No. 671,915. Patented Apr. 9, 1901.

L. E. CURTIS.

ROLLS FOR CUTTING EXPANDED METAL.

(Application filed Oct. 13, 1900.)

(No Model.) 5 Sheets—Sheet 1.

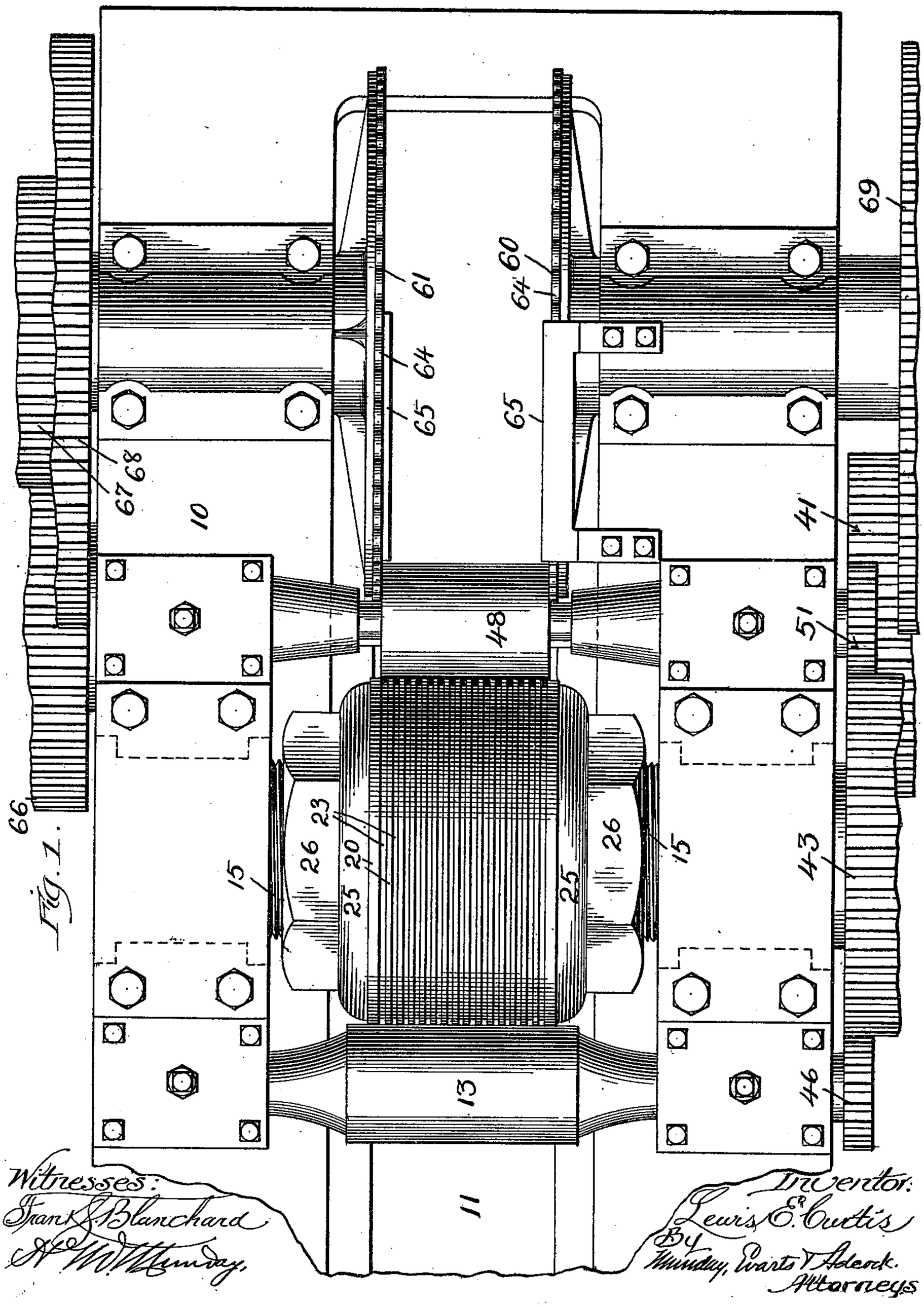


Fig. 1.

Witnesses:
Frank L. Blanchard
H. W. Munday.

Inventor:
Lewis E. Curtis
By Munday, Evarts & Adcock.
Attorneys

No. 671,915. Patented Apr. 9, 1901.

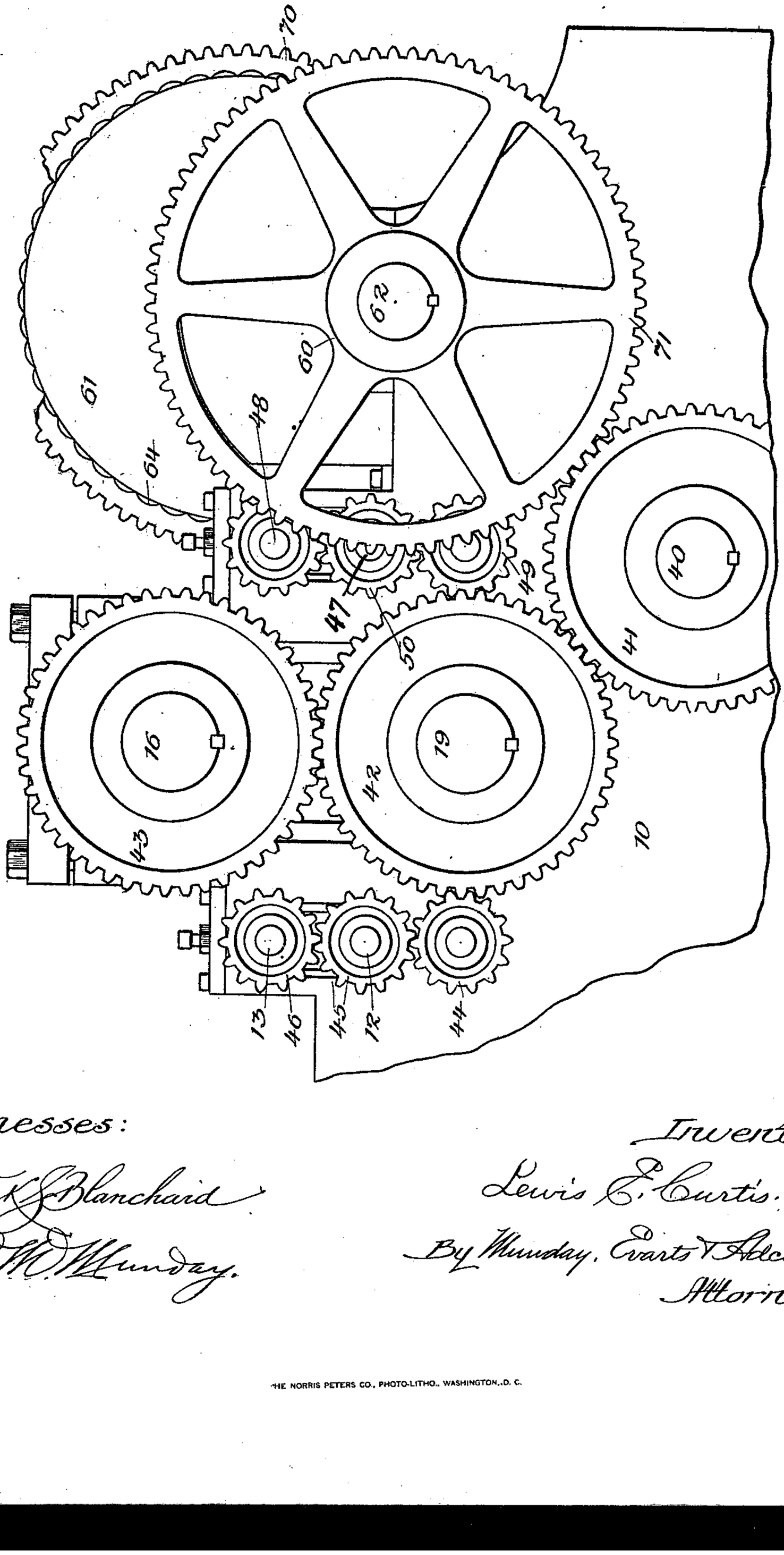
L. E. CURTIS.

ROLLS FOR CUTTING EXPANDED METAL.

(Application filed Oct. 13, 1900.)

(No Model.) 5 Sheets—Sheet 2.

Fig. 2



Witnesses:

Frank L. Blanchard

N. W. Munday.

Inventor:

Lewis E. Curtis.

By Munday, Evarts & Adcock.

Attorneys.

No. 671,915. Patented Apr. 9, 1901.

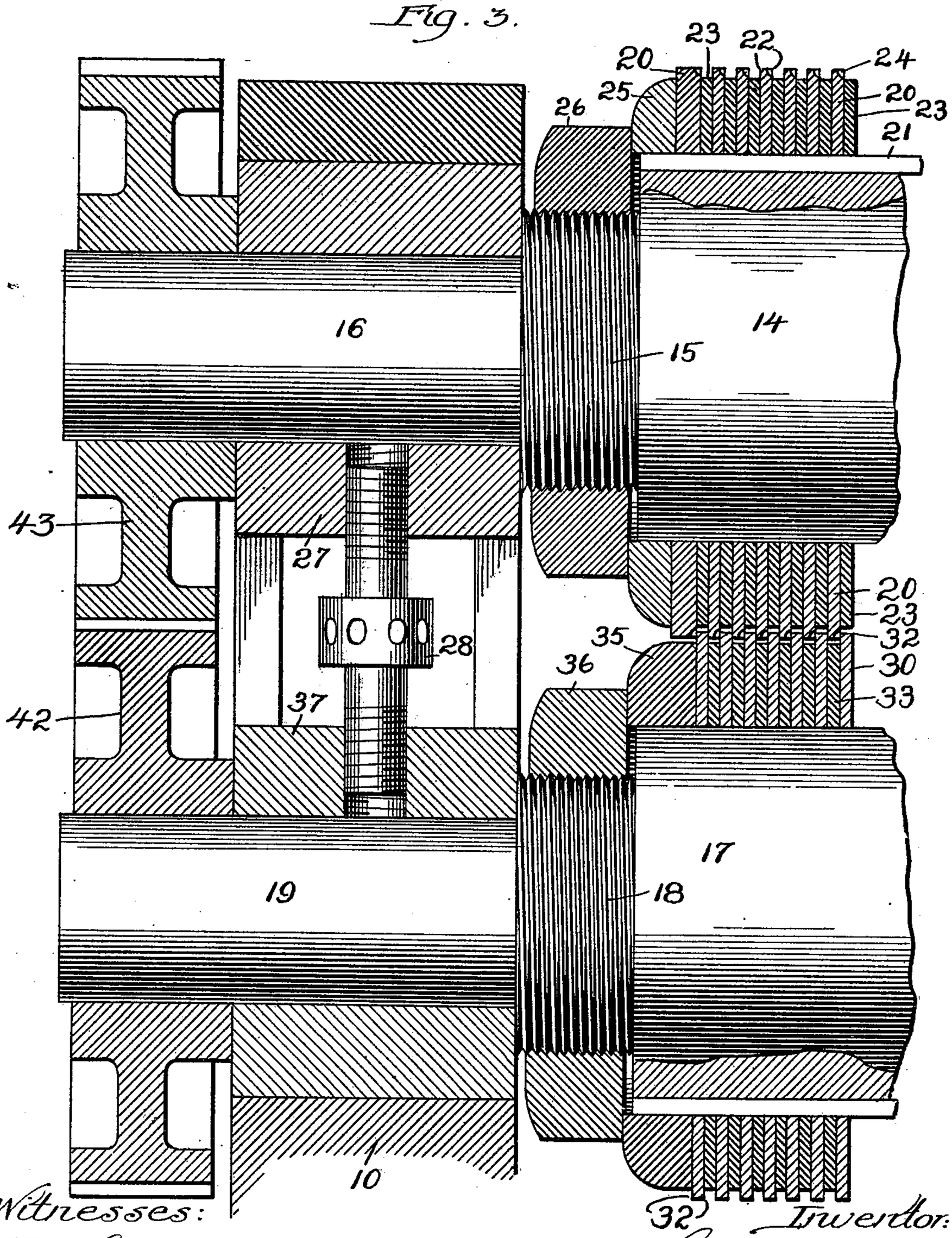
L. E. CURTIS.

ROLLS FOR CUTTING EXPANDED METAL.

(Application filed Oct. 13, 1900.)

(No Model.) 5 Sheets—Sheet 3.

Fig. 3.



Witnesses:
Frank L. Blanchard
H. W. Munday.

Inventor:
Lewis E. Curtis
By Munday, Evarts & Adcock.
Attorneys.

No. 671,915. Patented Apr. 9, 1901.

L. E. CURTIS.

ROLLS FOR CUTTING EXPANDED METAL.

(Application filed Oct. 13, 1900.)

(No Model.) 5 Sheets—Sheet 4.

Fig. 4.

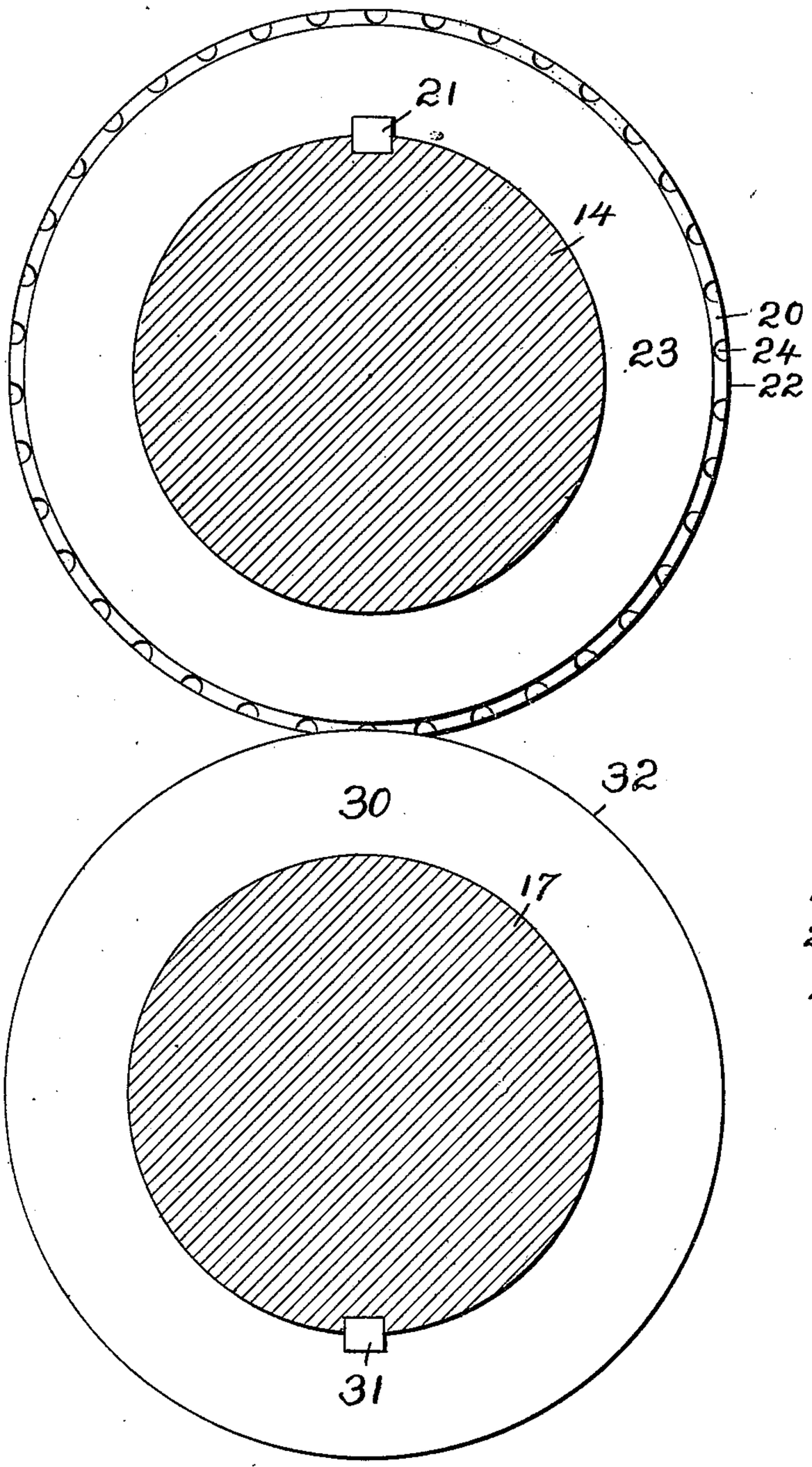


Fig. 5.

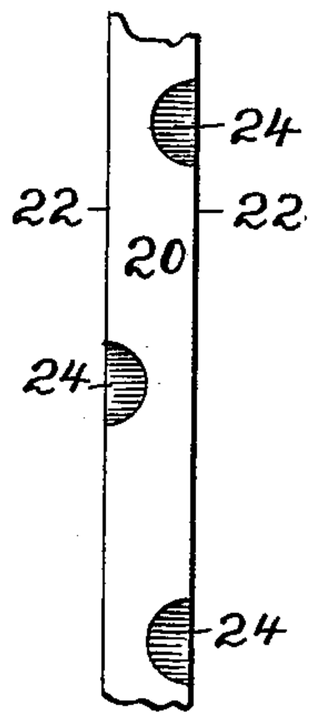
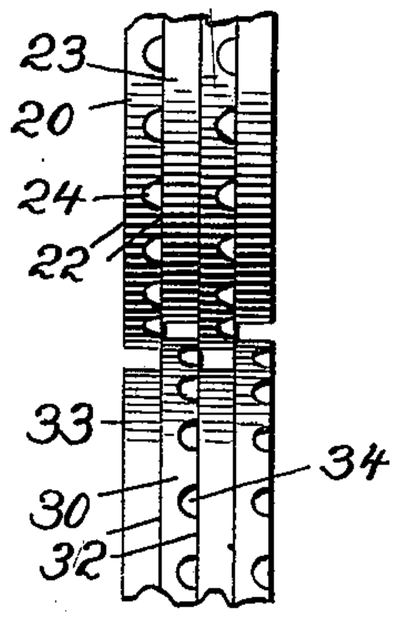


Fig. 6.



Witnesses:
Frank L. Blanchard
H. W. Munday.

Inventor:
Lewis E. Curtis.
By Munday, Evarts & Adcock.
Attorneys.

No. 671,915. Patented Apr. 9, 1901.

L. E. CURTIS.

ROLLS FOR CUTTING EXPANDED METAL.

(Application filed Oct. 13, 1900.)

(No Model.) 5 Sheets—Sheet 5.

Fig. 7.

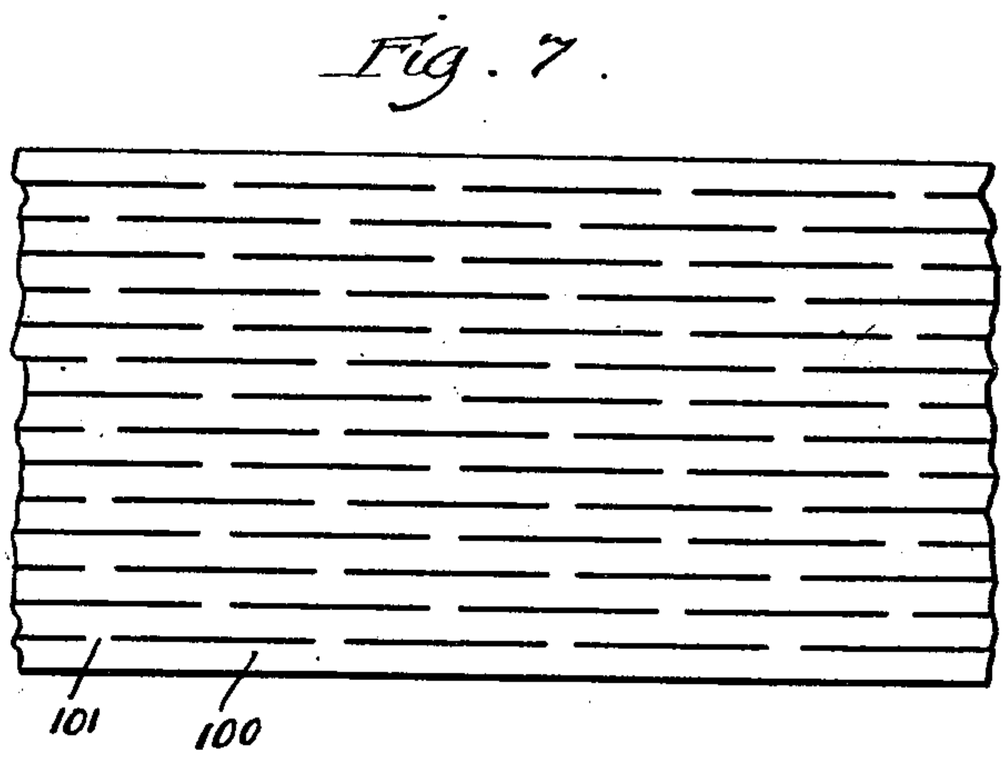
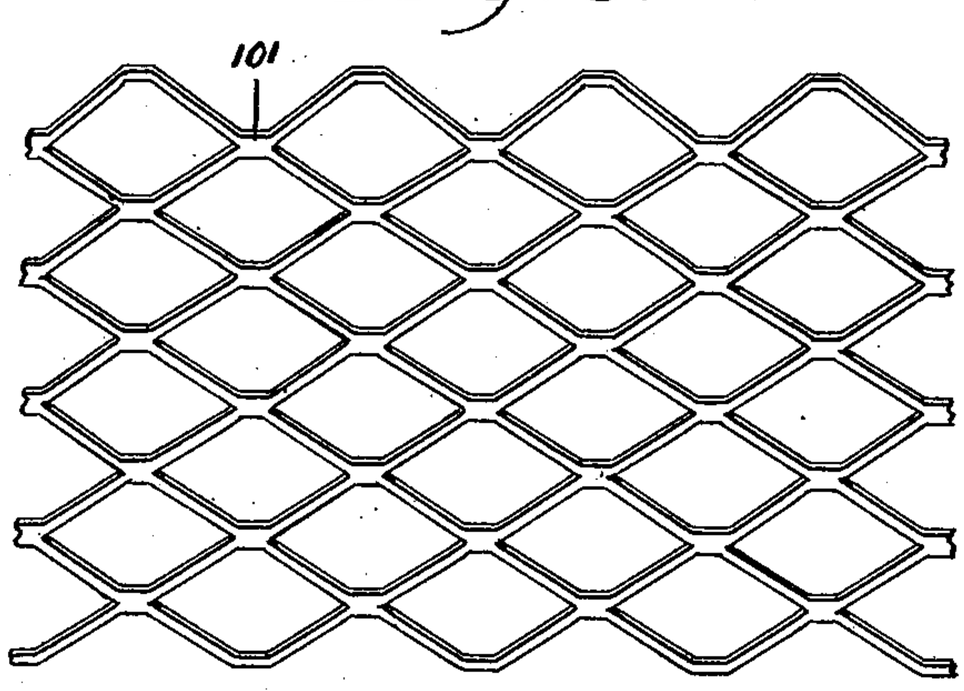


Fig. 8.



Witnesses:
Frank L. Blanchard
H. W. Munday.

Inventor:
Lewis E. Curtis
By Munday, Evarts & Adcock.
Attorneys.

UNITED STATES PATENT OFFICE.

LEWIS E. CURTIS, OF CHICAGO, ILLINOIS, ASSIGNOR TO OSCAR BRADFORD, OF SAME PLACE, AND WILLIAM L. CALDWELL, OF NEW YORK, N. Y.

ROLLS FOR CUTTING EXPANDED METAL.

SPECIFICATION forming part of Letters Patent No. 671,915, dated April 9, 1901.

Application filed October 13, 1900. Serial No. 32,906. (No model.)

To all whom it may concern:

Be it known that I, LEWIS E. CURTIS, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Rolls for Cutting Expanded Metal, of which the following is a specification.

This invention relates to machines for cutting or slitting sheet metal preparatory to expanding it. I have shown herein my improved slitting mechanism in connection with one form of expanding mechanism; but it will be understood that any suitable expanding mechanism may be used.

The present invention in the slitting mechanism is found in the construction of the cutting devices employed upon the cutting-rolls. In prior machines the cutting devices consist of upper and lower rolls, each provided with a series of narrow cutting-rings, those upon the upper roll being beveled to sharpen the edge and the edge being broken or interrupted by notches and those upon the other roll being beveled, though not necessarily to so sharp an edge as are the rings of the upper roll, and being unbroken or uninterrupted.

Instead of the above construction I form the cutting-rings as follows: The rings of both rolls are spaced apart, so that those of one roll may enter between the rings of the other roll, and their edges instead of being beveled to an edge are perfectly square, forming right-angled cutting-corners around their peripheries, and instead of interrupting the peripheries by notches extending from side to side of the rings I interrupt the cutting-corners only by cutting notches upon the side of the edge portion of the rings and extend them only part way through the ring in the direction of its thickness. I may form these notches upon both sides of the rings of one roll or upon one side only of the rings of both rolls, as preferred.

My improved rings are very easily sharpened, and their life of service is lengthened, both results being due to the square peripheries, and the cost of the rolls is greatly reduced, because by utilizing both corners of the cutters the number of cutting-rings is only half of the number heretofore necessary. By using cutting-rings with flat peripheries no tendency to turn is imparted to the metal under operation.

The nature of the invention will be fully understood from the description given below and from the accompanying drawings, in which—

Figure 1 is a plan of an expanded-metal machine embodying my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a partial longitudinal section of the slitting-rolls. Fig. 4 is a transverse section of the rolls. Fig. 5 is an enlarged partial edge view of one of the cutting-rings. Fig. 6 is an edge view of parts of the rings of both rolls modified from the construction of Fig. 5. Fig. 7 shows the slitted sheet produced by the machine, and Fig. 8 shows the same sheet after it has been expanded.

In said drawings, 10 represents suitable side frames, in which the moving parts are supported, and 11 is a table from which the metal sheets are supplied to the feed-rolls 12 and 13, by which they are fed to the slitting-rolls. These rolls are constructed as follows: The shaft of the upper roll has its main body or central portion 14 enlarged, so as to properly support and carry the cutting-rings, and at its ends it is threaded, as at 15, and further reduced, as at 16, to form end journals. The shaft of the lower roll is constructed in the same way, having its body enlarged, as at 17, and its end portions threaded at 18 and reduced at 19 to form the journals. The cutting-rings of the upper roll are shown at 20 and are mounted upon and keyed to the enlarged portion 14 of the shaft by key 21. They are flat rings with unbroken peripheries cut at right angles to the side faces, so that their peripheral corners 22 may act as cutters. They are spaced at even distances apart by spacing disks or rings 23, placed between each pair of adjacent cutters and agreeing in thickness with the thickness of the cutting-rings on the lower roll, the spacing-disks being of less diameter than the cutters, so that open annular spaces are formed between the cutters, into which the countering cutters of the other roll may enter. In order that the cut of the rings may be interrupted at the points where the bonds 101, uniting the strands of the cut sheet 100, occur, I notch out the

side faces of the rings 20 from the periphery inward, as shown at 24, and I prefer to form these notches upon both sides of all the rings, as shown at Fig. 5, arranging the notches in staggering fashion, so that those upon one side of each ring will be in planes between those upon the other side of the same ring. The notches extend only part way through the ring in the direction of its thickness, and consequently the periphery remains continuous and uninterrupted, except that its cutting-corners are broken at intervals. The cutter-rings 30 of the lower roll are also made flat, with continuous or unbroken peripheries cut square with reference to the side faces, and they are mounted upon the enlarged portion 17 of the shaft and keyed thereto by key 31, and their corners 32 form the cutters proper. Like the rings of the upper roll, the rings 30 are also spaced apart by spacing-disks 33 of smaller diameter than rings 30 and agreeing in thickness with the thickness of the cutting-rings upon the upper roll, so that annular open spaces are formed between cutters 30, adapted to admit the edges of cutters 20. I do not notch the rings 30, as that is unnecessary if the rings 20 are notched upon both sides, as shown at Fig. 5; but instead of that construction the upper rings may be notched upon one side only, and the lower rings should in that case also be notched upon one side, as seen at 34. Either construction works well.

The cutters 20 and 30 and their spacing-disks are clamped together firmly upon the rolls by washers and nuts, (shown at 25 and 26 in the case of the upper roll and at 35 and 36 in the case of the lower roll.) The cutters should lap by each other only enough to enable them to completely sever the metal, though the rings at the ends of the rolls may be changed from the form shown in case it is desired to depress the outer strands for convenience in expanding the sheet after it is slitted, or that function may be devolved upon the expanding mechanism.

The journals of the upper slitting-roll are supported in bearings 27, which are removably held in ways in the frames, and the journals of the lower roll revolve in bearings 37, also removably held in the same ways. The distance between the rolls is regulated by right and left handed screws 28, threaded into the bearings 27 and 37, as shown at Fig. 3. The rolls are driven from the power-shaft 40 by gears 41, 42, and 43, the two latter being on the journals of the rolls, and the feed-rolls 12 and 13 are driven from gear 42 by pinions 44, 45, and 46. After being slitted the sheet passes into the embrace of another pair of feed-rolls 47 and 48, driven from gear 42 by pinions 49, 50, and 51, and these feed-rolls deliver it to any suitable mechanism by which the slits will be opened and the sheet expanded. The mechanism preferred by me for this work consists of two large expanding-disks 60 and 61, mounted upon shafts 62 and 63, respectively. The shafts are located at different heights, as shown, and the disks are also so located that one may engage one edge of the sheet as it is delivered by the rolls, while the other disk engages the other edge. The disk 60 rotates from the plane in which the sheet is delivered by the feed-rolls, and consequently it carries the edge of the sheet engaged by it upward from said plane, and the disk 61 rotates downward from the same plane, and consequently carries the other edge of the sheet downward. Both disks engage and hold the edges while expanding the sheet, their peripheries being provided with curved projections 64, coacting with curved guards 65, inclosing so much of the peripheries of the disks as is actively engaged in the performance of that function, the projections bending the outer strands from the plane of the sheet as they come together in the movement of the disks and the sheets. The shafts 62 and 63 are independent, and unobstructed room is left between the disks for the passage of the sheet, and the shaft 63 is driven from shaft 40 by gears 66, 67, and 68 and the shaft 62 by gears 41 and 69. The guards are adapted to control the sheet while it is carried up on one disk and down by the other and until it reaches the upper and lower crowns, respectively, of the disks, at which time it will have been completely expanded. As soon as the entire sheet has moved beyond the guards it releases itself automatically from the disks.

As already stated, any suitable expanding mechanism may be used with my improved slitting-rolls, and I lay no claim to that shown, but expressly reserve the same for a companion-application to be filed contemporaneously herewith, in which companion application the construction and operation of the mechanism are more fully set forth.

An important result attending my construction of the slitting-rolls is that the rings cannot spring laterally, because each knife while cutting is pressed equally in both lateral directions by the knives of the opposing roll between which it enters.

I claim—

1. The slitting-rolls for cutting expanded metal provided with spaced and countering cutting-rings having right-angle corners acting as cutters, such corners being interrupted at intervals by notches formed in the side faces of the rings, and the notches being relatively staggered, substantially as specified.

2. The slitting-rolls for cutting expanded metal, provided with spaced and countering rings having sharp corners for cutting the metal, such corners being interrupted by notching out the side faces of the rings for a portion of the thickness of the rings, substantially as specified.

LEWIS E. CURTIS.

Witnesses:
EDW. S. EVARTS,
H. M. MUNDAY.