

(No Model.)

2 Sheets—Sheet 1.

J. F. DITTMAN.
ROTARY SHEARS.

No. 586,808.

Patented July 20, 1897.

Fig. 1.

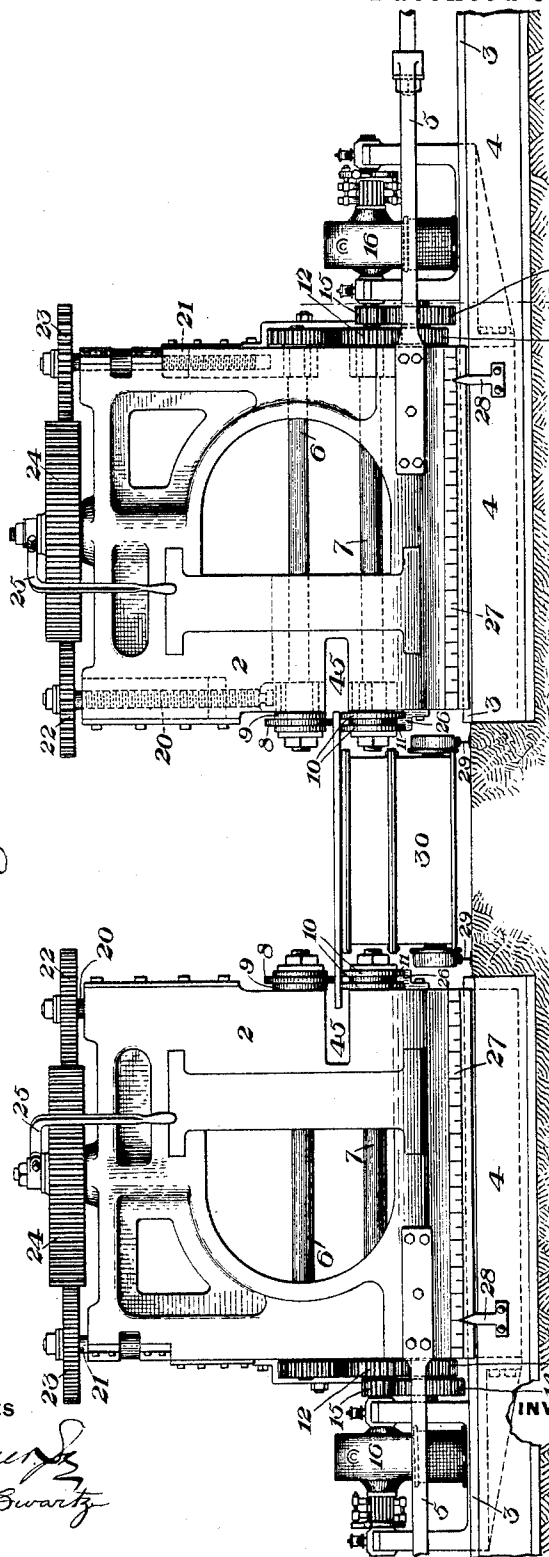


Fig. 5.

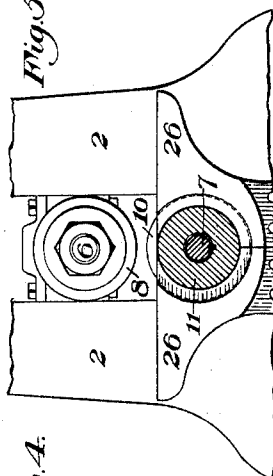


Fig. 4.

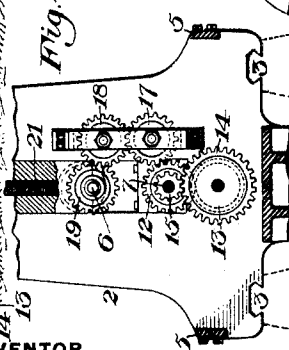
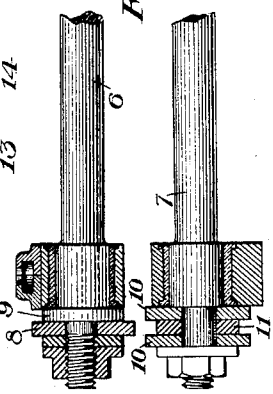


Fig. 6.



WITNESSES

W. L. Conner
Warren L. Swartz

INVENTOR

J. F. Dittman
By R. H. Russell & R. H. Russell
his attys.

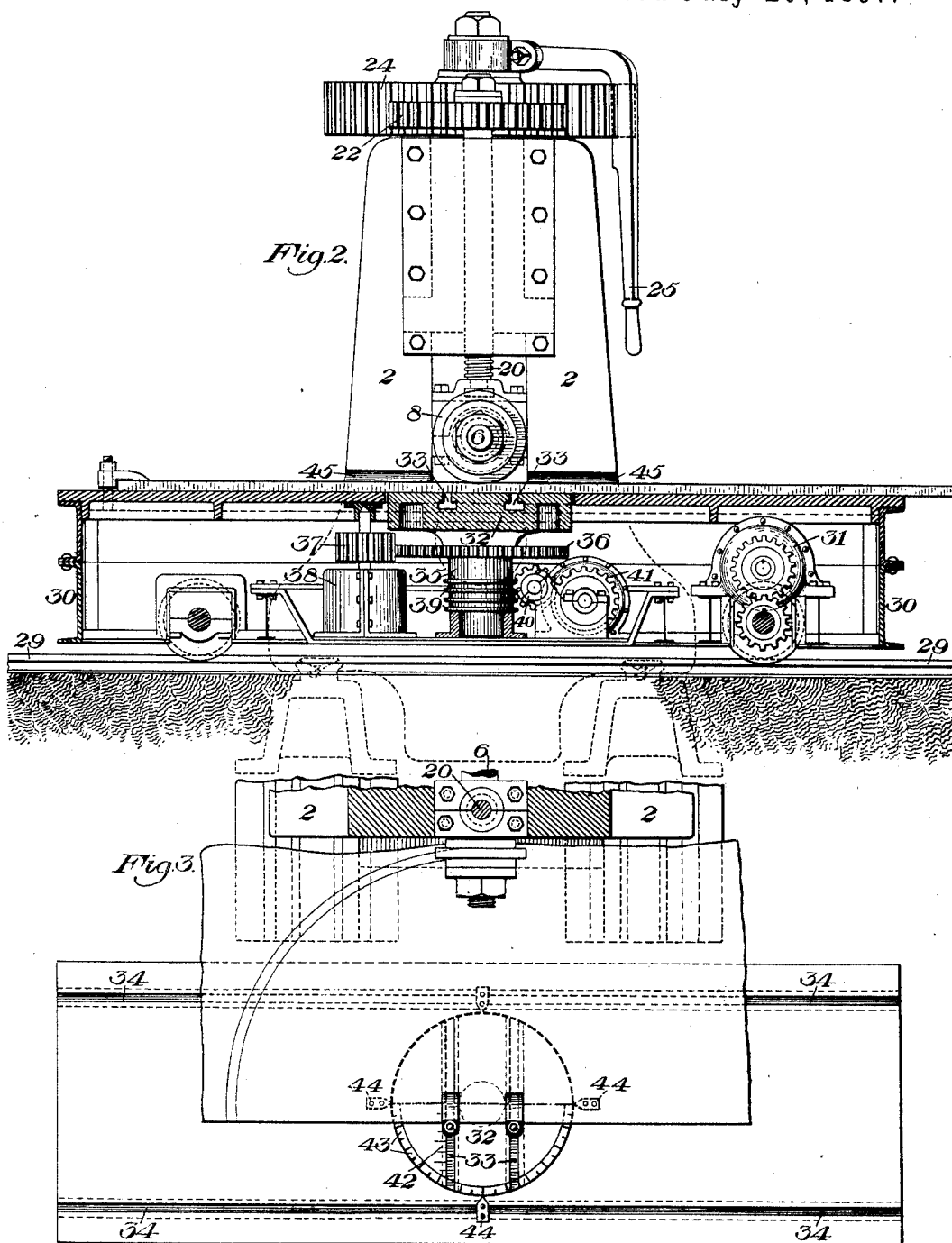
(No Model.)

2 Sheets—Sheet 2.

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ROTARY SHEARS.

No. 586,808.

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WITNESSES

Warren W. Swartz
Warren W. Swartz

INVENTOR

J. F. Dittman
J. F. Dittman
by *Baker & Baker*
his attys.

UNITED STATES PATENT OFFICE.

JOHN F. DITTMAN, OF PITTSBURG, PENNSYLVANIA.

ROTARY SHEARS.

SPECIFICATION forming part of Letters Patent No. 586,808, dated July 20, 1897.

Application filed July 22, 1896. Serial No. 600,166. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. DITTMAN, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Rotary Shears, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front elevation of my improved shearing apparatus. Fig. 2 is a central longitudinal section of the same. Fig. 3 is a partial horizontal section showing the cutting of an arc-shaped plate; and Figs. 4, 5, and 6 are detail views of the bearings of the rotary shears.

My invention relates to the class of rotary shears for cutting sheets or plates of metal, and is designed to provide an improved machine of this character which will operate not only to cut arc and circular shaped plates, but also to form plates with parallel side edges or with one edge extending at an angle to that of the other.

In the drawings, in which similar numerals indicate corresponding parts, 2 2 represent two housings placed opposite to each other and arranged to be slid toward or from each other upon dovetailed guides 3, formed in base-plates 4. These housings are moved toward and from each other by hydraulic cylinders or any suitable means attached to the connecting-rods 5, secured to the housings, so as to adjust the shears to the width of the plate desired. These housings and their contained apparatus are similar to each other, each containing two horizontal shafts 6 and 7, these shafts carrying at their forwardly-projecting ends the circular cutters. The cutter upon the shaft 6 consists of a circular plate of steel 8, which is secured against a shoulder 9 upon the shaft by a suitable nut and washer, as shown. The lower cutter upon the shaft 7 consists of two circular plates of steel 10 10, which are spaced apart by an intermediate circular plate 11 of smaller diameter, leaving an annular groove into which the upper cutter 8 forces the narrow strip of metal cut from the plate being operated upon.

The lower shaft 7 is carried in stationary

bearings in the housing, and at its rear end is provided a toothed wheel 12, intermeshing with another toothed wheel 13, carried on a counter-shaft, which is provided with a toothed wheel 14, intermeshing with a pinion 15 upon the shaft of an electric motor 16, which is carried upon standards bolted to the housing. The toothed wheel 12 also intermeshes with an idler-wheel 17, which intermeshes with another idler-wheel 18, engaging the teeth of the wheel 19, mounted upon the upper shaft 6, this connection allowing a certain amount of vertical motion of the upper shaft while still maintaining its driving connection with the lower.

The upper shaft is raised and lowered by means of two screw-shafts 20 and 21, one of which is right and the other left hand threaded, the shaft 20 passing through an innerly-screw-threaded bearing in the housing and having at its lower end a boss or button confined within the forward bearing of the upper shaft, whereby this bearing may be moved positively in either direction. The other shaft 21 passes through smooth bearings in the housing and is screw-threaded at its lower portion, this screw-threaded portion entering a screw-threaded socket in the rear bearing, as shown in Fig. 4. The shafts 20 and 21 are provided at their upper ends with gear-wheels 22 and 23, which intermesh with a large central wheel 24, loosely mounted upon the housing and arranged to be rotated in either direction by the pivoted lever-handle 25, by means of which the upper shaft 6 and its cutter may thus be moved up or down, as desired.

To prevent any possibility of the curling up of the strip of scrap which is cut from the plate, I provide two guides 26, which are cut out so as to fit the periphery of the lower shear, their upper faces lying in a plane tangent to the edge of the spacing-disk 11, so that the strip or scrap will be guided along their upper edges.

To provide for gaging accurately the width of the plate to be cut, I preferably secure to each housing a horizontal scale 27, which moves over a pointer 28, secured to the base-plate, this scale being laid off in any suitable manner so as to indicate the width of the

plate which will be formed. Between the housings and parallel with their front faces extends a track 29, upon which moves a car 30, this car being moved along by an electric motor 31, having a gearing connection with the wheels of the car, the current being supplied to this motor by any suitable means, such as an underground trolley. Centrally carried upon this car is a rotatory turn-table 32, having suitable T-shaped grooves 33 for the reception of bolts by which the plate is secured thereto. The top plate of the car is also provided with similar T-shaped grooves 34, by which the plate may be secured rigidly to the car.

The supporting-post 35 of the turn-table is provided with a gear-wheel 36, intermeshing with a pinion 37, carried upon the shaft of a motor 38, by which the turn-table may be rotated. To raise and lower the turn-table, I provide upon its post annular teeth 39, which are engaged by the teeth of the pinion 40, driven from a suitable motor 41, carried upon the car. Upon the turn-table 32 I provide a transverse scale 42, by which the amount of lap of the plate may be accurately measured when boiler-plate or similar plates are being sheared, and around the circumference of the turn-table I provide a protractor-scale 43, which co-acts with pointers 44 upon the car to measure the angle at which point one edge of the plate is to be cut, when this is desired.

The operation is as follows: The plate being placed upon the car at a point removed from the housing, the plate is secured to either the top plate of the car or the turn-table thereon by bolts taking into the T-shaped grooves and the car is then moved to a point between the two housings, the plate entering the horizontal slots 45 in the housings and passing between the separated rotatory shear-blades. The housings then being moved toward or from each other to give the desired width of the plate, if the plate is a comparatively thin one the bearings of the upper shafts are adjusted to a point where the shears will completely sever the plate at one pass, and the car being driven along the track the plate is severed as desired, both edges being cut simultaneously. Where a thick plate is to be sheared, the cutters are so adjusted that the first pass will merely score the metal along the desired line, the plate then being given another pass in the opposite direction, if desired, the cutters in the meantime having been adjusted closer together. Enough passes are given so that the thick plates shall be completely severed or the strip or scrap shall be fractured from the adjoining portions of the plate, so that it can be readily broken apart. It is evident that in the cutting of a plate power may be applied to drive the car forward and also to positively rotate the cutters, or power may be applied to drive the

car, thus rotating the cutters, or the cutters alone may be rotated, thus drawing the plate through them. The upper cutter is preferably not rigidly secured to its shaft, but is so arranged that it may slip around the shaft if for any reason it becomes jammed in the metal, thus preventing liability of breakage. If an arc or circular shaped plate is to be formed or an irregular contour is to be given, the plate having been secured to the turn-table, the plate is acted upon by one set of cutters and the turn-table is rotated as desired. If a plate is to be cut with one edge extending at an angle to that of the other, the plate having been secured to the car, the car is moved along the track and one set of cutters is actuated to shear one edge of the plate. The plate then being secured to the turn-table, the turn-table is rotated so as to bring the plate into the position to give the desired angle as indicated by the protractor upon the turn-table. The turn-table then being held in this position the car is passed back through the shears, when the opposite set of shears will cut the other edge at the angle desired. If the ends as well as the sides are to be sheared, the housings are drawn apart the desired distance and the plate being rotated by means of the turn-table its ends are sheared in the same manner as before.

The advantages of my invention will be apparent to those skilled in the art, since both edges of a plate are sheared simultaneously and continuously no matter what its length. When used with thick plates, as many passes may be given as may be necessary, a deeper cut being given at each pass. Moreover, arc and circular shaped plates and plates of irregular shapes may all be formed by the same shears and by simply laying the pattern on the plate to be sheared, no marking of the plate being necessary. After the plate is sheared as desired the car may be moved along the track to any desired point, where the plate is removed and the operations repeated.

Many variations may be made in the form and arrangement of the parts without departing from my invention, since

I claim—

1. In a rotary shear, a circular cutter having a peripheral groove, and a narrower circular cutter arranged to force the metal into said groove, the latter cutter being mounted loosely upon its shaft, whereby it may slip if it becomes jammed in the metal, in combination with mechanism for positively rotating said cutters.

2. The combination with a pair of rotary cutters, of a platform movable past the same, a rotatory turn-table mounted on the platform, and normally in a plane at least as low as that of the platform, means for moving the turn-table vertically above the platform, and means upon both the platform and turn-table

for clamping a plate thereon; substantially as described.

3. The combination with a pair of rotary cutters, of a platform movable past the same, a rotatory turn-table mounted upon the platform and normally in a plane at least as low as that of the platform, means for moving the turn-table vertically to a plane above

that of the platform, and a transverse scale upon said turn-table.

In testimony whereof I have hereunto set my hand.

JOHN F. DITTMAN.

Witnesses:

JNO. DILLENWORTH,
J. B. RICHARDS.