No. 783,951. PATENTED FEB. 28, 1905.

C. J. W. HAYES.

MACHINE FOR SLITTING SHEET METAL.

APPLICATION FILED JUNE 6, 1904.

2 SHEETS—SHEET 1.

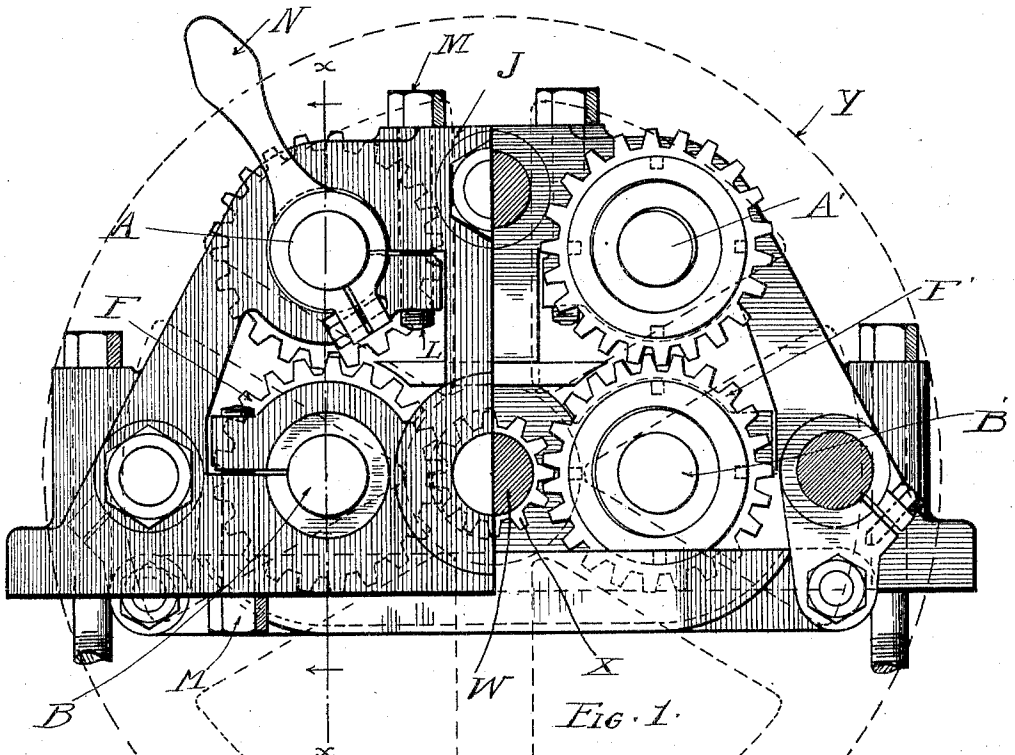


FIG. 1.

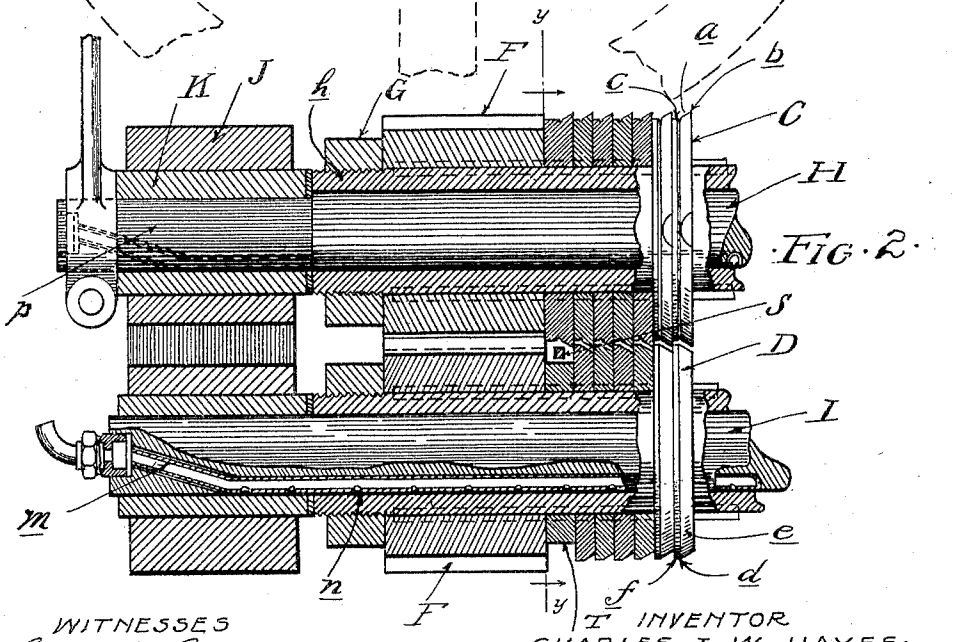


FIG. 2.

WITNESSES

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BY James Whittemore

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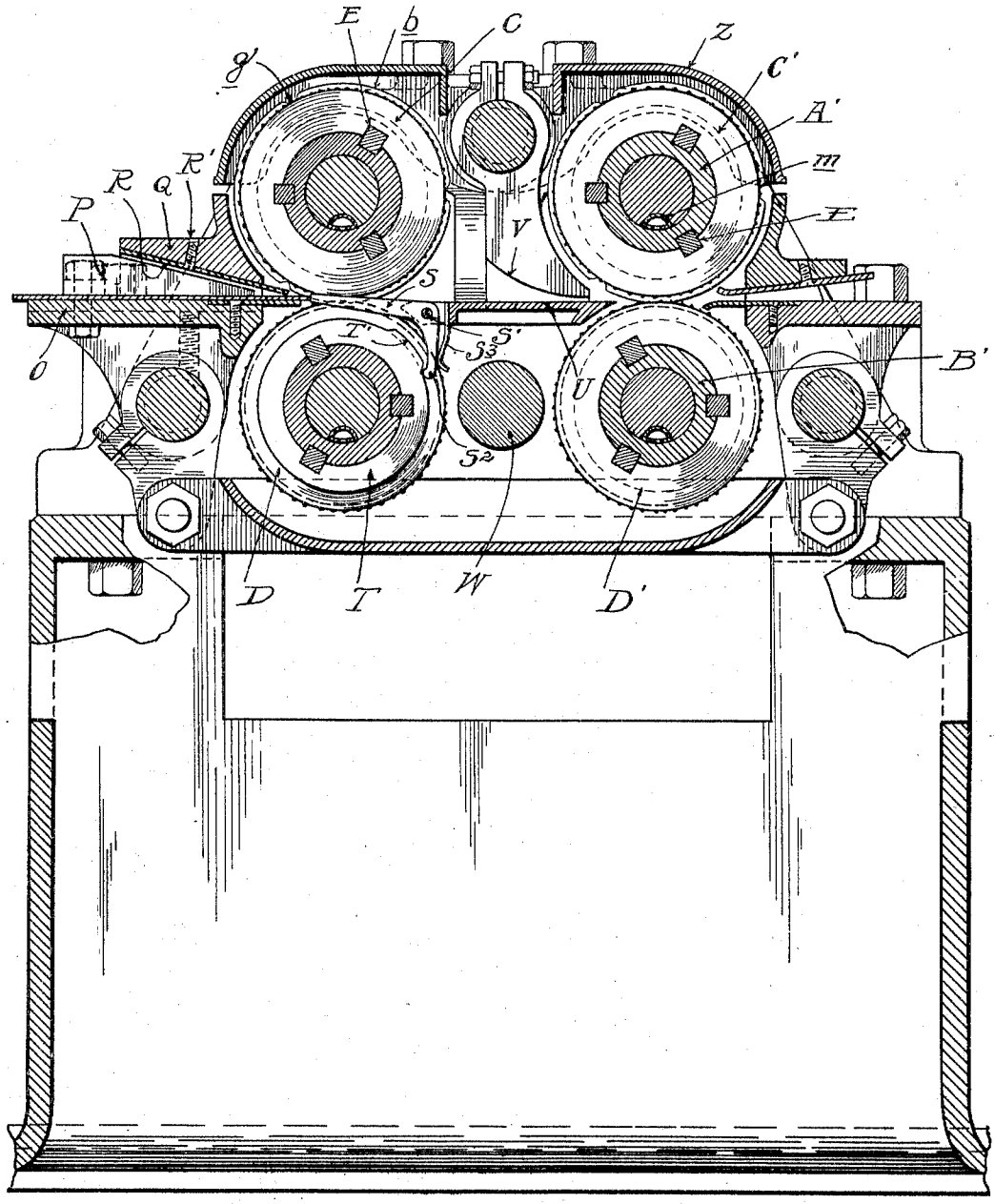


Fig. 3.

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No. 783,951. Patented February 28, 1905.

UNITED STATES PATENT OFFICE.

CHARLES J. W. HAYES, OF DETROIT, MICHIGAN, ASSIGNOR TO FRANK P. CLEVELAND, TRUSTEE, OF DETROIT, MICHIGAN.

MACHINE FOR SLITTING SHEET METAL.

SPECIFICATION forming part of Letters Patent No. 783,951, dated February 28, 1905.

Application filed June 6, 1904. Serial No. 211,419.

To all whom it may concern:

Be it known that I, CHARLES J. W. HAYES, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Machines for Slitting Sheet Metal, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to machines for slitting sheet metal, and more particularly designed for use in connection with the manufacture of expanded metal.

It is the object of the invention to provide a construction which will not only slit metallic sheets, but will also indent the metal, so that one edge of each strand between the slits is projected beyond the plane of the metal at the points of juncture of strands. The metal thus slitted and indented is adapted for use in connection with an expanding-machine, which forms no part of the present invention, but in which the projecting edges of the strands are used to hold the sheet in position during the expanding operation.

In the drawings, Figure 1 is a side elevation, partly in longitudinal section, of the machine. Fig. 2 is a cross-section substantially on line *x x* of Fig. 1, and Fig. 3 is a longitudinal section substantially on line *y y* of Fig. 2.

The machine comprises, essentially, a pair of revolving arbors A and B, upon which are mounted series of rotary slitting-cutters C and D. These cutters are adapted to coöperate with each other to shear the metal and form the slits, and they also coöperate to feed the metallic sheet and to indent the strand between slits. As shown in Fig. 2, each of the cutters C comprises a portion having a beveled periphery *a*, forming the cutting edge *b*, and adjacent this beveled portion the cylindrical portion *c*. The latter is preferably serrated or roughened, so as to form a feeder for engaging with the metal sheet and advancing the same. The cutters D, which are mounted upon the shaft B, have corresponding serrated cylindrical portions *d*, which are arranged opposite the portion *c* of the disks C. They are also provided with beveled portions *e*, which are oppositely inclined to the corresponding portions *b* upon the cutter C, so that the bevels of the adjacent portions of the cutters C and D will be arranged parallel to each other, the disks D having cutting edges *f*, which are on the opposite side of the disk from the cutting edges *b* of the disk C. Thus the edges *b* and *f* are oppositely arranged and overlap each other in the same plane, so as to coöperate to shear the metallic sheet when fed between the disks.

The disks C and D are mounted, respectively, upon the arbors A and B, preferably by providing longitudinally-extending keys E, engaging with corresponding key-seats in said arbors and with keyways in each of the disks. The cutting edge of each disk is provided with one or more interuptions or cut-out portions, so as to leave uncut sections between the ends of the strands in the slitted sheet. As preferably constructed each disk is divided into three equal segments by interruptions or cut-away portions *g*, and these are preferably arranged midway between the key-seats in the disks, so as to prevent unduly weakening the cutters. At the end of the series of disks on each of the arbors is mounted a pinion F, which pinions on the two arbors intermesh with each other. The pinions, together with the series of disks, may be firmly clamped upon the arbor by providing the threaded portion *h* at the end of the arbor, which engages with a nut or clamping-collar G.

The arbors A and B are journaled in a suitable frame, preferably by forming said arbors of tubes which are sleeved upon stationary axles H and I. These axles are mounted at opposite ends in bearings in a suitable frame J and are arranged, preferably, in the same vertical plane, so that the sheet to be slitted may be fed horizontally between the disks. In order to permit of accurately positioning the disks C and D in relation to each other, the ends of the axles H and I are secured in a frame J by engaging with split collars or bearings K. These bearings are secured in split boxes L, formed in the frame J, and said collars are longitudinally adjustable within

the boxes and bear against the ends of the tubular arbors A and B, and the collars K are secured in position by clamping-bolts M, which draw together the portions of the box on opposite sides of the slit and also clamp the collars K upon the axles H and I. Thus the arbors A and B may be adjusted longitudinally by loosening the bolts M, which will permit of longitudinal adjustment of the collars K in the boxes L.

To adapt the machine for operating upon metallic sheets of different gage, one of the arbors must be laterally adjustable in relation to the other. This adjustment is obtained by providing the arbor H with the eccentric portions *p*, which engage with the collars K, and by connecting the end of the axle with the lever or handle N, by means of which the axle may be rotated in the collar K whenever the bolts M are loosened. With this construction the movement of the lever N will cause the arbor H and the disk C thereof to approach or recede from the arbor I with the disks D, and in this manner the space between the feeding portions *c* and *d* of the disks C and D may be adjusted to be suitable for the thickness of the metallic sheet operated upon.

It is essential in the manufacture of slitted sheets which are subsequently to be expanded upon a separate machine that the successive sheets operated upon should be uniform in the positioning of the slits both in relation to the edges of the sheet and the ends thereof. To accomplish this, the sheet to be operated upon is preferably fed between the arbors A and B over a table O, mounted upon the frame. This table has secured to opposite sides thereof guides P, which engage with the edges of the sheet to properly center it in relation to the cutters. Above the table O is the hood Q, which is preferably beveled and has the plate R adjustably secured thereto by the screw R′. This plate may be so adjusted as to bear with its entire edge upon the upper face of the metallic sheet and hold it down upon the table O. Beyond the inner end of the table O and located between the arbors A and B at the ends of the series of disks thereof is a stop S, which is normally arranged in the path of the metallic sheet fed inwardly over the table O. This stop, as shown, is pivoted at S′ and has a projecting bell-crank arm S^2, which extends in proximity to a cam T upon the arbor B at one end thereof. This cam T has a raised portion T′, which once in each revolution of the arbor will move the arm S^2 and cause the withdrawal of the stop S from the path of the sheet. As the cam T is in fixed timed relation with the cutter-disks C and D, it is obvious that the stop S will always be withdrawn from the path of the metallic sheet, so as to permit the latter to engage with the same portion of the cutter-disks, and thus the arrangement of the slits will always be in the same relation to the ends of the sheets operated upon. When the stop S is withdrawn, the metallic sheet will hold it from returning until after said sheet has passed, whereupon the spring S^3 will again return it into its position in the path of the sheet.

Where it is necessary to slit the metallic sheets so as to form narrow strands, the cutters may be strengthened by a construction in which only a portion of the slits are formed by one set of cutters, the intervening slits being formed by other cutters, which subsequently operate upon the sheet. Such a construction is illustrated in Figs. 1 and 3 of the drawings, in which A′ and B′ are arbors corresponding to the arbors A and B, but arranged in rear thereof, so as to operate upon the sheet subsequently to the operation of the cutters C and D. These arbors A′ and B′ may be of the same construction as already described and may be provided with cutting-disks C′ and D′ corresponding to the disks C and D. The disks C′ and D′ are adjusted to have their cutting edges in longitudinal planes intermediate the cutting edges of the disks C and D, so that each strand formed by the operation of the latter will be subsequently divided into a pair of strands by the cutters C′ and D′. The metallic sheet after leaving the cutters C and D is fed over a central table U, which is preferably arranged in the same horizontal plane as table O, but between the two sets of cutters. The end of the sheet is guided between the cutters C′ and D′, preferably by an inclined guide V, arranged above the table U.

For driving the arbors A′ and B′ a drive-shaft W is preferably arranged between the arbors B and B′ and is provided with the pinion X, which intermeshes with the pinions F and F′ on the arbors B and B′.

Y is a pulley (indicated in dotted lines in Fig. 1) which is secured to the drive-shaft W and is adapted to communicate restricted motion thereto. Thus the rotation of the shaft W will be communicated to the pinion X, directly to the pinions F and F′ on the arbors B and B′, and from said latter pinions to the corresponding pinions on the arbors A and A′.

The cutters C and D are preferably housed in a suitable casing Z, so that no portion thereof is exposed. The bearing of the arbors upon the axles may be lubricated by any suitable means, such as oil-channels *m*, passing through the axles and having distributing-apertures *n* throughout their length.

What I claim as my invention is—

1. In a slitting-machine a pair of rotating arbors arranged on opposite sides of the work, a series of disks C mounted on one arbor having the cylindrical feeding portion *c*, the beveled portions *a* terminating in a cutting edge *d* and one or more notches *g* in said beveled portions, and a series of disks D mounted on the other arbor having cylindrical portions *d* opposite a portion *c* of the disk C.

2. In a slitting-machine a frame, a pair of rotary arbors, an axle upon which one of said arbors is sleeved, a series of coöperating rotary cutters mounted upon said arbors, eccentrics on opposite ends of said axle, clamping-bearings for securing the eccentric portions of said axle to said frame, and split bushings surrounding said eccentric portions, and longitudinally, adjustably secured within said bearings, whereby said arbor may be adjusted longitudinally and laterally in relation to the other arbor.

3. In a slitting-machine, the combination with a pair of parallel rotating arbors, feeding-disks mounted thereon, and projecting shearing-segments on said feeding-disks of one of said arbors, of a pivoted stop normally in the path of the sheet to be fed into the machine and means whereby said stop is removed from the path of said sheet at a determinate time.

4. In a slitting-machine, the combination with a pair of parallel rotating arbors, feeding-disks mounted thereon, and projecting shearing-segments on the disks of one of said arbors, of a pivoted stop normally in the path of the sheet to be fed into the machine, a bell-crank arm on said stop, and a cam on one of the arbors, whereby the said stop is removed from the path of the said sheet.

5. In a slitting-machine, the combination with a pair of parallel rotating arbors, each having mounted thereon a series of feeding-disks respectively on opposite sides and in peripheral contact with the work, projecting shearing-segments on the disks of one arbor, a portion of the disks on the opposite arbor being reduced in diameter, whereby the sheet fed between said disks is slitted and indented during the rotation thereof, of a pivoted stop normally in the path of the sheet to be fed, a bell-crank arm on the stop, and a cam on one of the arbors adapted to engage said bell-crank arm and remove said stop from the path of the sheet at a determinate point in the revolution of the shearing-segments.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES J. W. HAYES.

Witnesses:

JAS. P. BARRY,

H. C. SMITH.