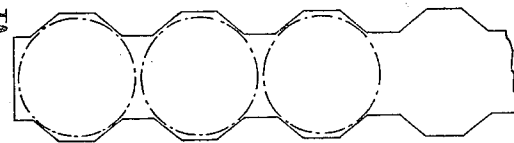
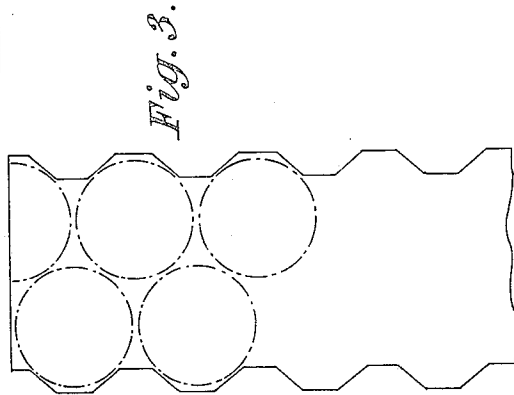
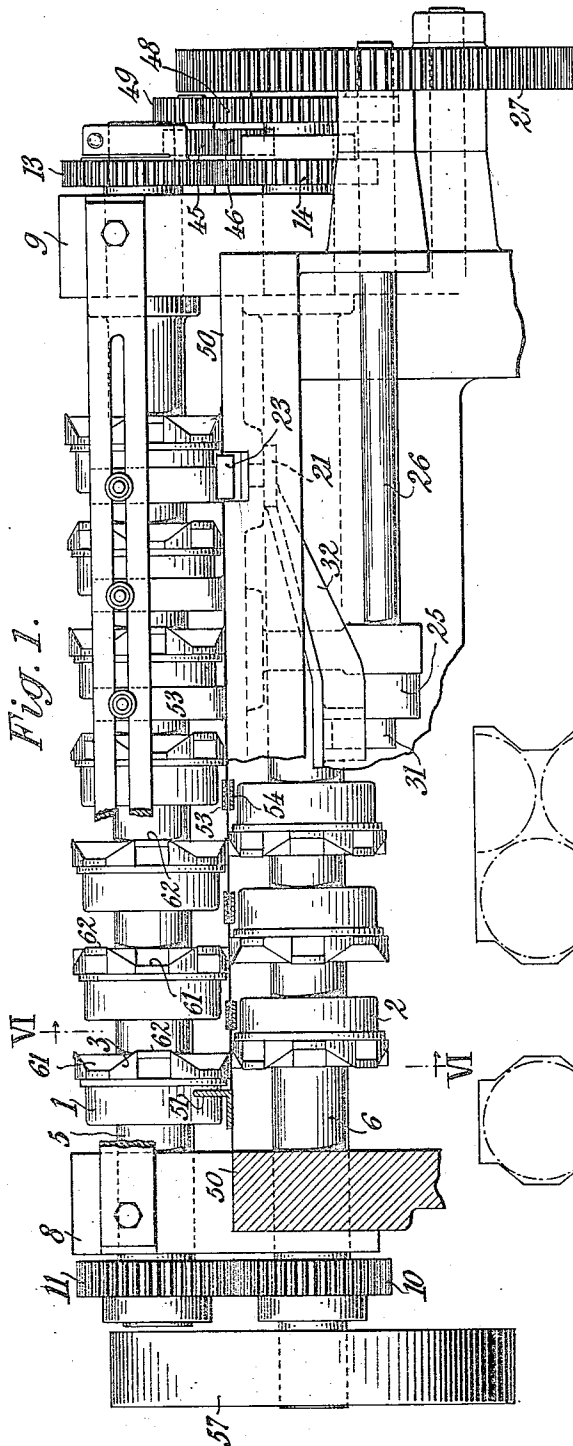


P. KRUSE.
ZIGZAG CUTTER.
APPLICATION FILED FEB. 26, 1921.

1,433,138.

Patented Oct. 24, 1922.
3 SHEETS—SHEET 1.



Inventor:
Peter Kruse,
By Attorneys,
Fraser & Myers

P. KRUSE.
 ZIGZAG CUTTER.
 APPLICATION FILED FEB. 26, 1921.

1,433,138.

Patented Oct. 24, 1922.
 3 SHEETS—SHEET 2.

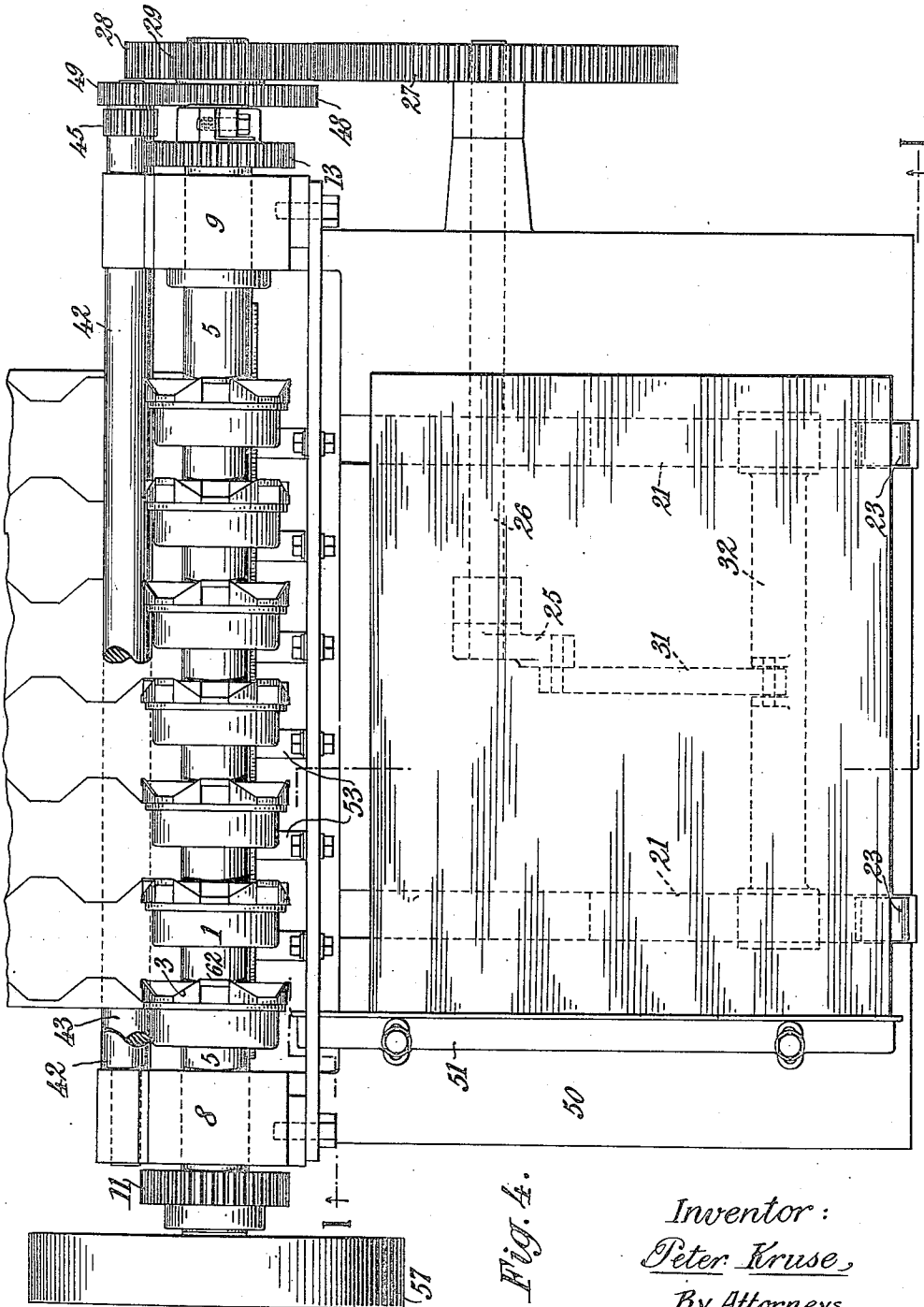


Fig. 4.

Inventor :
Peter Kruse,
 By Attorneys,
Fraser & Myers

1,433,138.

Patented Oct. 24, 1922.
3 SHEETS—SHEET 3.

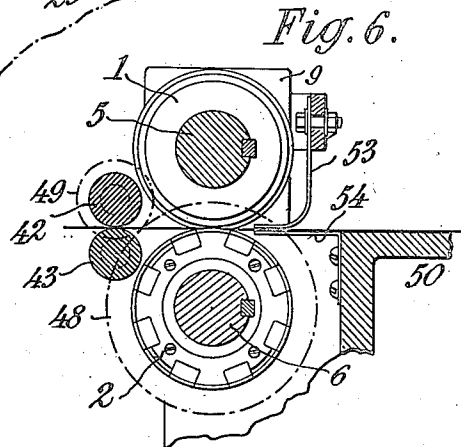
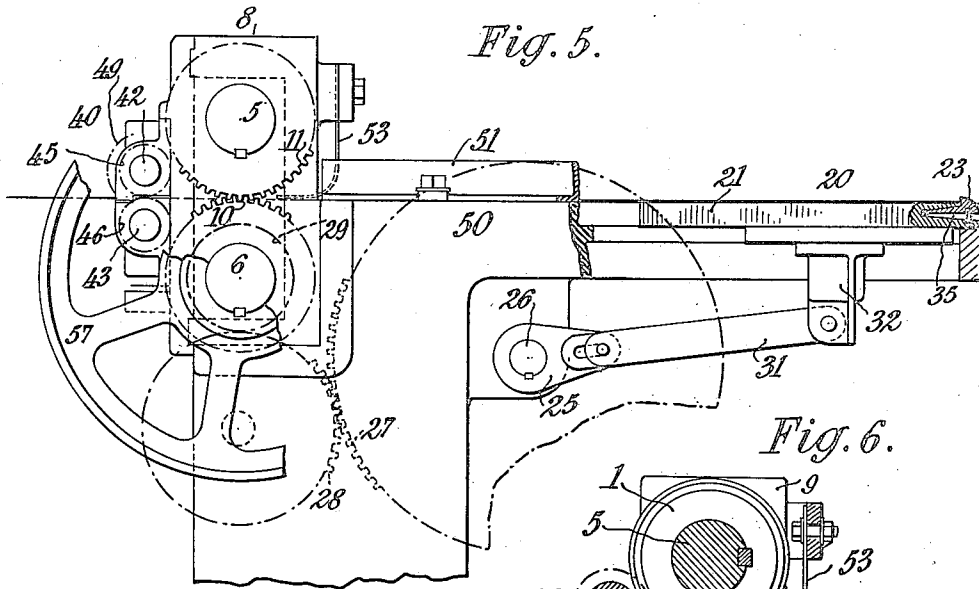


Fig. 7.

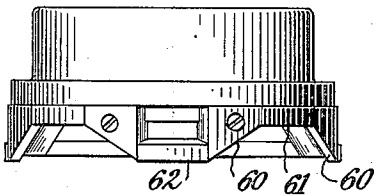


Fig. 8.

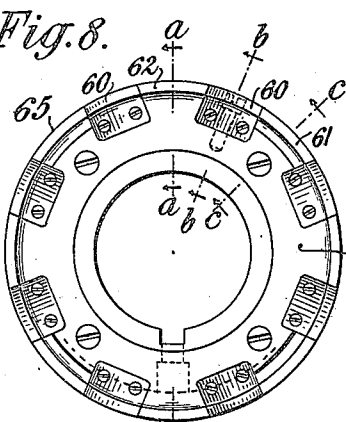


Fig. 9^a

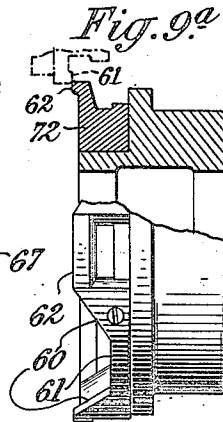


Fig. 9^b

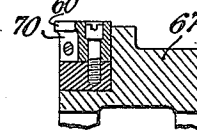
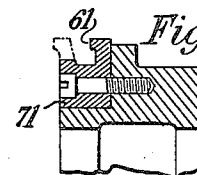


Fig. 9^c



Inventor:
Peter Kruse,
By Attorneys,
Thos. J. Myers

UNITED STATES PATENT OFFICE.

PETER KRUSE, OF BROOKLYN, NEW YORK, ASSIGNOR TO E. W. BLISS COMPANY, OF
BROOKLYN, NEW YORK, A CORPORATION OF WEST VIRGINIA.

ZIGZAG CUTTER.

Application filed February 26, 1921. Serial No. 448,230.

To all whom it may concern:

Be it known that I, PETER KRUSE, a citizen of the United States of America, residing in the borough of Brooklyn, county of Kings and State of New York, have invented certain new and useful Improvements in Zigzag Cutters, of which the following is a specification.

This invention relates to improvements in rotary cutting devices for metal plate or the like, especially intended for cutting strips with zig-zag edges, that is, cuts not in a straight line, and aims to provide improvements therein.

The invention provides a device wherein strips with zig-zag edges suitable, for example, for use in a press for forming can-heads or "ends," may be expeditiously cut from sheets of metal plate or the like. The invention further provides a cutter of the gang type wherein a plurality of zig-zag cuts may be simultaneously made in a sheet.

The invention further provides a device employing rotary cutters having zig-zag cutting edges, wherein successive strips of identical shape may be cut from sheets.

The invention further provides a cutting device of compact and durable form.

The invention further provides an improved cutter admitting of convenient manufacture, assembling, and sharpening.

Other features of improvement will be pointed out hereinafter.

An embodiment of the invention is illustrated in the accompanying drawings; wherein,

Fig. 1 is a view thereof, partly in end elevation, and partly in vertical section, the view being along the line I—I, Fig. 4, in the direction of the arrows.

Figs. 2 and 3 are views of strips of metal, showing examples of the work which may be done in the device.

Fig. 4 is a top plan view of the construction shown in Fig. 1.

Fig. 5 is a side elevation, partly in section.

Fig. 6 is a vertical sectional view on the line VI—VI Fig. 1.

Figs. 7 and 8 are respectively side and face views of one of the cutters, and

Figs. 9^a, 9^b and 9^c are sectional views on the lines *a—*a**; *b—*b**; and *c—*c**, Fig. 7.

Referring to said drawings, numeral 1 indicates a rotary cutter having a zig-zag

cutting edge 3 thereon, and 2 designates a part coacting with the cutter 1, which is preferably also in the form of a cutter, preferably also a rotary cutter, the cutters being thus grouped in a pair or pairs. The cutters 1 and 2 are mounted in convenient manner, as upon shafts 5 and 6, journaled at each end in suitable bearings in the side frames 8 and 9 of the machine, and preferably intergeared, as by means of gears 10, 11, in such manner that the shafts 5 and 6 turn at the same angular speed. An additional pair of gears 13, 14, is provided, one of which is frictionally fastened to the shaft in such manner as to be rotatable on the shaft when its fastening is loosened, in such a manner that all backlash or independent movement between the shafts 5 and 6 is prevented.

The cutting edges 3 preferably overlap slightly, in such manner as to shear or cut a sheet of metal, or the like, when passed between the two cutters. The cutters 1 and 2 are so positioned on their respective shafts, that, as the cutters turn, each zig-zag part of one cutter has a counterpart of the zig-zag cutting edge of the other cutter opposite it, at the meeting or overlapping point.

Means are preferably provided for coacting or co-operating with the cutter, or cutters, in such manner, that successive strips cut by the device may have an identical shape, at least on the side having the zig-zag cut. This means may be various. It may conveniently comprise a feeding or presenting device 20 between which and the cutter support there may be relative movement, and as here embodied, (cutter on shaft in stationary bearings) said means may comprise a reciprocatory bar or bars 21, having a projection or projections 23 thereon for engaging the rear edge of a sheet to be cut, as indicated in Figs. 5 and 4. The bar or bars 21 may be driven or set in any suitable manner, in timed relation to the rotary cutters 1, 2. As here shown, the driving means comprise a crank arm 25 on a shaft 26, which shaft has thereon a gear 27 meshing with an idler gear 28, which idler gear may mesh with a gear 29, mounted upon one of the shafts 5, 6, carrying cutters. A link 31 may serve to connect the crank 25 to a cross arm 32 carrying the feed bar or bars 21. The relation between the movement of the bar or bars

21 to the rotary cutters, is such that said bar or bars will bring the initial edges of sheets of the same length against the cutters at a predetermined circumferential point or points on the cutters, so that identical cuts will be made upon successive sheets. The movement of the bar or bars 21 may be such as to only feed the sheet to the point where the initial edge of the sheet comes under the action of the cutters. The cutters thereafter may serve to pull or feed the sheet through the cutters.

The projections 23 are conveniently mounted upon spring pressed fingers 35.

Any other means than those specified may be provided for initiating the cutting action of the cutters at a predetermined circumferential point or points on the cutters. The construction specifically described, however, has the advantage that the cutters may be rotated continuously and sheets fed or presented thereto in such manner that identical strips may be cut from succeeding sheets.

Suitable feeding or forwarding means may be provided for feeding the cut strips away from the cutter or cutters. This means may conveniently comprise a pair of rollers 42, 43, geared together by gears 45, 46, and conveniently driven from one of the cutter shafts 5, 6, by means of gears 48, 49. The ratio of the gearing is conveniently such that the rollers 42, 43 have a circumferential speed slightly greater than that of the edges of the cutters.

The device is conveniently provided with accessory parts such as a table 50, a lateral guide 51, and strip or spring guides 53, 54, for holding straight the initial edge of a sheet immediately in front of the cutters.

The device may be driven by means of a pulley 57 mounted directly upon one of the cutter shafts 5, 6.

The cutter is preferably of the gang type, in which case the cutter shafts 5, 6, may be provided with a plurality of pairs of cutters 1, 2. In this manner, the device may operate to cut simultaneously a plurality of strips from a sheet of metal or the like.

In the embodiment shown, the machine is especially adapted for cutting strips which are afterwards fed to a press for cutting and stamping the head or ends, so called, of cans. Fig. 1 illustrates a strip suitable for feeding to a single die press; and Fig. 3 illustrates a strip suitable for feeding to a two die press. By cutting the sheet into strips with zig-zag edges and so that the broad portions of one strip or series are staggered with relation to the broad portions of an adjacent series or strip, in the manner illustrated, a greater number of can heads or ends may be obtained than from a sheet of equal dimensions cut into strips with straight edges.

With a plurality of cutters the arrangement is such that, in an axial line, parts of the cut-

ting edges (as 62, 61, Fig. 1) of two of said cutters are adjacent, and of the second and third cutters are remote, thus presenting in the sheet, staggered (partial) polygons.

The cutters for producing certain kinds of strips, as for example, the strips mentioned above for use in presses for forming can heads, may, to advantage, be formed of straight edges 60, 61, 62 joining at an angle, as illustrated clearly in Fig. 7. The circumference of the cutting edge is preferably circular, as indicated at 65. Moreover, for convenience in manufacture, the cutting edges in whole or in part may be formed upon separable parts, and fastened to a hub 67. For example, the parts 61, 62 of the cutting edge, which are in parallel planes perpendicular to the axis of the shaft, may be formed upon separate parts 71, 72 (Figs. 9^a, 9^c), and the diagonal parts 60 of the cutting edge may be formed upon separate parts 70. The construction of the cutter wherein the cutting edge is formed in whole or in part upon separate sections or parts, is also favorable to the sharpening of the cutting edges by means of a rotary grinding disc. For example, by removing the parts 70 having the diagonal parts of the cutting edge thereon, the cutters may be rotated against a rotary grinder opposite the edges 61, 62. Or, instead, the edges 62 may be first rotated against a rotary grinder, and then the parts or sections 72 carrying these edges may be removed, and the edges 61 rotated against a rotary grinder. After the parts have been sharpened, they may be re-assembled on the hub 67.

The operation of the machine will be clear from the foregoing description.

The inventive idea herein set forth may receive other embodiments than that herein specifically illustrated and described, and parts of the invention may be used independently of others.

What is claimed is:

1. A zig-zag cutting device for cutting strips of metal plate or the like, comprising a plurality of axially spaced rotary cutters having zig-zag cutting edges, each of said cutting edges being at substantially an octahedral angle to an adjoining edge, each cutting edge, when said cutters are spaced apart the width of a single width strip, being similar but opposite (enantiomorphous) to the edge of an axially opposite cutter, and being similar when said cutters are spaced apart the width of a double width strip.

2. A zig-zag cutting device for cutting strips of metal plate or the like, comprising a plurality of axially spaced rotary cutters having zig-zag cutting edges, each of said cutting edges being at substantially an octahedral angle to an adjoining edge, and means for initiating the cutting action of said cutter on sheets at an identical point on

the circumference of said cutter, or successively at several points having symmetrical relations to the zig-zag contour of said cutting edges.

5 3. A zig-zag cutting device for cutting strips of metal plate or the like, comprising a plurality of axially spaced rotary cutters having zig-zag cutting edges, each of said cutting edges being at substantially an octahedral angle to an adjoining edge, each cutting edge, when said cutters are spaced apart the width of a single width strip, being similar but opposite (enantiomorphous) to the edge of an axially opposite cutter, and
10 being similar when said cutters are spaced apart the width of a double width strip, and means for initiating the cutting action of said cutter on sheets at an identical point on the circumference of said cutter, or successively at several points having symmetrical relations to the zig-zag contour of said cutting edge.

4. A zig-zag cutting device for cutting strips of metal plate or the like, comprising
25 a rotary cutter having a zig-zag cutting edge and means for initiating the cutting action of said cutter on sheets at an identical point on the circumference of said cutter, or successively at several points having symmetrical relations to the zig-zag contour of said cutting edge.

5. A zig-zag cutting device for metal plate or the like, comprising a rotary cutter having a zig-zag cutting edge, means for initiating the cutting action of said cutter on sheets at an identical point on the circumference of said cutter, or successively at several points having symmetrical relations to the zig-zag contour of said cutting edge, and means for
30 producing relative movement between said cutter and said means.

6. A zig-zag cutting device for metal plate or the like, comprising a rotary cutter having a zig-zag cutting edge, and a feed device
45 having its motion timed to that of the rotation of the cutter, the coaction of said feed device and cutter being such that the edge of a sheet to be cut is presented at a predetermined circumferential point or points on the cutter.

7. A zig-zag cutting device for metal plate

or the like, comprising a rotary cutter having a zig-zag cutting edge, and a feed device having its motion timed to that of the rotation of the cutter, the coaction of said feed
55 device and cutter being such that the edge of a sheet to be cut is presented at a predetermined circumferential point or points on the cutter, and means for continuously running said cutter and sheet-feeding means.

8. A zig-zag cutting device for cutting strips of metal plate or the like, comprising a plurality of axially spaced rotary cutters having zig-zag cutting edges, each of said cutting edges being at substantially an octahedral angle to an adjoining edge, and a feed device having its motion timed to that of the rotation of the cutter, the coaction of said feed device and cutter being such that the edge of a sheet to be cut is presented at a
65 predetermined circumferential point or points on the cutters.

9. A zig-zag cutting device for metal plate or the like, comprising a rotary cutter having a zig-zag cutting edge, said cutter comprising cutting edge portions in displaced
75 planes perpendicular to the axis of the cutter, and a diagonal edge portion connecting said parallel edge portions, and separable parts on which diagonal cutting edge portions are formed, permitting ready grinding of said parallel edge portions.

10. A zig-zag cutting device for metal plate or the like, comprising a rotary cutter having a zig-zag cutting edge, said cutter
85 comprising cutting edge portions in displaced planes perpendicular to the axis of the cutter, and a diagonal edge portion connecting said parallel edge portions, and separable parts on which said diagonal cutting edge portions are formed, permitting ready grinding of said parallel edge portions, and separable parts on which parallel cutting edge portions are formed, permitting removal to give access to other parallel cutting edge portions for grinding.

In witness whereof, I have hereunto signed my name.

PETER KRUSE.

Witnesses:

CHAS. J. ELLSWORTH,
M. D. TRUESDALE.