(No Model.) 2 Sheets—Sheet 1.

# E. GOTHBERG.

## CORRUGATING MACHINE.

No. 434,594. Patented Aug. 19, 1890.

*Fig. 1.*

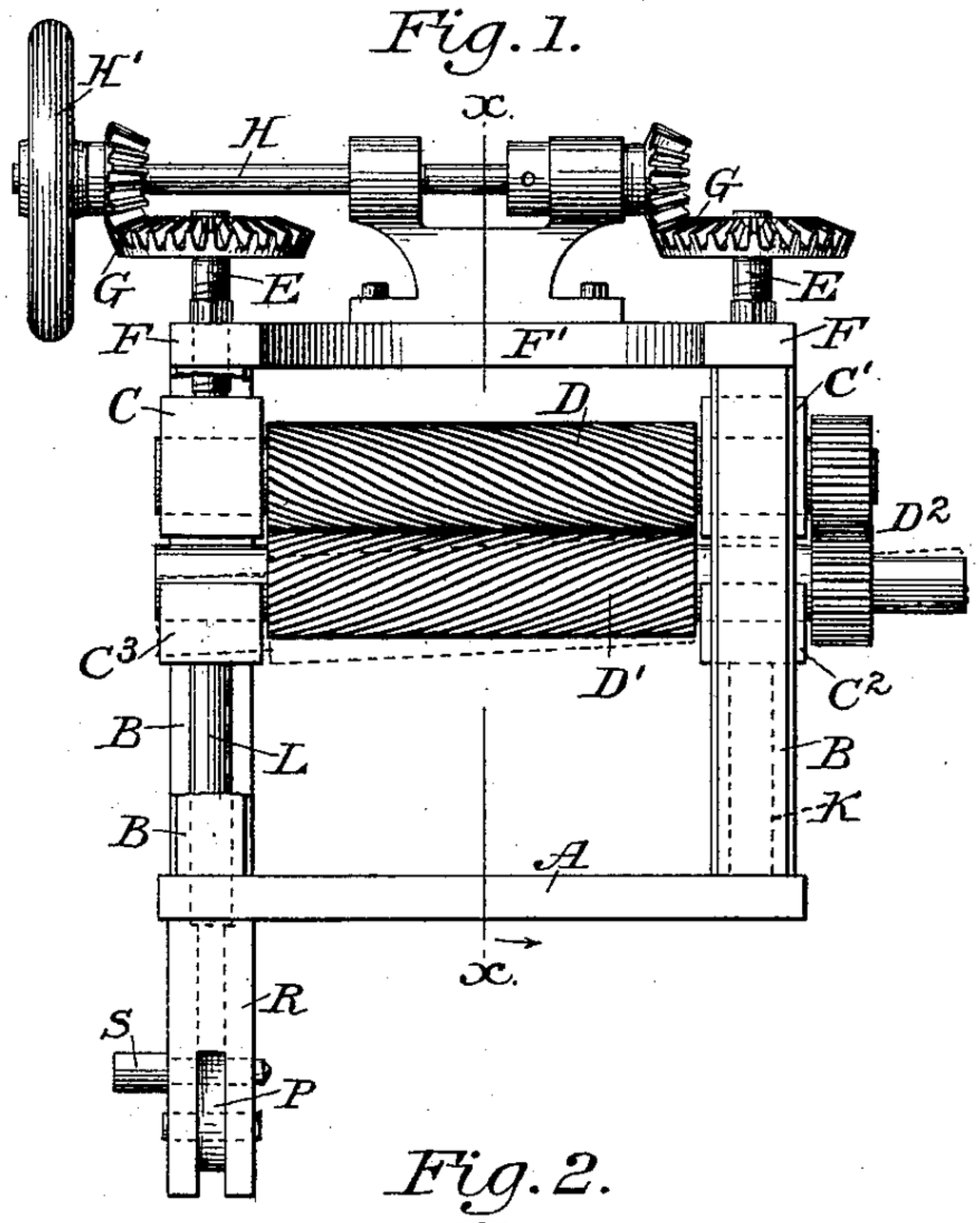
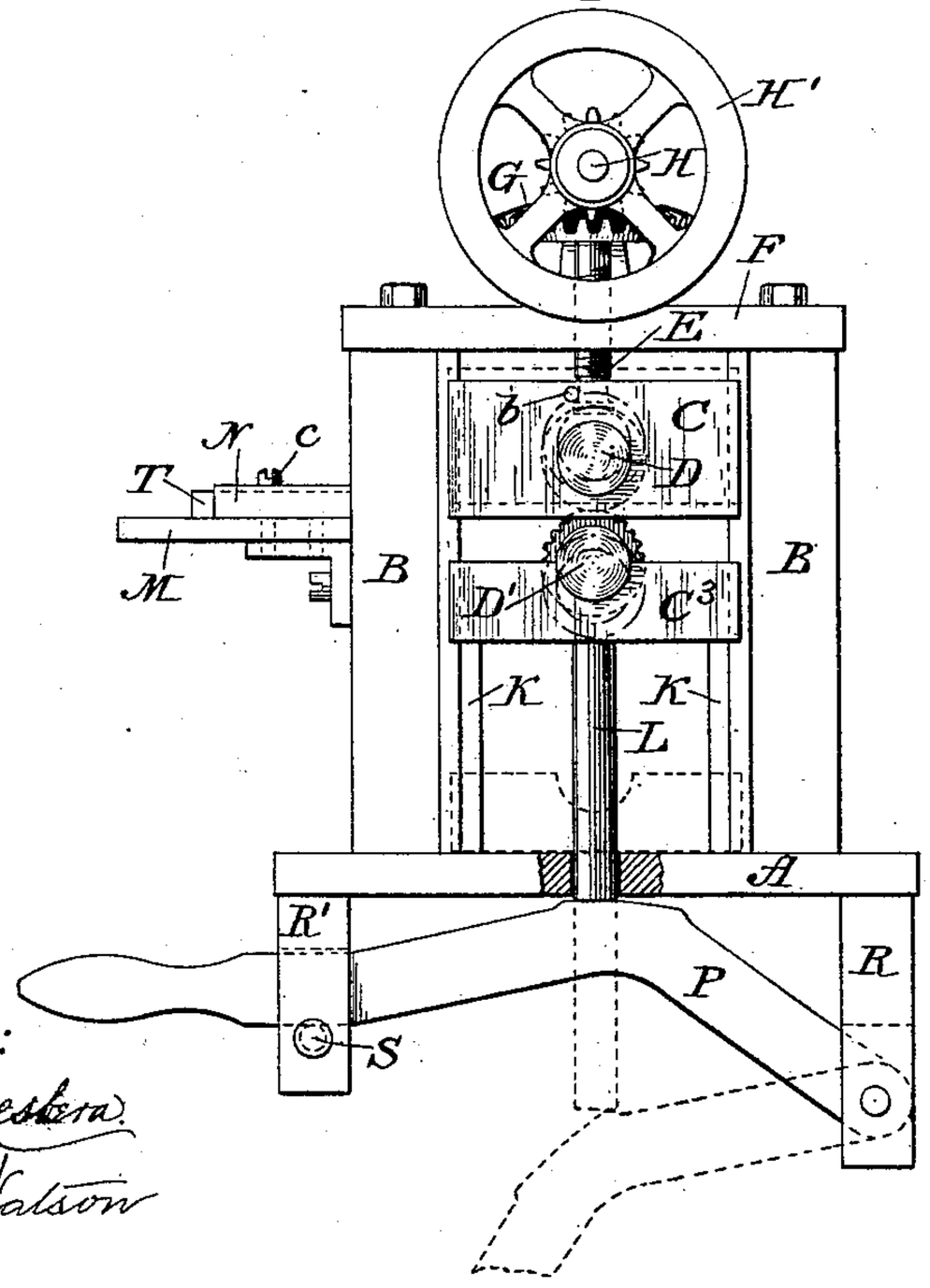



*Fig. 2.*

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(No Model.) 2 Sheets—Sheet 2

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## CORRUGATING MACHINE.

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*Fig. 3.*

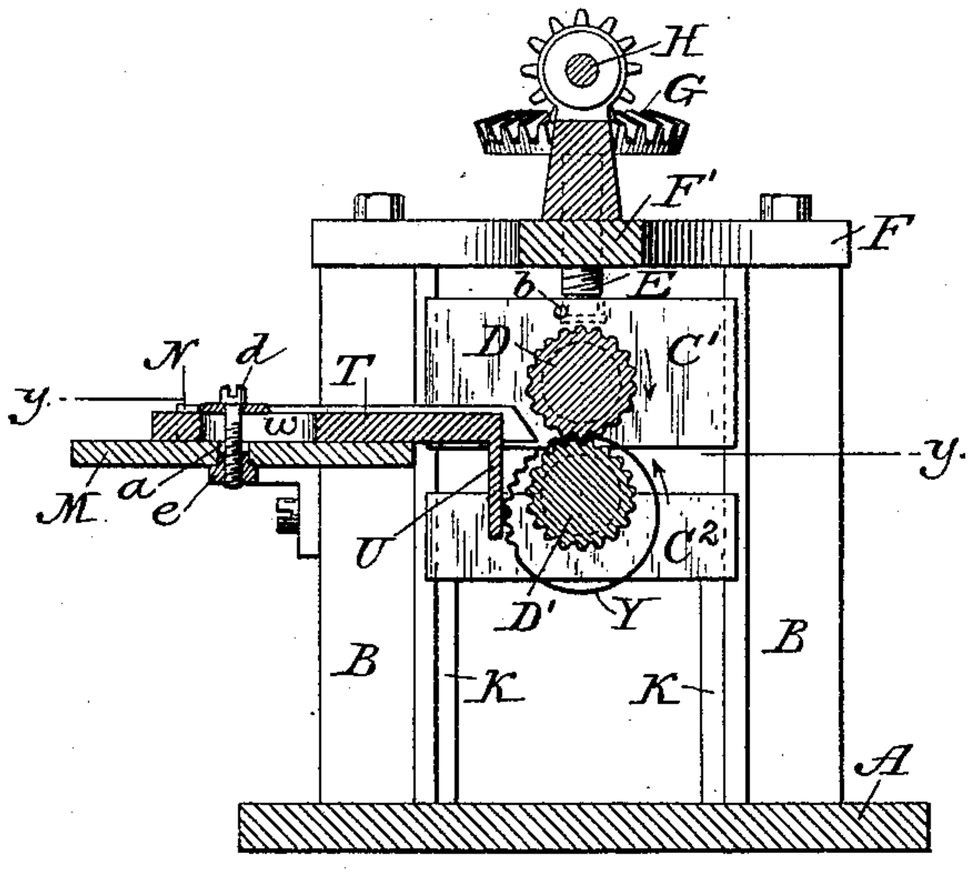
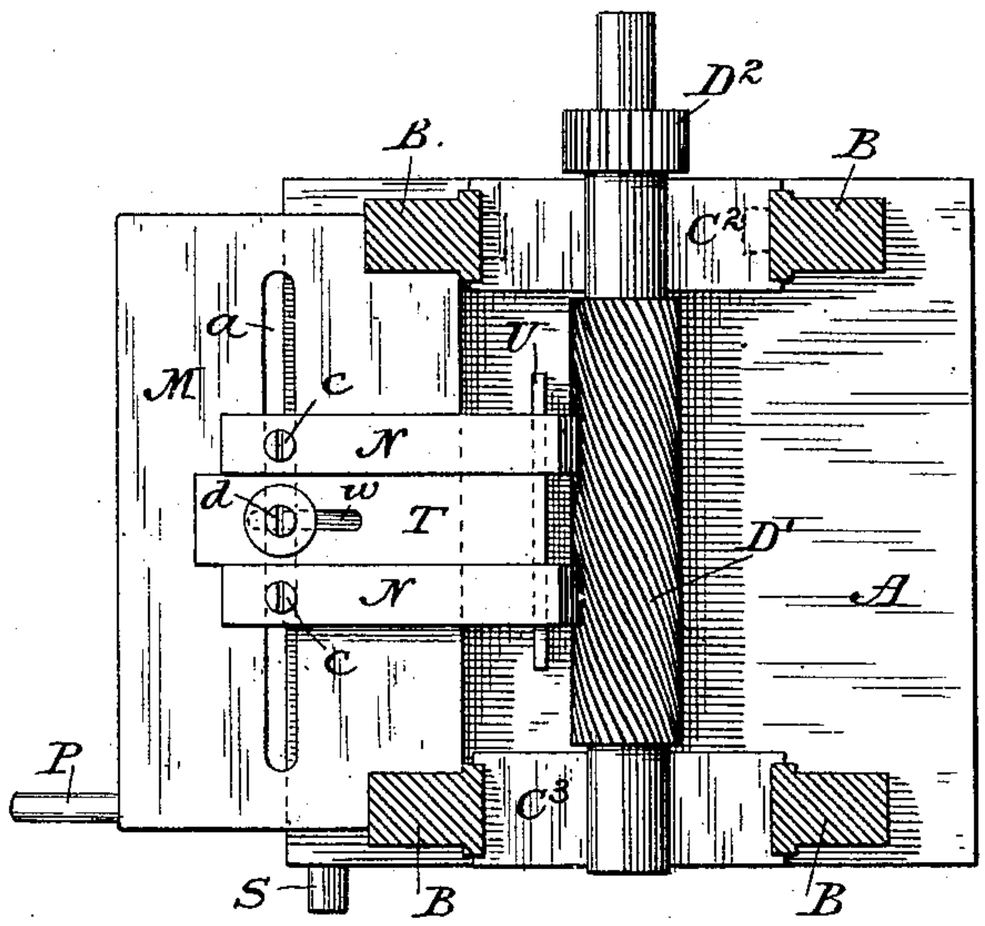



*Fig. 4.*

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# UNITED STATES PATENT OFFICE.

ERNEST GOTHBERG, OF JERSEY CITY, NEW JERSEY.

## CORRUGATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 434,594, dated August 19, 1890.

Application filed June 10, 1890. Serial No. 354,880. (No model.)

*To all whom it may concern:*

Be it known that I, ERNEST GOTHBERG, of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Machines for Corrugating Sheet-Metal Tubing; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

My invention relates to power-machines for longitudinally corrugating and embossing sheet-metal tubing.

Heretofore in the machines devised and constructed for crimping or corrugating annular bands or short tubes or the rims of cylindrical vessels the crimping or corrugating rollers have been provided with bearings on one side only of their working-surfaces, so that there is a tendency to spring apart at the unsupported ends. This tendency to spring apart prevents the use of such machines in rolling diagonal or spiral grooves, which require in their production that the parallelism of the rollers and of the axis of the tubing with the axes of the rollers shall be constantly and absolutely maintained.

The object of my invention is to provide without increase of cost or weight a machine of greater strength than those heretofore made, and which shall be sufficiently powerful and be otherwise adapted to spirally corrugate or otherwise emboss with accuracy and precision comparatively long pieces of sheet-metal tubing preparatory to shaping the same into hollow spirally-corrugated spheres or spheroids, or for other purposes.

In the accompanying drawings, Figure 1 is a rear elevation of my power corrugating-machine; Fig. 2, an end view of the same; Fig. 3, a transverse vertical section in line *x x* of Fig. 1, and Fig. 4 an irregular horizontal section in line *y y* of Fig. 3.

Similar letters indicate like parts in all of the figures.

A represents the bed-plate upon which the machine is supported, and which may be mounted upon a supporting frame or table of any approved form.

B B are the four standards, secured upon the bed-plate A in pairs, at each end thereof, and between which the journal-boxes C C′ $C^2$ $C^3$ for the corrugating-rolls D D′ are fitted to admit of independent vertical movement, the inner faces of the standards being adapted to serve as guides for said journal-boxes. The spaces between the standards at each end of the rolls are made to so far exceed the diameter of the rolls (see Figs. 2 and 3) as to permit the pieces of tubing which are to be corrugated by the rolls to be readily inserted between the standards, so as to be passed endwise over the lower roll.

The upper journal-boxes C C′ are severally adjusted vertically each by means of a central screw E, working through a cross-bar or top plate F, secured upon the standards, the lower end of each screw entering the top of the box being confined therein by means of a transverse pin *b*, carried through the box to engage an annular groove in the end of the screw, as shown in Figs. 2 and 3. Each of the screws E E is fitted with a beveled pinion G, gearing with a horizontal shaft H, mounted in bearings in the top plate F′, connecting the cross-bars F F, and said shaft H is provided with a hand-wheel H′, by which the shaft may be rotated to produce a movement of the screws E E for the vertical adjustment of the upper journal-boxes in either direction, as required.

The journal-bearings in said upper boxes C C′ consist of cylindrical apertures, so that the upper roller D, whose journals are fitted therein, will partake of the movement thereof. The bearings for the lower roll D′ are formed on the upper side of the lower boxes $C^2$ $C^3$, and are semi-cylindrical, so that the roller may be readily lifted out therefrom, or the box be permitted to drop away from the roller. The lower box $C^2$ at one end is supported in its proper position in place to allow the two rolls to be brought together by means of removable prop blocks or supports K K, inserted under the same upon the bed-plate A. The lower box $C^3$ under the opposite end of the roller is supported at the proper height by means of a vertical rod or prop L, carried through the bed-plate to rest upon a lever P, pivoted at one end to a hanger R, depending under the bed-plate, and whose opposite free end, extending transversely under the bed-plate at a right angle with the length of the

rolls, is upheld by means of a detachable bolt or pin S, fitting transversely thereto in a second hanger R′, depending from the bed-plate. By removing the bolt S the lever P is allowed to drop, as shown by dotted lines in Fig. 2, so as to permit the journal-box $C^3$ and the end of the lower roll to drop when required. A metallic plate or table M, Figs. 2, 3, and 4, is mounted horizontally in front of the rolls about on a level with their plane of intersection. This table is longitudinally slotted, as at *a*, in line parallel with the rolls, and upon it are placed two adjustable bars N N, each at a right angle to the rolls, and which are made fast when adjusted to or from each other by means of bolts *c c*, inserted through their outer ends to extend through the slot *a* in the table and be secured by nuts working thereon under the table. Between these parallel adjustable bars is fitted a plate T, (see Figs. 3 and 4,) longitudinally slotted at its outer end, as at *w*, and which is secured by a bolt *d*, passing through said slot and the underlying slot *a* in the table M, and made fast by a nut *e*, screwing thereon under said table.

The longitudinal slot *w* in the plate T permits the plate to be moved to and from the rolls D D, it being guided in said movement on the bars N N. Upon its front edge is secured a dependent guide-plate U, (see Fig. 3,) which is made to extend parallel with the rolls the greater part of the length thereof, (see Fig. 4,) the ends of the guide-bars N N, which overlap its upper edge, being made to rest upon said edge. (See dotted lines, Fig. 4.) The rolls D D′ are geared together by cog-wheels $D^2$ at one end thereof, so as to move in unison, and are driven, as usual, by a suitable motor, to which they may be geared in any approved manner. The peripheries of the two rolls are spirally corrugated, (see Figs. 1 and 4,) each as a counterpart of the other, and are so mounted and geared together as that the spiral ridges on the one shall register and interlock with the counterpart grooves on the other, as shown in Fig. 3.

In the operation of the machine the rolls D D′ are first loosened by turning the hand-wheel H′, so as to cause the upper journal-boxes and the upper roll D, mounted therein, to be lifted sufficiently to relieve the lower roll D′ and the pin S, which confines the lever P from pressure. The pin S may then be withdrawn to allow the free end of the lever P to swing downward, (see dotted lines, Fig. 2,) and thereby permit the journal-box $C^3$ at the outer end of the lower roll D′ to drop away entirely clear from the roll to facilitate the insertion of the piece of sheet-metal tubing Y to be corrugated over said lower roll D′ and between it and the upper roll D, as is illustrated in Fig. 3, the space between the standards B B, in which the journal-box $C^3$ travels, being of a width so far exceeding the diameter of the tubing as to permit this to be readily accomplished. The journal-box $C^3$ is now lifted back to its place under the outer journal of the lower roller D′, to support the same, by means of the lever P, which is then secured by the pin S, so as to afford a firm solid bearing and support for said outer end of the roll. By turning the hand-wheel H′ the screws E E are brought to bear upon the upper roll D to carry it toward the lower roll D′ and clamp and compress firmly between them the interposed sheet-metal tubing Y, so that the revolution of the rolls when driven by power shall operate to crimp and corrugate the tube along its entire length in spiral or diagonal corrugations corresponding with those on the rolls. As the tubing is revolved between the rolls, it is carried against the guide-plate U, as illustrated in Fig. 3, and this plate operates to maintain the parallelism of the tube with the axes of the rolls, so as to preserve the regularity and uniformity of the spiral corrugations.

I claim as my invention—

1. The combination, with the working-rolls, in a machine for embossing and corrugating sheet-metal tubing, of a movable journal-box supporting the journal at one end of the lower roll and adapted to drop wholly away from said journal, standards forming guides for the ends of said journal-box to direct its movement, said standards being separated by an interval exceeding the diameter of the lower roll, and means for rigidly supporting the journal-box when in position to furnish a bearing for the roll, substantially in the manner and for the purpose herein set forth.

2. The combination, with the working-rolls, in a machine for embossing and corrugating sheet-metal tubing, of a movable journal-box supporting the journal at one end of the lower roll and adapted to drop wholly away from said journal, standards forming guides for the ends of said journal-box to direct its movement, said standards being separated by an interval exceeding the diameter of the lower roll, a pivoted lever supporting said box, and a device for rigidly fastening and confining said lever when the box has been carried thereby into supporting relation to the roll, all substantially in the manner and for the purpose herein set forth.

3. The combination, with the working-rolls, in a machine for embossing and corrugating metal tubing, and with the frame in which said rolls are mounted, of detachable bearings for the journals of the lower roll, a detachable prop interposed between the bearing at one end of said roll and the frame to afford rigid unyielding support to said bearing, a pivoted lever mounted under the bearing at the opposite end of said roll to support said bearing and carry it against the journal, and means for rigidly securing said lever to provide an unyielding support for the roll, substantially in the manner and for the purpose herein set forth.

4. The combination, in a machine for em-

bossing and corrugating sheet-metal tubing, of the bed-plate, the frame supported thereby, the upper roll mounted in journal-boxes guided vertically between the standards of the frame, means for securing said journal-boxes, the lower roll mounted upon journal-boxes fitted to move between said standards and to drop away from the bearings of the upper roll, one or more detachable supports fitted under one of the journal-boxes at one end of the lower roll, a movable prop fitted under the journal-box at the opposite end of said roll, and a device for actuating and supporting said movable prop, substantially in the manner and for the purpose herein set forth.

5. The combination of the bed-plate, the standards, the cross-bars upon said standards, the two upper journal-boxes fitted to move vertically between the standards, the adjusting-screws working through the cross-bars and supporting the upper boxes, the roll mounted in said boxes, the two lower journal-boxes fitted severally under the upper boxes to move between the same standards, a detachable prop interposed between the bed-plate and one of said lower boxes, the lever pivoted to oscillate vertically under the opposite box, the interposed rod, and the device by which the free end of the lever is made fast when the box resting mediately thereon has been elevated to its normal position, all substantially in the manner and for the purpose herein set forth.

6. The combination, with the rolls, in a machine for corrugating metallic tubing, of a horizontal table mounted in front of the rolls parallel therewith, the parallel guide-bars mounted upon said table at a right angle to the rolls and severally admitting of adjustment in a direction parallel therewith, an interposed central bar or plate admitting of adjustment between them to and from the rolls, and a guide-plate depending from said central bar longitudinally between the rolls and the table and parallel therewith, substantially in the manner and for the purpose herein set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ERNEST GOTHBERG.

Witnesses:
A. N. JESBERA,
E. M. WATSON.