(No Model.) 4 Sheets—Sheet 1.

F. C. WILSON & Z. H. BOOLS.

MACHINE FOR CUTTING SHEET METAL

No. 279,899. Patented June 19, 1883.

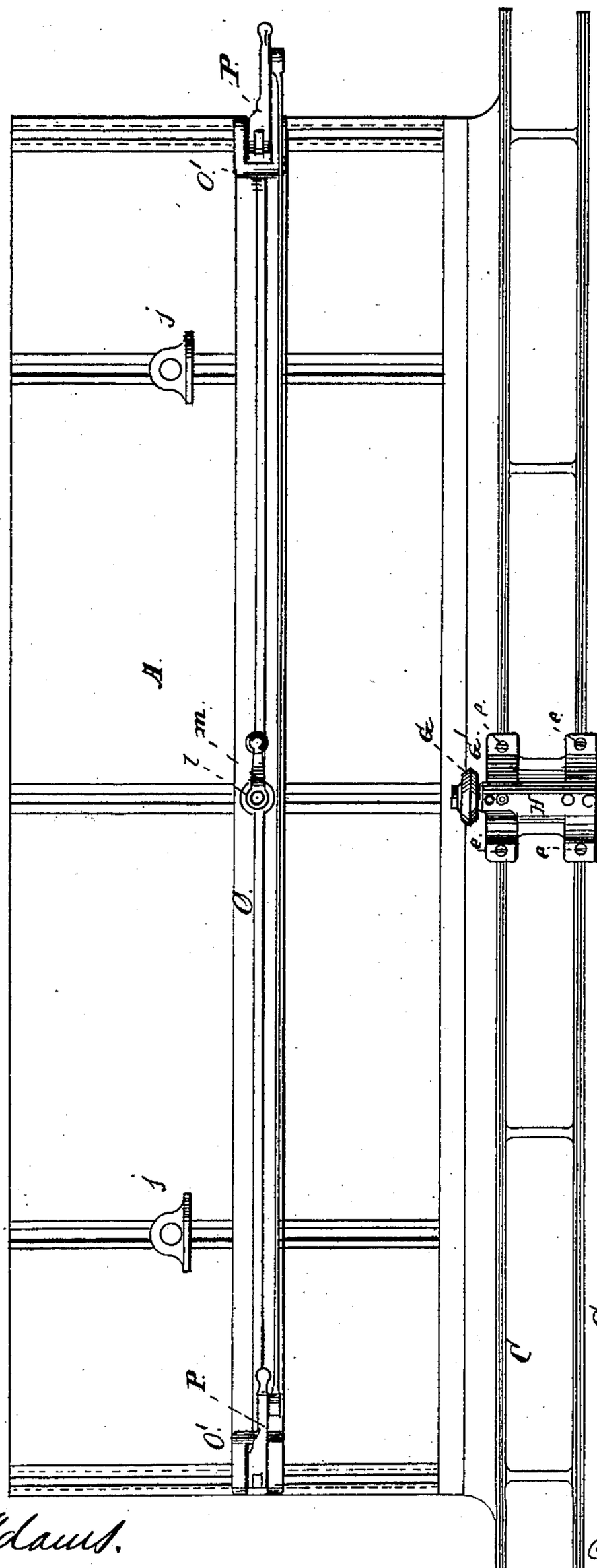

Fig. 1.

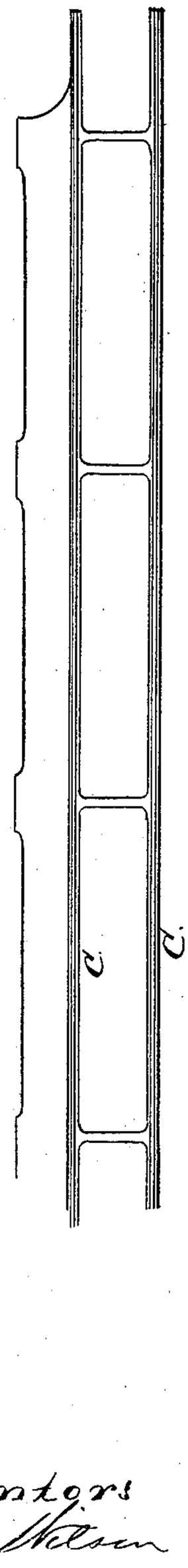

Fig. 2.

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(No Model.)

4 Sheets—Sheet 2.

F. C. WILSON & Z. H. BOOLS.

MACHINE FOR CUTTING SHEET METAL

No. 279,899. Patented June 19, 1883.

Fig. 3.

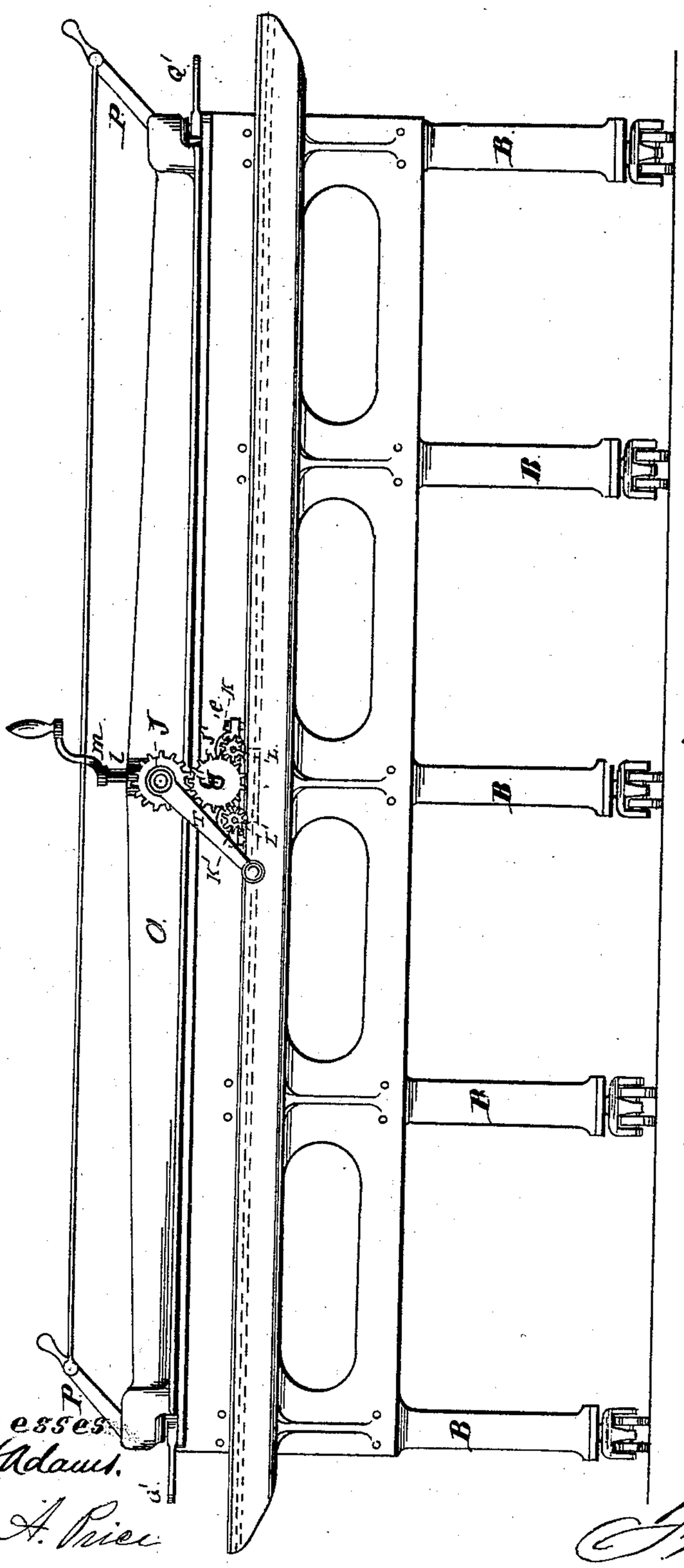
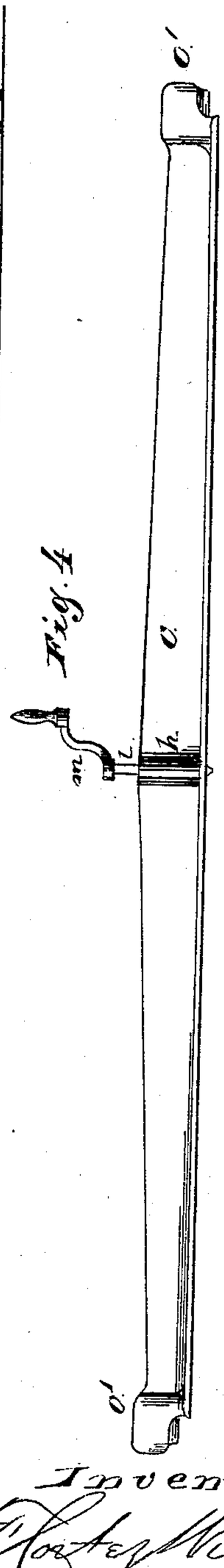


Fig. 4.



Witnesses
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(No Model.) 4 Sheets—Sheet 3.

F. C. WILSON & Z. H. BOOLS.

MACHINE FOR CUTTING SHEET METAL

No. 279,899. Patented June 19, 1883.

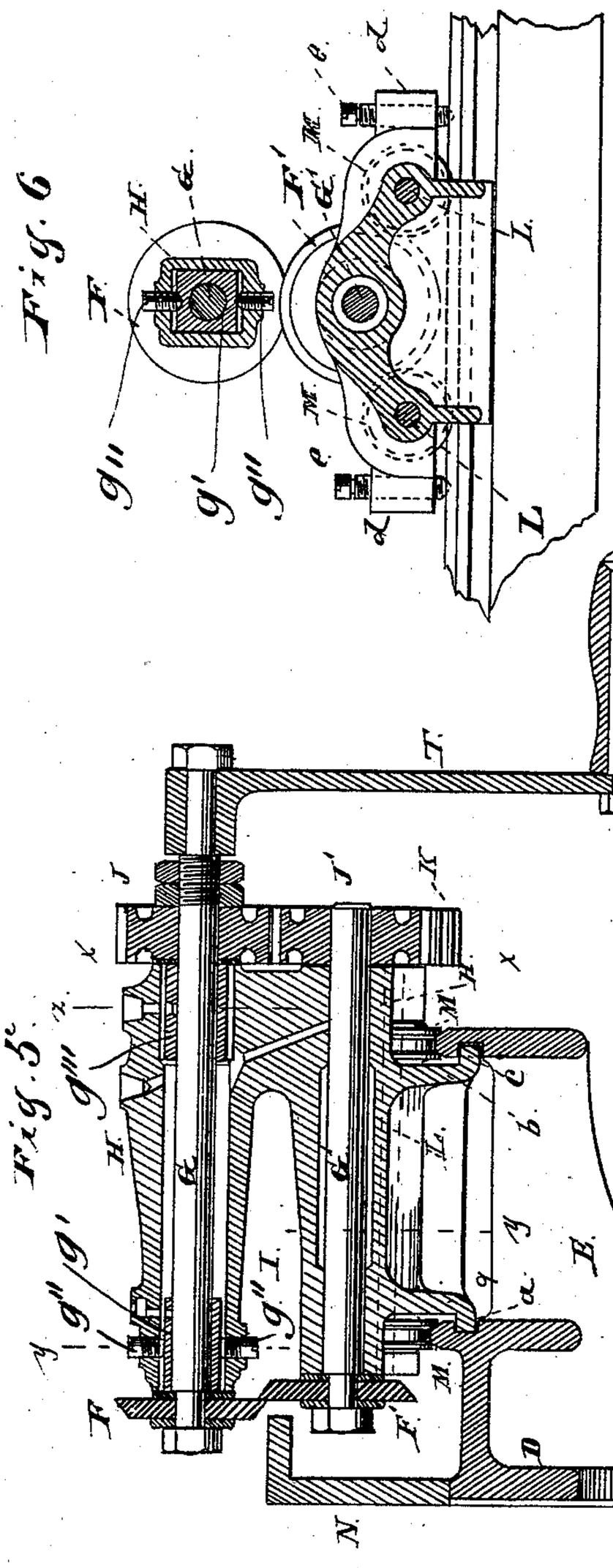

Fig. 6

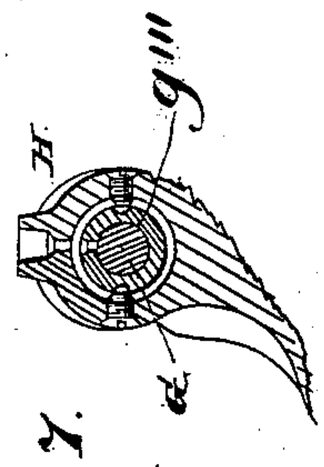

Fig. 7.

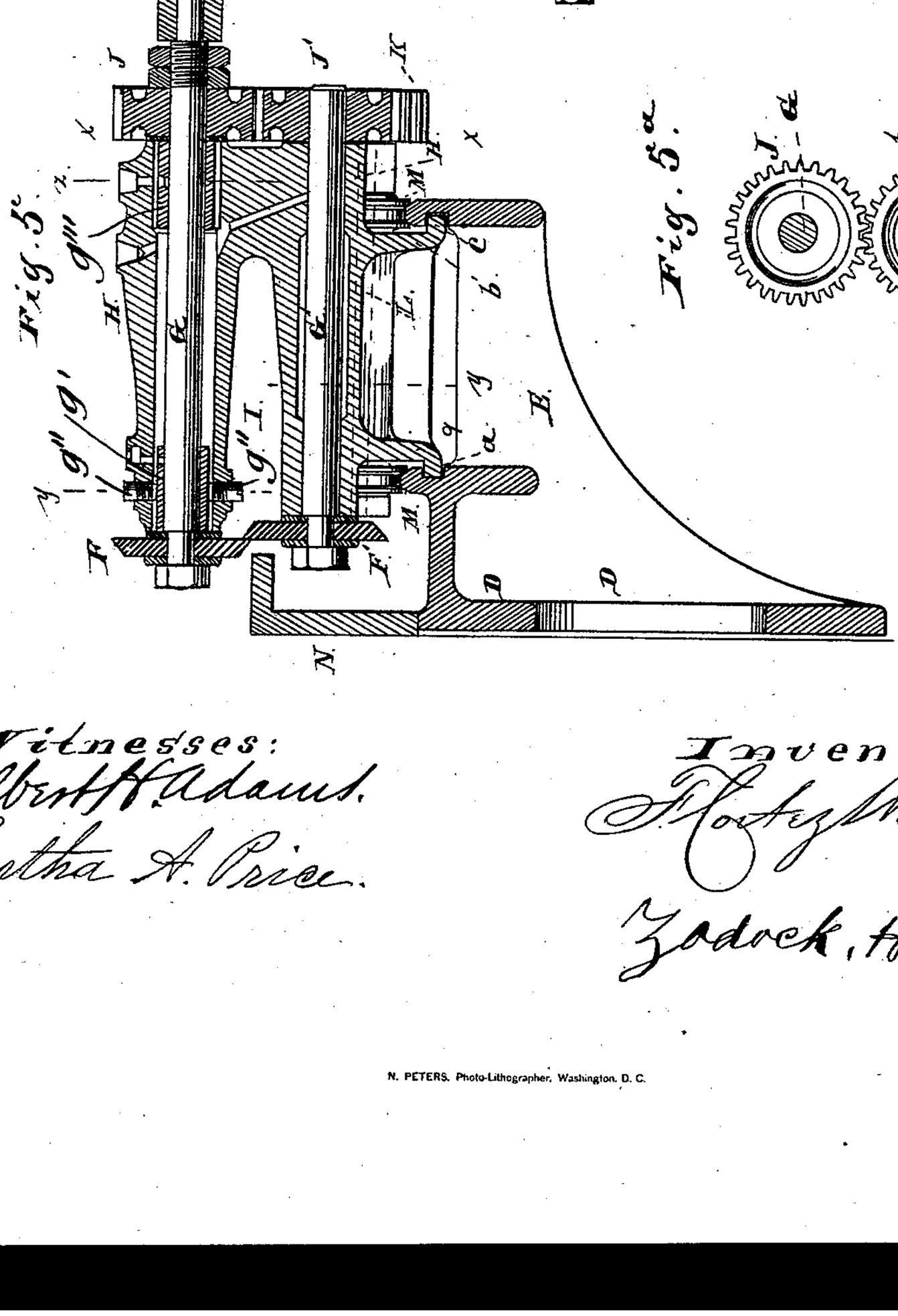

Fig. 5.

Fig. 5a.

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(No Model.)

4 Sheets—Sheet 4.

F. C. WILSON & Z. H. BOOLS.

MACHINE FOR CUTTING SHEET METAL

No. 279,899. Patented June 19, 1883.

Fig. 8.

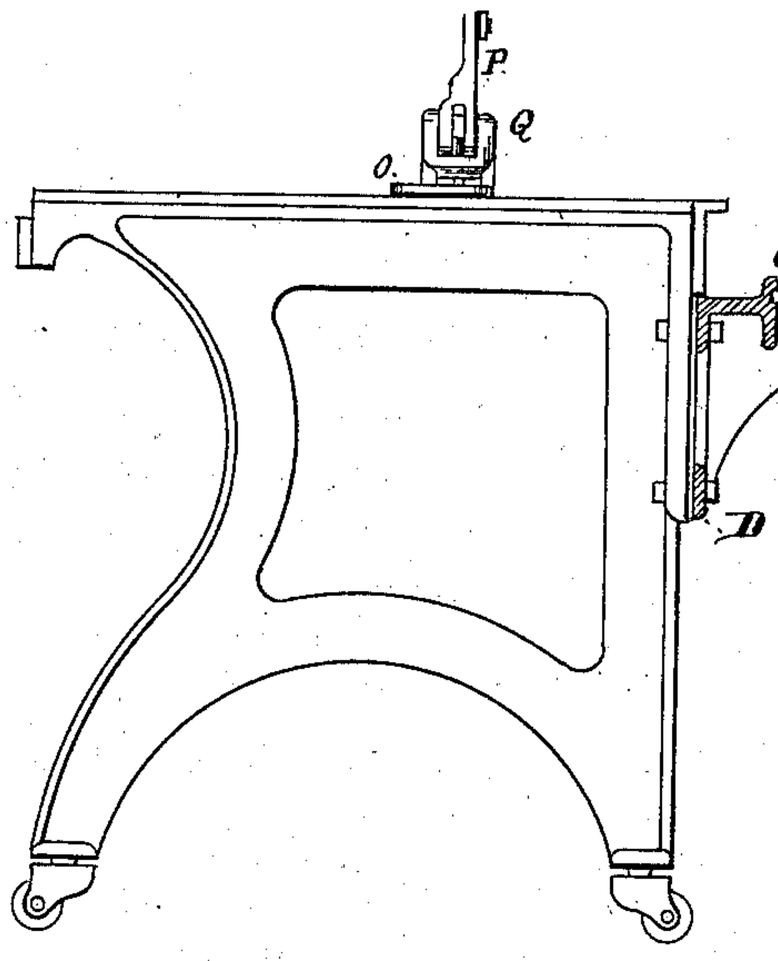


Fig. 9.

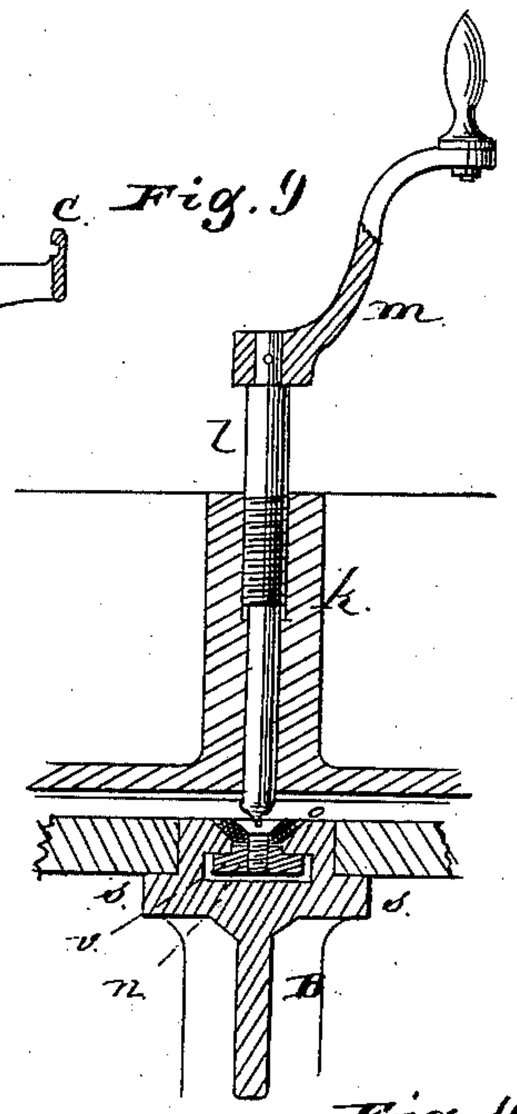


Fig. 9a.

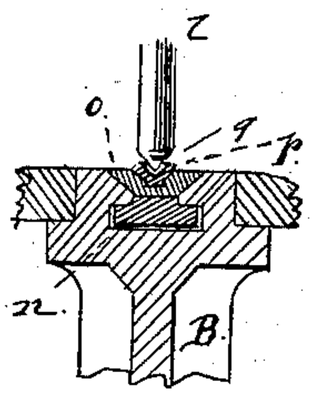
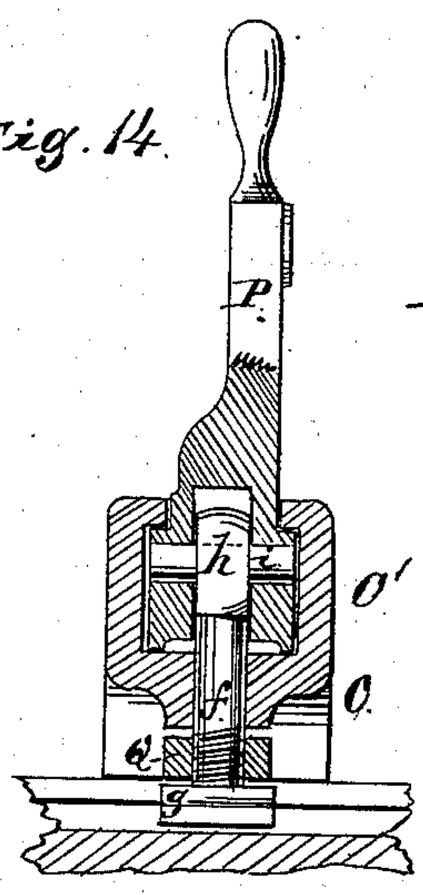


Fig. 12.

Fig. 10.

Fig. 14.



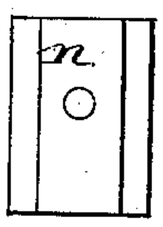


Fig. 13.

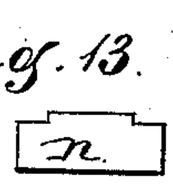


Fig. 15.

Fig. 11.

Witnesses:
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Bertha A. Price.

Inventors
F. Coates Wilson
Zadock H. Bools

UNITED STATES PATENT OFFICE.

F. CORTEZ WILSON AND ZADOCK H. BOOLS, OF CHICAGO, ILLINOIS; SAID BOOLS ASSIGNOR TO SAID WILSON.

MACHINE FOR CUTTING SHEET METAL.

SPECIFICATION forming part of Letters Patent No. 279,899, dated June 19, 1883.

Application filed January 8, 1883. (No model.)

To all whom it may concern:

Be it known that we, F. CORTEZ WILSON and ZADOCK H. BOOLS, residing at Chicago, in the county of Cook and State of Illinois, and citizens of the United States, have invented new and useful Improvements in Machines for Cutting Sheet Metal, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a plan. Fig. 2 is a detail, being a plan of the parts represented. Fig. 3 is a front elevation. Fig. 4 is a detail, being an elevation of the clamping-bar. Fig. 5 is a vertical cross-section of the cutter-head, cutters, and the track on which the cutter-head moves. Fig. 5ª is a section at line *x x* of Fig. 5. Fig. 6 is a section at line *y y* of Fig. 5. Fig. 7 is a section of the parts shown at line *z* of Fig. 5. Fig. 8 is an end elevation, the cutter-head being removed and some parts being shown in section. Fig. 9 is a detail, being a vertical longitudinal section of the parts represented. In this figure the centering-pin is shown over the head of the screw in the slide shown in Fig. 10, instead of over the recess therein. Fig. 9ª is a detail similar in the main to Fig. 9, except that in this figure the centering-pin is over the recess in the slide instead of over the screw. Figs. 10, 11, 12, and 13 are details. Fig. 14 is a cross-section of the devices for operating the clamping-bar. Fig. 15 is a longitudinal section of the same.

In manufacturing various articles from sheet metal it is necessary to trim the edges of the sheets, to cut strips of various widths from the sheets, and to cut pieces having a circular form and of various sizes.

The objects of our invention are to provide improved machinery and devices for performing said work, and this we accomplish as hereinafter fully set forth.

Our invention, so far as it relates to the cutting of strips from sheet metal, consists in two rotary cutters mounted in a frame which travels back and forth upon a track in front of a table upon which the sheet metal to be cut is placed, and in devices for clamping such sheets upon the table.

Our invention, so far as it relates to cutting sheet metal in a circular form, consists in the same rotary cutters mounted in a frame which is or can be made to be stationary, and in devices for centering and holding in position pieces of sheet metal of various sizes which are to be cut in such form, as set forth. We have embodied in a single machine all of the devices by means of which the desired results are accomplished.

In the drawings, A represents the top of a table, which is supported by a suitable frame-work, preferably of iron, B being the standards of such frame-work. As shown, these standards B extend to the top of the table proper, and are provided with flanges on which the wooden parts of the top rest. Such flanges *s* are shown on the central support in Fig. 9; but this is only a detail of construction.

C C is a double track in front of the table, at a little distance therefrom, and located a little below its top. This track may be cast in connection with a plate, D, and braces E, and secured in place by bolting the plate D to the front of the frame, as shown in Figs. 3 and 8.

F F′ are two circular cutters, arranged relatively to each other as shown in Fig. 5, each cutter having a beveled edge. Each of these cutters is mounted upon one end of a shaft, which shafts G G′ run through and revolve in the head or frame H, which is so formed that there is an open space, I, at one end thereof, extending back, as shown, beyond the center.

In order that the upper cutter, F′, may be lowered when it becomes worn by use and sharpening, the forward end of the shaft G is passed through the box *g′*, which can be held at the desired vertical adjustment in the frame H by set-screws g^2, as shown in Fig. 5, while the other end of the same shaft is passed through the box *g‴*, (shown in the same figure,) which is trunnioned in the frame by pins, (seen in Fig. 7,) so as to have a slight vertical oscillatory movement to permit the adjustment of the other end of the shaft.

J J′ are two cog-wheels, mounted respectively upon the shafts G G′, which wheels engage with each other. The shaft G is provided with a suitable crank, T.

K K′ are two pinions, with both of which the cog-wheel J′ engages. The pinion K is se-

cured to a shaft, L, which has its bearings in the head or frame H, and on this shaft L are secured two rollers, M, which engage with the track C. The other pinion, K′, is mounted and supported in a similar manner, and its shaft has upon it two other rollers, M′, which also engage with the track C. These four rollers, M M′, support the head H upon the track. Each part of the track is provided with a longitudinal groove, *a*, on the inside thereof.

Extending down from the main part of the head H are two flanges, *b*, each of which is provided at its lower end with a lateral flange, *c*, which flanges *c* enter the grooves *a*, and serve as guides, and also to hold the head H in place upon the track. *d* are short projections upon the head H, each of which is provided with a screw-threaded opening, in which is inserted a screw, *e*. The lower end of each screw comes in contact with the top of the track. By turning these screws *e* a little the frame or head H can be lifted a trifle, so that the wheels M M′ will not be in contact with the track, and the head will be clamped upon the track by means of the flanges *c* and screws.

N is a piece of angle-iron, which is bolted to the front of the main frame, the top of the same being on a level with the top of the table. Suitable oil cups and passages are provided for lubricating the shafts G G′.

O is a clamping-bar extending the whole length of the table, and having an enlargement, O′, at each end, in which is a chamber. (See Fig. 14.) At each end of the clamping-bar there are devices for connecting the same with the table, for adjusting the same laterally upon the table, and for raising and lowering the same. These devices being substantially the same, those only at one end need be described.

f is a pin, upon the lower end of which is a T-head, *g*, which moves in a corresponding groove at the upper end of the supporting-frame. (See Figs. 14 and 15.) The top of the pin *f* is provided with a head, *h*, in which is permanently secured a pin, *i*.

P is a lever, which is pivoted upon the pin *i*. This lever P, as shown, is provided with an eccentric upon each side, at its lower end, which eccentrics are arranged to come in contact with the lower surface of the chamber, in which the end of the lever is located, and also with flanges at the top of the chamber. By moving the lever in one direction the eccentrics will depress the clamping-bar, and by moving it in the other direction the eccentrics will raise it.

Q is a nut upon the pin *f*, which is screw-threaded, and Q′ is a handle connected with the nut Q. The clamping-bar can be held in any desired position by means of this clamping-nut Q. When such nut is loosened the clamping-bar can be adjusted laterally upon the table. The two levers P P are connected by the rod R, so that when one lever P is moved the other one will have corresponding motion, and thereby both ends of the clamping-bar can be raised or lowered at the same time.

j are two guides, the lower ends of which are located in dovetailed or other suitably-formed grooves in the table, or the frame thereof, which guides can be moved laterally and fixed in any desired position by means of set-screws or other suitable devices. At the center of the clamping-bar O is an enlargement, *k*, through which there is a hole, the upper portion of which is enlarged and screw-threaded. In this hole in *k* is a centering-pin, *l*, on the upper end of which is a crank, *m*, the lower end of the pin *l* being somewhat pointed. In the top of the central supporting-piece of the frame is a groove, the lower part of which is T-shaped, while the sides of the upper portion are beveled. The form of the groove will be seen in Fig. 9. In this groove there is a sliding block, *n*. *o* is another block, in the upper surface of one end of which is inserted a pin, *p*, having an indentation, *q*, in the top thereof. This piece *o* is secured to the sliding piece *n* by means of a screw, *r*. When the screw *r* is loosened, the two pieces *n* and *o* can be moved along in the groove in which they are located, and when adjusted to any desired point, by tightening the screw *r* the two parts will be clamped together and held firmly wherever placed. The slide *n* is formed so as to fit the lower part, *v*, of the groove in which it is placed, while the edges of the block *o* are beveled, corresponding with the sides of the upper part of the said groove.

The operation is as follows: To trim the edges of sheets of metal, the guides *j* are to be adjusted so that when one edge of the sheet is against them the other edge will project over the front edge of the table far enough to be operated upon at the proper point by the cutters F F′, and the clamping-bar O is to be brought over to the front edge of the table and there held by means of the nuts Q. The head or frame H, with the cutters, is to be brought to one end of the track C—for example, to the left end—and the clamping-bar O being then raised, the sheet to be cut is to be placed upon the table, beneath the bar O, and in the proper position for the front edge to be trimmed by the cutters. Then, by means of the levers P and the eccentrics thereon, which levers can be operated by means of the rod R, the clamping-bar O can be forced down in contact with the sheet to be cut, and will hold it firmly in place. Then, if the operator rotates the cog-wheel J by means of the crank T, motion will be given to the cutters, and at the same time, the cog-wheel J′ engaging with the pinions K K′, motion will be given to the wheels M M′, and the head H, with the cutters, will be moved along the track C, and the cutters will operate upon the metal sheet upon the table, and will rapidly and accurately trim the same or cut a strip from the edge thereof. The cutters operate equally well when the frame moves over

the track in the opposite direction from that just described, so that a sheet can be trimmed or cut with the return movement of the head and cutters. In cutting a series of strips from the same sheet the operation is the same as that just described; but in doing such work we do not use the guides *j* after the edge of the sheet has been trimmed, but loosen the clamping-bar and bring the front edge of the sheet forward the proper distance, then tighten the clamping-bar and operate the head and cutters as before. The operation can be repeated until the whole sheet has been cut into strips. The width of the strips which can be cut from the sheet depends upon the depth of the space or opening I in the head H.

We cut sheet metal into a circular form with this machine in the following manner: We first place the head or frame H at the center of the table, with the cutters opposite the pin *l*, as shown in Fig. 3, and raise the wheels M M′ from the track by turning the screws *e*, which will also clamp the head in place upon the track. We then adjust the blocks *n o* in the groove in which they are located, so that the distance of the point *q* from the cutting-edges of the machine will be equal to one-half of the diameter of the desired circular piece. The clamping-bar O is then to be brought into such position that the point of the centering-pin *l* will be over the depression *q*. The clamping-bar is then to be raised up, and the piece of metal to be cut is to be placed upon the table with its center as nearly as possible beneath the point of the centering-pin *l*, which should be a little below the lower edge of the clamping-bar O. Then, the clamping-bar being brought down by means of the levers P, the end of the centering-pin will come in contact with the sheet metal and force the metal of the sheet which is under the point of the pin into the depression *q*, forming thus a pivot around which the sheet metal can rotate. Then its center will be held in the position mentioned. At this time the clamping-bar will be at a little distance from the sheet, so as not to interfere with its rotation. Then, if the edge of the sheet be brought to the cutters and the latter be rotated by turning the crank T, they will cut the sheet, and the rotation of the cutters will also draw the sheet to the cutters, causing the sheet to turn upon its pivotal center, and then it can be very rapidly cut in a circular form. We are thus able to trim the edges of large sheets of metal, also to cut sheet metal up into strips, and to cut sheet metal into a circular form of any desired size, with accuracy and great rapidity by the use of a single machine. The table of the machine which we are using, and which is represented in the drawings, is nine feet long, and receives for operation sheets of metal which are eight feet long.

The sliding block *n* is desirable, but is not a necessity. If the sharp point of the pin is depressed into the sheet, it will hold it without a recess beneath it.

We are aware that it is not new to employ a traveling carriage with a single rotating cutter and a fixed bed with a cutting-edge near the edge of the circular cutter, nor to employ two cutters in a rotating frame, with a rotating clamp for the sheet metal at one side of the cutters, in cutting out circular pieces of sheet metal, and therefore lay no claim to either of said constructions.

What we claim as new, and desire to secure by Letters Patent, is as follows:

1. The combination of a traveling frame, two revolving cutters supported in said frame, a track for said frame to travel upon, and a table in front of said two cutters for supporting the metal sheets, substantially as described.

2. A clamping-bar, O, in combination with a table to receive the sheet, a movable frame carrying revolving cutters, and a track upon which said frame travels, substantially as specified.

3. In a machine for cutting sheet metal, a clamping-bar, O, supported above a table, in combination with devices for connecting the same with the table, for adjusting the same laterally, and for raising and lowering the same, substantially as and for the purposes specified.

4. A clamping-bar, O, provided with an adjustable screw or pin, in combination with a table to receive the sheet metal, a movable frame carrying revolving cutters, and a track for said frame to travel upon, substantially as described.

5. The combination of the movable head and the two cutters, one of said cutters being vertically adjustable, substantially as described.

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