C. J. HOLUB.

SHEET METAL CUTTER.

APPLICATION FILED JUNE 5, 1914.

1,154,924.

Patented Sept. 28, 1915.

3 SHEETS—SHEET 1.

Fig. 2

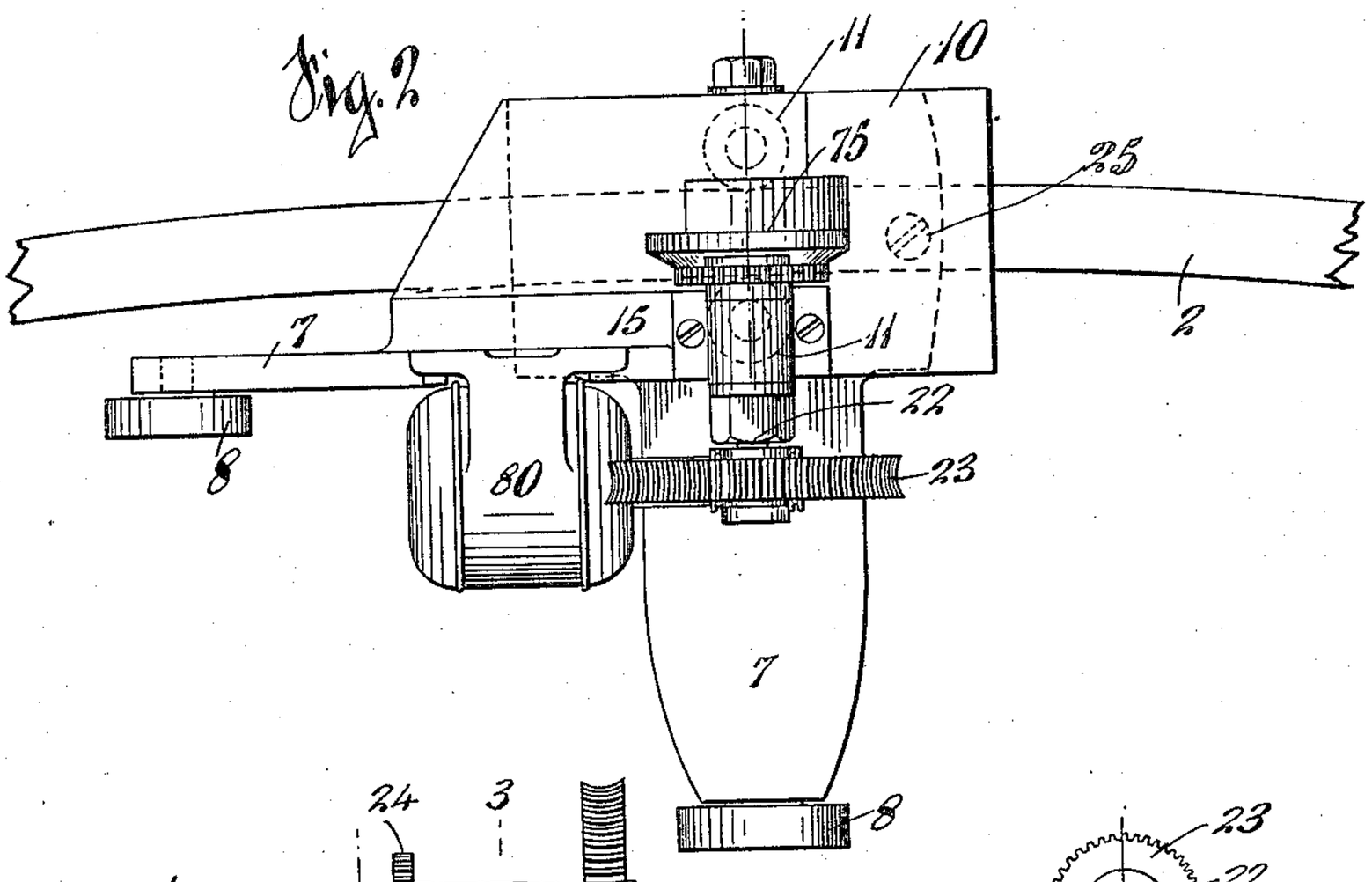


Fig. 1

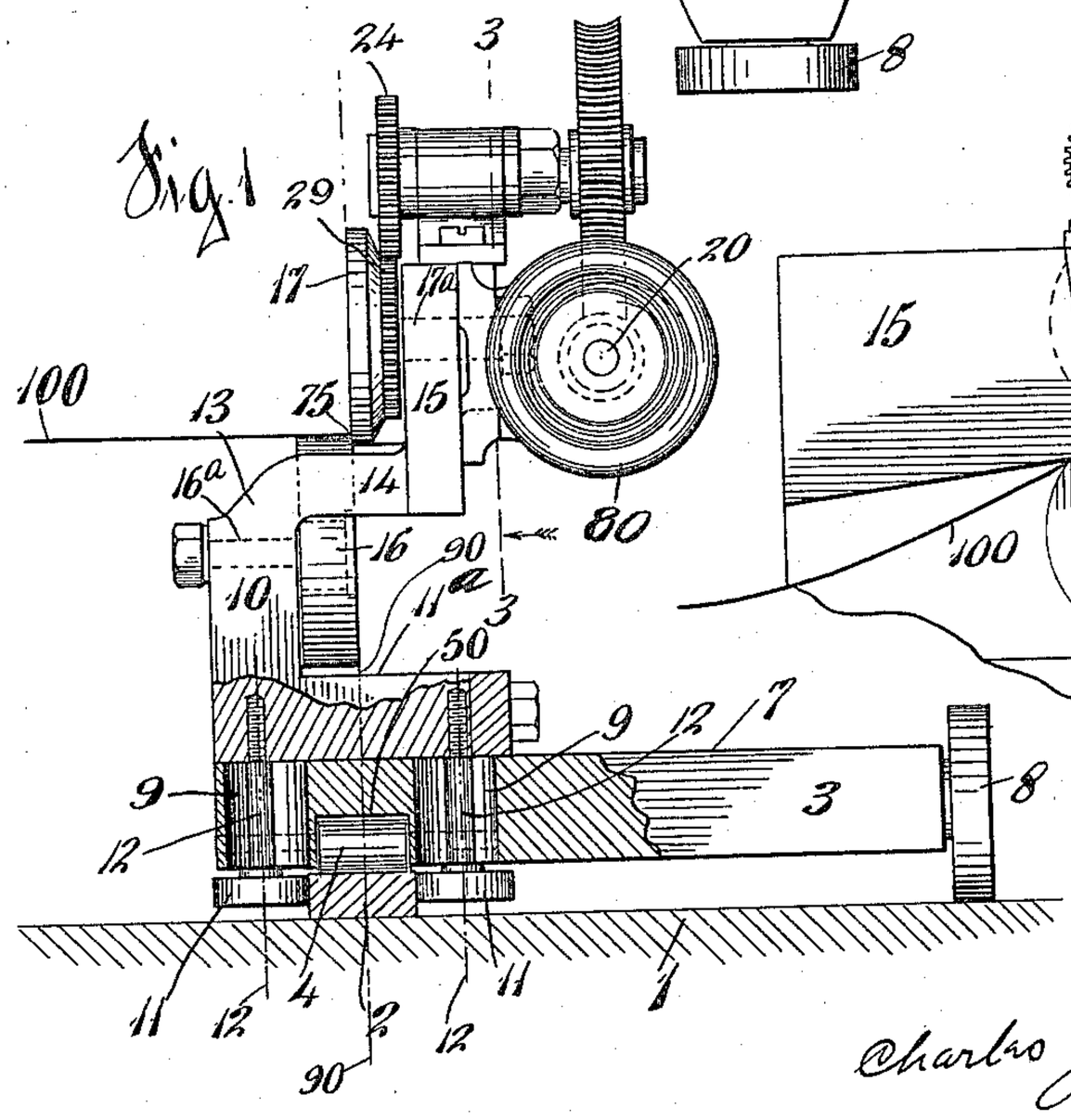
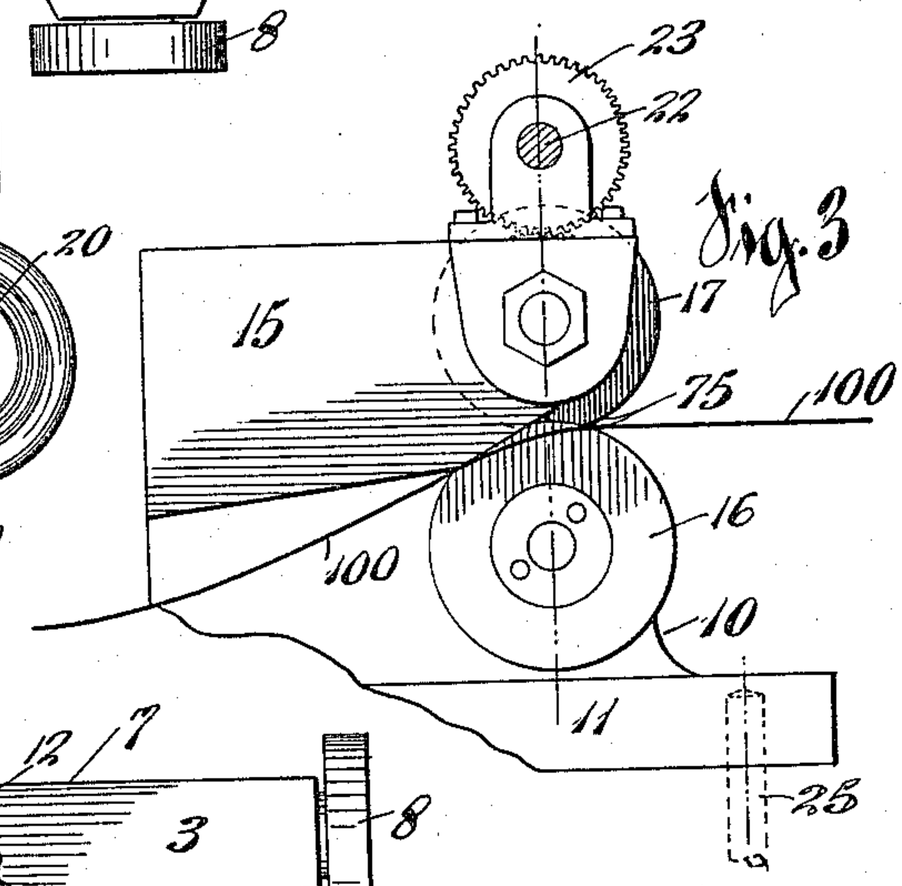


Fig. 3



Witnesses

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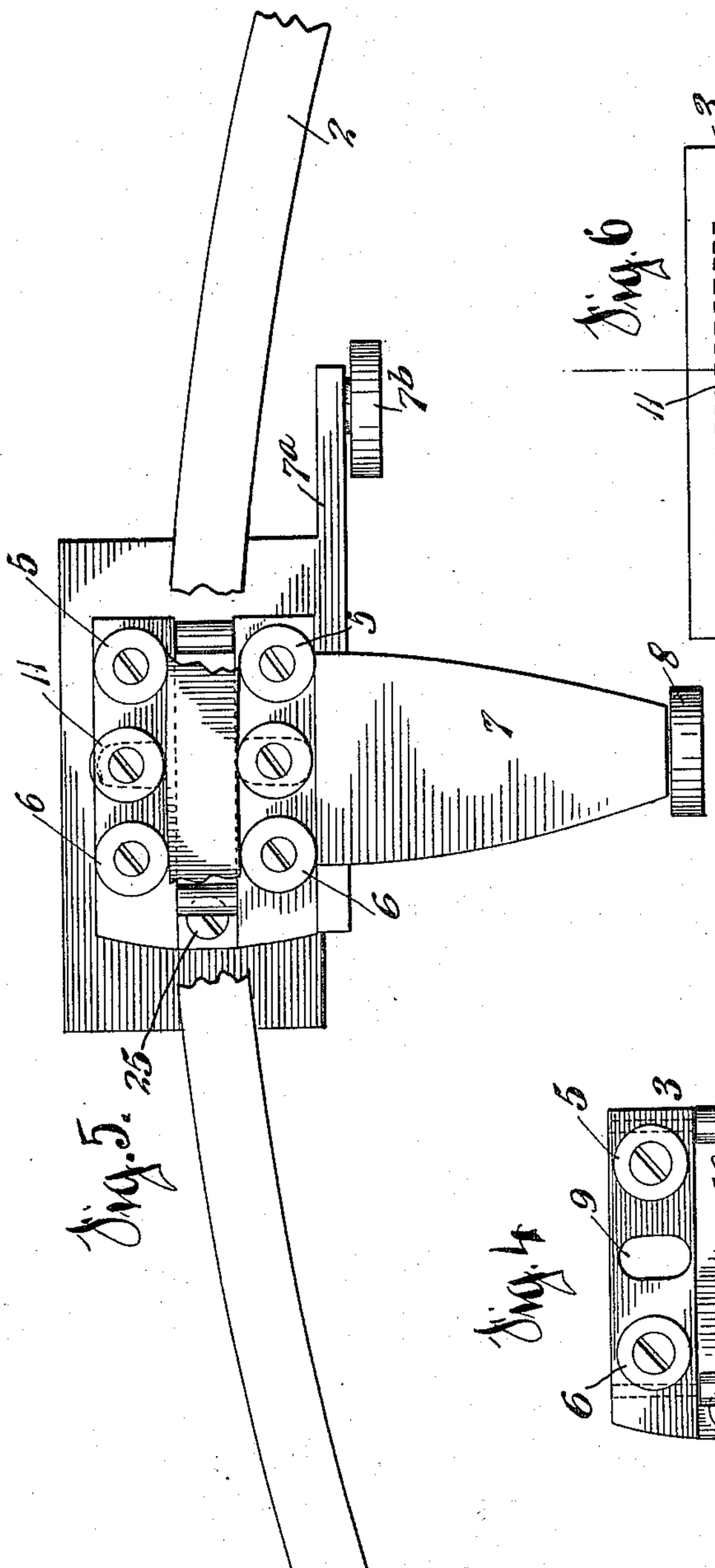

Fig. 5.

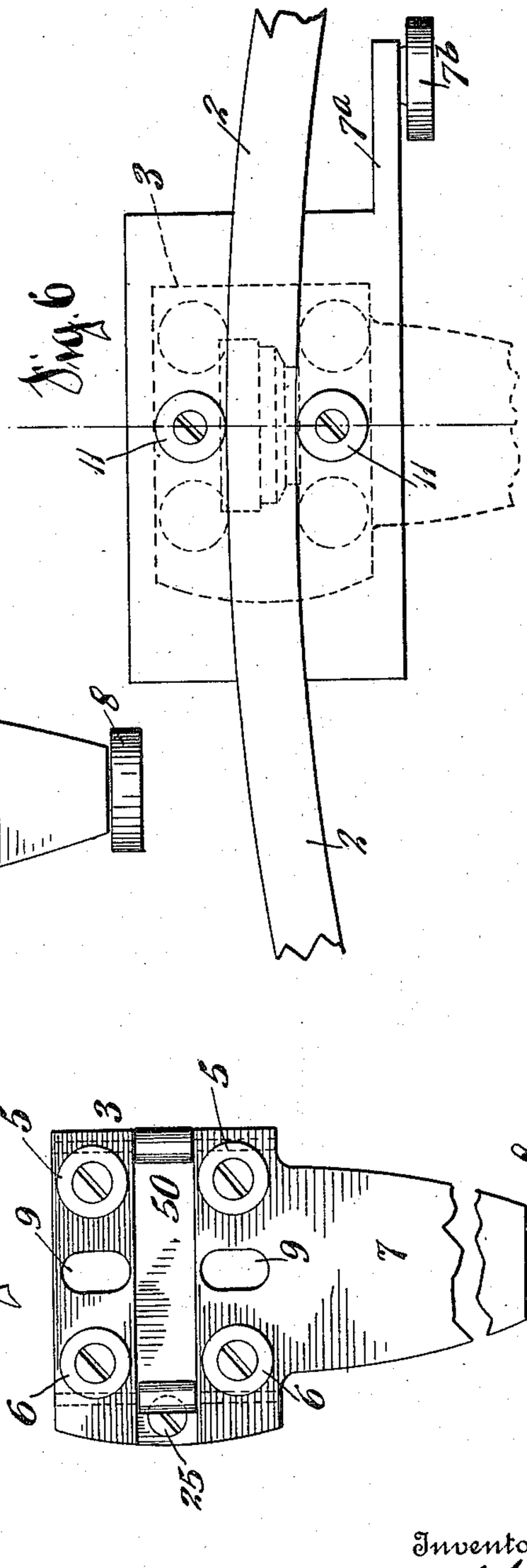

Fig. 6.

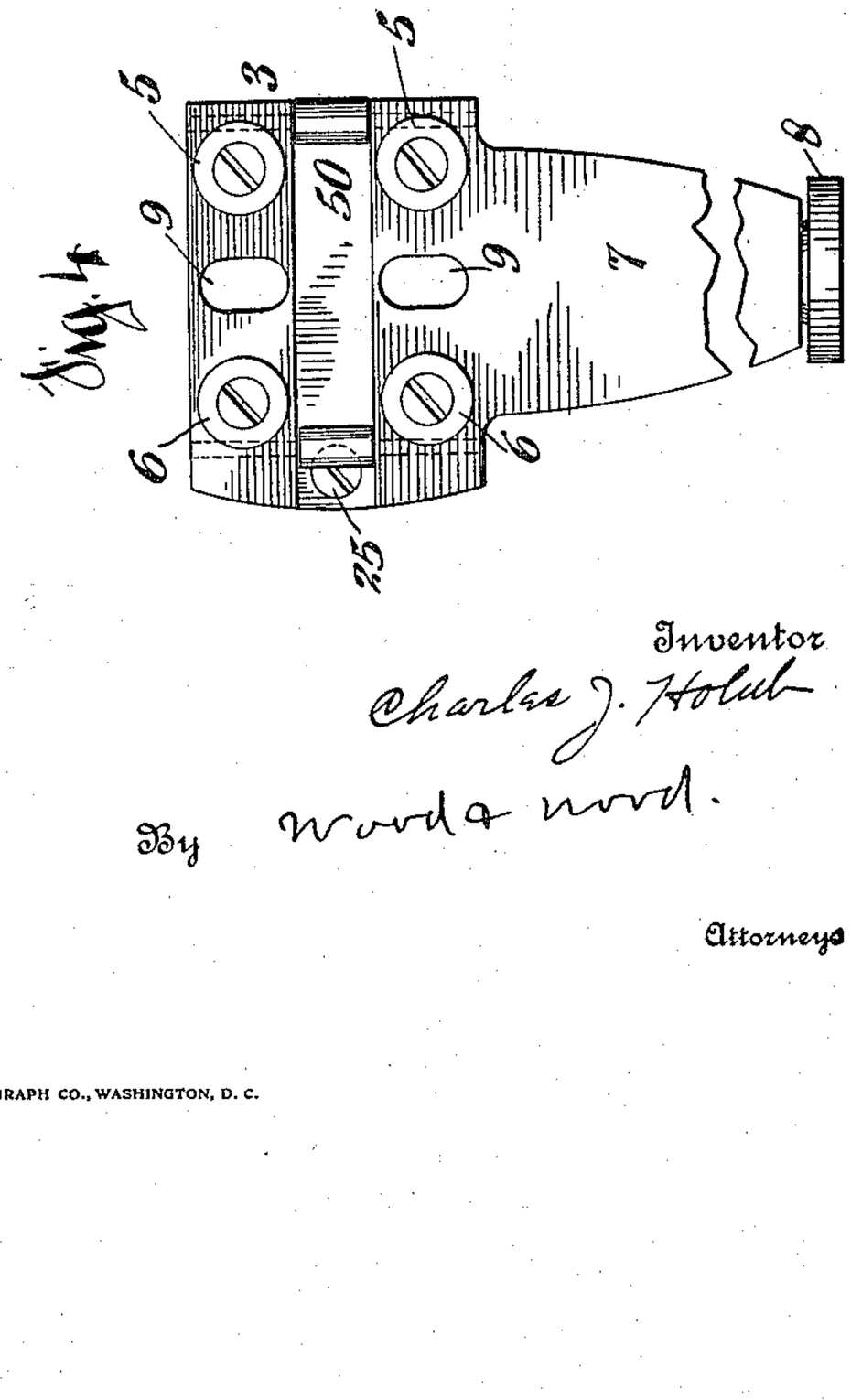

Fig. 4.

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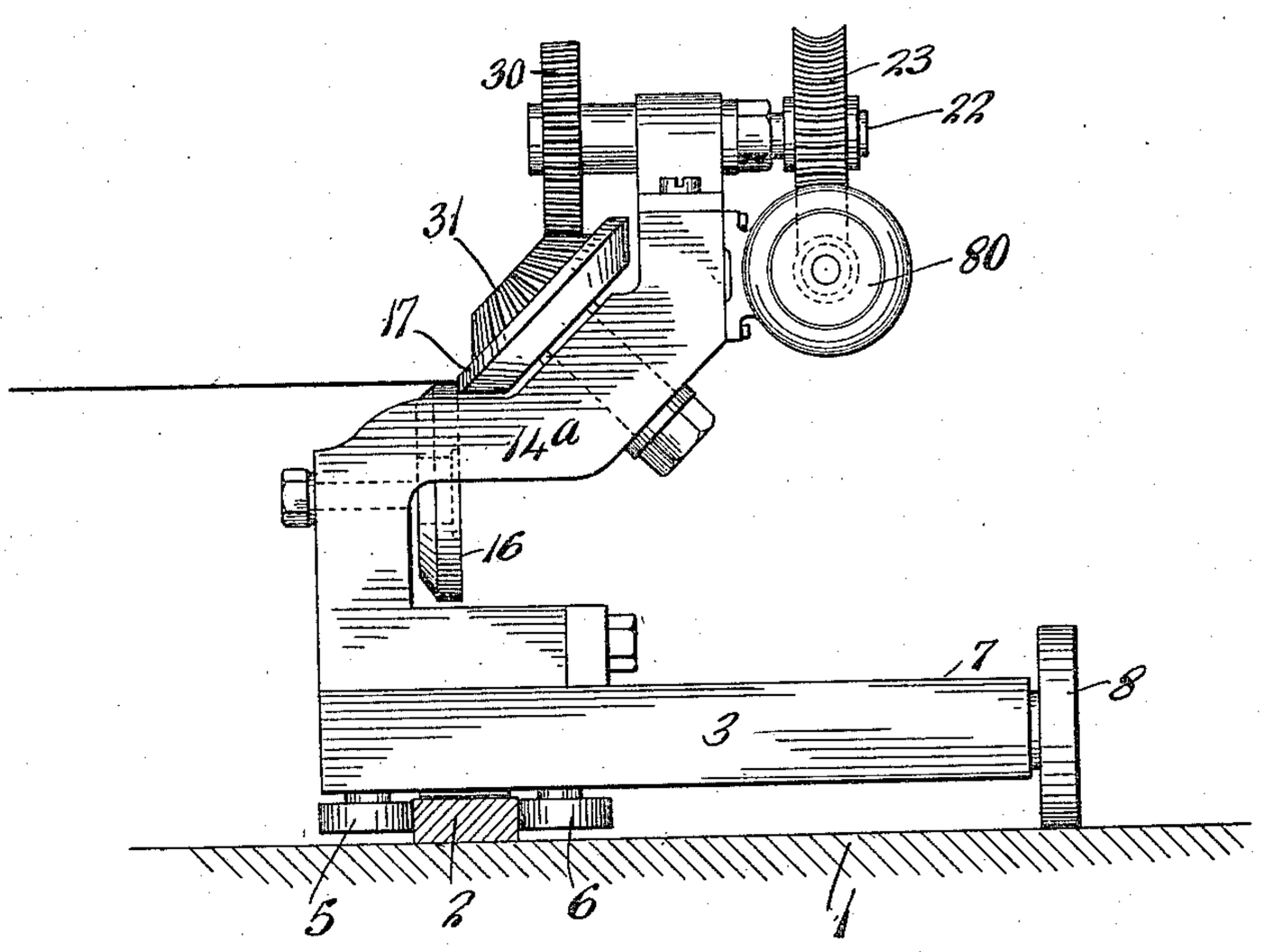
3 SHEETS—SHEET 3.

Fig. 7



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UNITED STATES PATENT OFFICE.

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SHEET-METAL CUTTER.

1,154,924. Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed June 5, 1914. Serial No. 843,136.

To all whom it may concern:

Be it known that I, CHARLES J. HOLUB, a citizen of the United States, and residing at Newport, in the county of Kenton and State of Kentucky, have invented a new and useful Improvement in Sheet-Metal Cutters, of which the following specification is a full disclosure.

My invention relates to a sheet metal cutting device.

One of the objects of the invention is to provide a sheet metal cutter for cutting curves, irregular or variable, and the device belongs to that class of mechanisms wherein the cutting edge is guided in its travel by a track pattern.

Another object of the invention is to provide means which will accurately reproduce the pattern contour, and without straining the blank or irregular shearing of the metal as the cutting edge at all times travels in a curved line coincident with the pattern.

Another object of the invention is to provide an improved cutter frame, enabling any depth of metal to be inserted between the cutter disks.

The features of my invention are more fully set forth in the description of the accompanying drawings, forming a part of this specification, in which:—

Figure 1 is a central vertical section through the machine, Fig. 2 is a top plan view. Fig. 3 is a side elevation. Fig. 4 is a bottom plan view of the truck. Figs. 5 and 6 are bottom plan views of the truck and cutter frame guide rollers in different positions on the track. Fig. 7 is a modification showing the upper cutting disk inclined to the vertical, this being the preferred form.

The machine operates on a table 1, having a curved pattern track 2, in this instance representing the pattern to be cut in forming a blank for a short metal elbow joint. The means for horizontally supporting the metal to be cut, adjacent the cutting edges of the disk, need not be shown as it is well known, but the metal sheet is indicated by the line 100, Fig. 1.

There is first a truck 3, traveling on the table and guided approximately by the pattern, see Fig. 5. The under side of the truck has a groove 50, into which the one-rail track extends, the two truck rollers 4, within the truck groove, riding on top of said rail, and the two pairs of rollers 5, 6, upon each side of the groove, engaging the sides of the rail. Preferably the truck has a lateral extension 7, having a table roller 8, and a rearward extension 7^a with a roller 7^b the better to enable the truck to roll in a curved path on the table and to be pushed by the operator. Midway between the pair of rollers 5, 6, the truck is formed with the elongated slots 9, extending coincidentally in the transverse line of the cutting edges of the disks. The cutter frame 10 is pivotally mounted on the truck. The forward portion of the cutter frame base plate 11^a is pivoted on the upper face of the truck by means of pivot bolt 25, in line with and in front of the cutting edges 75.

The cutter frame base plate has two rollers 11, upon opposite sides of the track, the axes 12 thereof extending vertically through slots 9 of the truck, and these guide rollers are adjacent and upon opposite sides of the cutting edges of the disks. The cutter frame pivot 25 is in front of and in a line midway between guide rollers 11, the cutting edges 75 being also in the same line. That is, as the truck frame rolls on the table, guided by the track, the cutter frame is pivoted on the truck, so as to trail the cutting disks, and the free or swiveling end of the frame is accurately guided by the track through the engagement of the cutter frame rollers 11 therewith, the elongated slots in the truck permitting of this relative movement of the truck and cutter frame.

The cutter frame is of unique construction, from the outer and rear margin of the base plate rises a frame piece 13, from the rear end of which outwardly projects the horizontal extension 14, the outer end of which member 14 extends vertically upward and then projects forwardly, forming the support 15 for the disk-operating mechanism. The lower cutting disk 16 is loosely journaled on a stud 16^a fixed in frame piece 13 and is not positively driven. The upper cutting disk 17 is secured to a shaft 17^a rotatably journaled in frame piece 15, thus disposing these cutting disks 16, 17, between the frame pieces 13, 15, in front of the horizontal frame piece 14, and in rear of the base plate pivot 25. These frame portions 13, 14, 15, constitute a super-frame relative to the base plate, and this super-frame carry-

ing the disks extends rearwardly of the pivot, see Fig. 3.

The metal 100, Fig. 1, projects from the direction in which the lower disk stud 16ª extends, resting on the lower disk and passing under the upper disk. The cutting action deflects downwardly the sheared portion which passes under the frame piece 14, as indicated in Fig. 3, and as no frame portion projects laterally beyond the cutting edges 75, any desired depth of metal can be inserted between the disks.

As shown in Fig. 1, the line 90 representing the vertical plane of the cutting edges bisects the pivot 25 and passes midway between the guide rollers 11.

The disk operating mechanism comprises a worm shaft 20 preferably motor driven, a motor 80 being shown in Figs. 1 and 2, a right angle shaft 22 having a worm wheel 23 engaging worm shaft 20 and a gear 24 meshing with gear 29 on the shaft 17ª of the cutter disk 17.

Preferably the upper disk is angled, as shown in Fig. 7, as this bevel type of cutter is better adapted to describe curves. A trailing, pivotal, bevel cutter is thus supported movably on the truck, the cutting edges being guided by the track in rear of the pivotal point 25, when the truck is appropriately advanced on the table, the cutter frame being so constructed that the disks are the advancing portions of the base plate superframe. This constitutes a very simple and effective sheet metal cutter, capable of accurately and invariably duplicating curved patterns, the incision being rendered without hacking or irregular shearing effect, and thus producing a uniform, regular, clear cut severed edge of the blank, the action being so smooth that the sheet metal need not be rigidly clamped.

In other devices for this purpose, with which I am familiar, relative motion between the table carriage and cutter frame is provided by causing the cutter frame to slide in right lines on the carriage to and from the metal to be cut, and as the cutting edges have appreciable lineal dimension, this out and in movement of the cutting edge maws or shears the blank irregularly, producing straight lines instead of curves in places, very much like the result of attempting to open a round can lid with a straight edge can-opener. Such out and in movement also causes the cutting edges to swerve from the tangential line of track curvature so that the edge of the blank so formed does not correctly correspond with the pattern.

My principle of a trailing, swiveled cutter holds the cutting edge in the path of travel always tangent to the tracked curvature, thus not only producing accurate blanks but materially increasing the ease and efficiency of moving the truck over the table, of guiding the cutting edge in exact conformity with the track and enabling the cutters to advance through the material without binding and with the utmost ease as the operator pushes the truck along the track.

In the modification shown in Fig. 7, the cutter frame portion 14ª, instead of being horizontal is inclined to the vertical in order to support the upper cutting disk 17 at an angle, thus providing an angle or bend cutting edge best adapted to describe curves. This arrangement requires that there be the bevel driving gears 30, 31, for rotating this upper or angled cutter disk. By this arrangement it will be seen that the cutting edge, being alined with the pivot point 25, is coincident with the radius of the arc of the circle in which the cutter-frame swings, as it is particularly guided by the track. Thus the cutting edge follows the curve of the pattern tangentially, as the cutter frame is positioned in its arc of movement by the pattern variation.

Having described my invention, I claim:—

1. In a sheet metal cutter for operating on an irregular pattern track, a truck, a cutter frame pivoted on the truck, cutters on the frame, the plane of the cutting edges being in radial alinement with the pivot point, the disk bearing portion of said frame being free to swing relative to the truck and being guided by the track.

2. In a sheet metal cutter for operating on a table having an irregular pattern track, a truck rolling in the table and guided by the track, a cutter frame, the forward portion of which is pivoted to the truck, cutters on said frame with the cutting edges in rear of and in line with the pivot, and guide rollers for the trailing portion of said frame operating through slots in the truck, the coincident line of said pivot and cutting edges passing midway between said frame guide rollers.

3. A sheet metal cutter for operating on an irregular or curved pattern track, comprising a truck, and a trailing cutter frame pivoted to swing radially on the truck, the free end being guided by the track.

4. A sheet metal cutter for operating on an irregular or curved pattern track, comprising a truck, a trailing cutter frame radially pivoted on the truck, the free end being guided by the track, and cutters on said frame providing an inclined cutting edge.

5. In a sheet metal cutter for operating on a table bearing a curved or irregular pattern track, a truck rolling on the table and track, a cutter frame, cutter disks thereon providing a cutter edge, said frame being pivoted on the truck with said cutter edge extending radially to the arc of the frame swing, and means on the frame engaging the track to swing the frame on the truck whereby the

cutting edge travels tangential to the curvature of the track.

6. In a sheet metal cutter for operating on a table, having an irregular or curved pattern track, a truck rolling on said table or track, a cutter frame, the advancing portion of which is pivoted on the truck, cutters on said frame in rear of and alined with said pivot, and means guiding the swinging portion of said frame by the track in a line transversely coincident to the cutting edge.

7. In a sheet metal cutter for operating on a table, having a curved or irregular pattern track, a truck, a cutter frame, disks providing a cutting edge, a pivotal connection between the truck and frame, and guide rollers for the swinging end of the frame, the cutting edge being alined with said pivot, the pivot being in the medial line of said guide rollers, and the guide rollers being disposed in a line transverse to the cutting edge.

8. In a sheet metal cutter, a frame having a base plate, a superstructure comprising a vertical projection from the plate, and a lateral extension terminating in a second vertical member, cutting disks having their axles extending in opposite directions and disposed in parallel vertical planes, said axles having bearings in portions of the superstructure, the disks being on the free ends of said axles between said bearing portions of the superframe.

9. In a sheet metal cutter, a truck, a base plate, the forward portion of which is pivoted to the truck, a superframe on the trailing portion of the base plate, cutting disks on the superframe providing a cutting edge alined with the pivot, means guiding the swinging portion of the base plate from the track adjacent the cutting edge, the pivot being on the medial line between the guides, the disks being on the forward portion of the superframe in rear of the pivot.

10. In a sheet metal cutter, a curved pattern track, a base plate, frame members thereon extending in parallel vertical planes connected by a transverse frame member, and cutting disks having bearings in said frame members in front of the transverse frame member and providing an advancing cutting edge.

11. In a sheet metal cutter, a curved pattern track, a base plate, frame members thereon extending in parallel vertical planes connected by a transverse frame member, cutting disks having bearings in said frame members in front of the transverse frame member, providing an advancing cutting edge, and means for rolling the base plate over and guiding it by the pattern track.

12. In a sheet metal cutter, a curved pattern track, a base plate, frame members thereon extending in parallel vertical planes connected by a transverse frame member, cutting disks having bearings in said frame members in front of the transverse frame member, providing an advancing cutting edge, a truck on which the base plate is swiveled to trail the cutting edge in alinement with the pivot, means enabling the relative movement of base plate and truck, and track controlled means guiding said movement of the trailing portion of the base plate transversely to the cutting edge.

13. In a sheet metal cutter for operating on a curve or irregular track, a truck having track rollers at each end and transverse slots intermediate the guide rollers, a cutter frame pivoted to the forward portion of the truck, guide rollers for the rear portion of the frame having stems projecting upwardly through the truck slots, cutting disks on the frame providing a cutting edge alined with the pivot and transverse to the frame guide rollers, the pivot being disposed in the medial line of said frame guide rollers.

In witness whereof, I hereunto subscribe my name, as attested by the two subscribing witnesses.

CHARLES J. HOLUB.

Witnesses:
STEPHEN MCDONOUGH,
CHAS. W. MCKEE.