7, on the blade and by its engagement with the adjacent cutter blocks in front and rear. The thrust of the cutter block in action, engaging the work, is transmitted and distributed around the ring of abutting blocks and consequently around the edge of the blade and to all portions of the blade.

Forward movement of the ring of cutter blocks on the blade, will cause loosening movement of the blocks on the blade and the blocks will be carried to loose or inoperative adjustment on the blade by radial outward movement thereon due to the forward sliding movement of the blocks on their respective edges 7 and consequent separation of the blocks at their ends 10. When the blocks have thus been moved forwardly in the saw blade to inoperative position, they can be removed from the blade by slipping them from the edge 5, of the blade into the work receiving opening. This result is usually accomplished by individually swinging the cutter blocks inwardly into the work receiving opening in the manner approximately illustrated by Fig. 6, wherein the rear inner corner of each block rocks on the front end of the next block to permit this swinging movement to release the block from the blade.

The cutter blocks can be formed to fit within the inner edge of the blade, see Fig. 7, instead of the blade fitting within the blocks as illustrated by Figs. 3 and 4.

The cutters can have working points of any suitable or desirable formation or arrangement either to provide the points approximately of the same width and length throughout the circle of cutters, or some of the points can be narrow and long with respect to the remaining points which can be relatively wide and short. For instance, I show alternate cutter blocks having similar points 4′ to form what are commonly known as narrow long points, while the intervening cutter blocks have their cutters formed with similar working points 4″ that are wide and short with respect to the cutting points 4′, as more fully illustrated by Figs. 1, 2, 3 and 4, and as will be readily understood by those skilled in the art.

Although in this instance, I happen to show ten cutter blocks each formed with four cutters and the saw blade with ten block receiving seats or edges 7, yet I wish it clearly understood that my invention is not so limited, as any suitable or desirable number of cutter blocks each formed with any suitable number of cutters can be employed.

It is evident that various modifications departures, and variations might be resorted to without departing from the spirit and scope of my invention, and hence I do not wish to limit myself to the exact disclosure hereof.

What I claim is;—

1. A rotary cutting off device having a central work receiving opening, in combination with a cutter ring wedged in said holder around said opening, said holder and ring having coöperating wedging surfaces to lock the ring in the holder by the wedging action of said surfaces on relative rotary movement of the holder and ring in one direction and to loosen said ring in said holder on relative rotary movement in the opposite direction, said ring being composed of a series of separate removable cutter blocks abutting end to end and held thus tightly together to form the ring when locked in the holder.

2. A saw comprising a blade having a central work receiving opening, and a cutter ring fitted to the blade in said opening and composed of separate removable cutter

blocks each formed with a series of cutters, said blade and blocks being formed with coöperating surfaces to force the blocks inwardly to locking position tightly abutting at their ends on forward rotation of the blade.

3. A saw comprising a blade having a central work receiving opening, the edge of the blade around said opening forming a series of inclined cutter block seats, and a cutter ring fitting said edge around said opening and composed of a series of separate removable cutter blocks abutting end to end and fitted to said seats respectively.

4. A saw comprising a blade having a central work receiving opening and an endless series of inclined cutter block receiving seats around said opening, and an endless series of separate similar removable cutter blocks fitted on said seats, respectively, each seat being longer than its cutter block, substantially as described.

5. A saw comprising a blade having a central work receiving opening, the edge of the blade around said opening forming an endless series of similar eccentric segmental cutter block seats separated by radial shoulders with respect to the axis of the blade, and a series of cutter blocks removably engaging said seats and longitudinally slidable thereon and movable radially of the blade to and from operative rocked position and inoperative position.

6. A saw comprising a blade having a central work receiving opening, the edge of the blade forming a series of longitudinally inclined cutter block receiving seats around said opening, and a series of separately removable cutter blocks, each block having a longitudinal concaved edge provided with cutters, said blocks being longitudinally slotted to straddle the edge of the blade around said opening and being removably fitted to said seats to move longitudinally thereof and to move radially with respect to the axis of the blade, substantially as described.

7. A saw comprising a blade having a central work receiving opening, the edge of the blade surrounding said opening forming an endless series of longitudinally inclined cutter block receiving seats, and a series of separate removable cutter blocks fitting the edge of the blade around said opening and movable longitudinally on said seats on forward rotation of the blade to move the blocks inwardly radially of the blade with their ends tightly abutting to lock the blocks in operative positions, and movable in the opposite direction on said seats when the blade is rotated in the opposite direction to cause said blocks to separate from each other for removal from the blade, substantially as described.

8. A saw having a transverse work receiving opening therethrough, the edge of the saw around said opening having an endless series of longitudinally elongated and inclined cutter block receiving seats, and a series of separate removable cutter blocks adapted to said seats to move longitudinally thereon for locking the blocks in the saw and with their ends abutting and for separating the blocks so that the blocks can be separately removed by swinging the same from one end into said opening, each block being shorter than its seat.

9. A blade provided with an annular series of wedging edges, in combination with a cutter ring composed of a series of separate removable cutter blocks at their working edges provided with cutters, said blocks having corresponding wedging surfaces adapted to and movable longitudinally of said edges of the blade to lock and loosen said blocks with respect to said blade, substantially as described.

10. A rotary cutting off device comprising a blade having cutter block driving and locking edge wedging surfaces, and a cutter ring composed of a series of cutter blocks having cutters at their corresponding longitudinal edges and having portions riding on and movable longitudinally of said wedging surfaces, said blocks adapted to abut end to end and being separately removable, each block having an inclined end whereby the blocks when in inoperative position can be removed from the blade by swinging on one end therefrom.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE GORTON.

Witnesses:

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C. R. CARPENTER.

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