(No Model.)

J. B. FOOTE.

SHEARING MACHINE.

No. 474,822. Patented May 17, 1892.

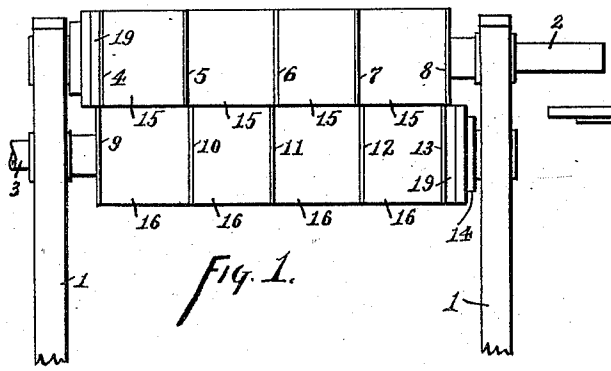

Fig. 1.

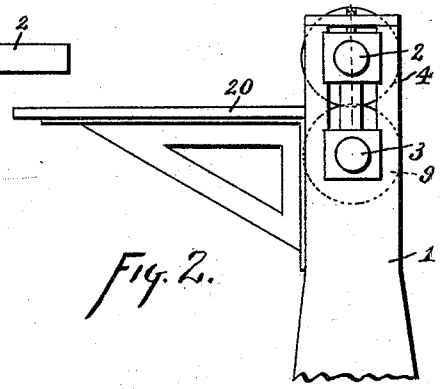

Fig. 2.

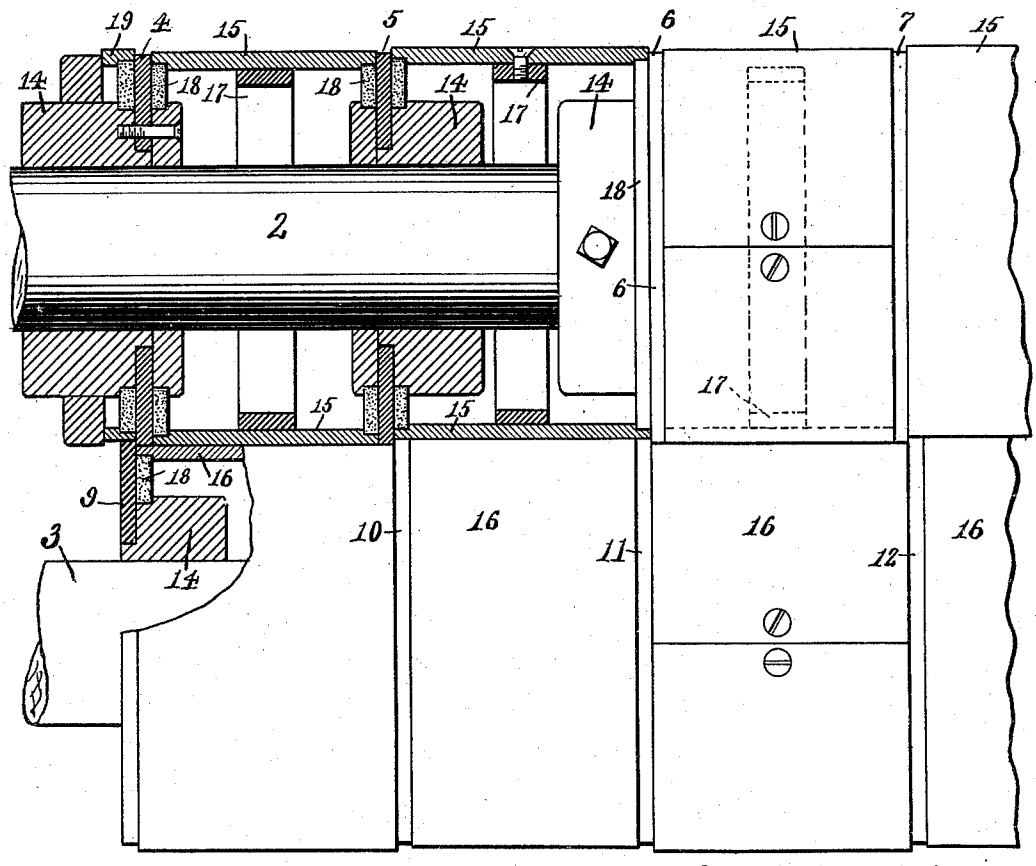

Fig. 3.

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UNITED STATES PATENT OFFICE.

JOHN B. FOOTE, OF HAMILTON, OHIO.

SHEARING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 474,822, dated May 17, 1892.

Application filed February 12, 1892. Serial No. 421,256. (No model.)

To all whom it may concern.

Be it known that I, JOHN B. FOOTE, of Hamilton, Butler county, Ohio, have invented certain new and useful Improvements in Shearing-Machines, of which the following is a specification.

This invention pertains to improvements in that class of shearing-machines generally spoken of as "rotary slitters" and designed for cutting up sheets of material into narrower strips by passing the sheet between two shafts on which are mounted rotary shearing-disks. In the shearing of sheet metal—as, for instance, in cutting out the bodies for fruit-cans—it is often found that the sheets are somewhat buckled, thus causing the sheared pieces when flattened out to vary somewhat in width from end to end. It is also found that the edges of the metal at the time of the shearing are apt to be turned down or up a trifle by the action of the shearing-disks, thus putting edge bends in the strips and causing them to run improperly between the slitters, producing strips not parallel in width. In machines of this class it is usual to feed the sheets into and draw the strips out of the machine by means of suitable feed-rolls placed before and after the slitters; but these feed-rolls cannot be set close enough to the slitters to prevent the evils spoken of and insure parallel shearing.

My improvements will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a rear elevation of a rotary shearing-machine embodying my improvements; Fig. 2, an end view of the same; and Fig. 3, a rear elevation at one end of the slitter-shafts and slitters, on an enlarged scale, some of the parts appearing in vertical longitudinal section in the plane of the centers of the slitter-shafts.

In the drawings, 1 indicates the usual housings for the support of the slitter-shafts, &c.; 2, the upper slitter-shaft; 3, the lower slitter-shaft, these shafts mounted in the housings and intended to be driven by power in the usual manner; 4, 5, 6, 7, and 8, slitter-disks fixed to the upper shaft at distances apart to suit the width of slitting to be done, the peripheries of these disks being hardened and ground, as usual; 9, 10, 11, 12, and 13, similar disks similarly fixed to the lower shaft, the upper peripheries of the lower disks lapping a trifle beyond the lower peripheries of the upper disks, against which they run to produce the shearing action, as usual, the disks being shown (see Fig. 1) as set in pairs alternately—that is to say, the first strip at the left is produced between disks 9 and 10, between which the two upper disks 4 and 5 engage, while the next strip is cut between the upper disks 5 and 6, which straddle the two lower disks 10 and 11, and so on, this being a common arrangement of slitting-disks and designed principally to prevent end-thrusts on the slitter-shafts; 14, the usual hubs fixed to but adjustable along the slitter-shafts and having the slitter-disks secured to them, the disks being thus adjustable along the shafts to suit the width of slitting to be done; 15, short tubes or shells disposed upon the upper shaft and normally concentric thereto and fitting neatly endwise between the slitter-disks of that shaft, these shells being preferably a trifle larger than the disks and being also preferably made in two longitudinal halves, so that they may be removed without the necessity of stripping all of the shells and slitters from the shaft, it being understood that the lengths of these shells must correspond with the distances between the disks, a change in distances calling for shells with suitable lengths, and also that the shells will be removed when the faces of the disks are to be reground; 16, similar shells similarly arranged between the lower slitter-disks; 17, a ring within each shell to serve as a means for securing together the two halves of the shells in case the shells are made in halves, as mentioned, the halves of the shells being secured to the rings by countersunk screws going through the shells and screwing into the rings, as shown; 18, radially-acting springs disposed within each end of each shell and abutting inwardly upon the hubs of the disks, these springs in the present case consisting of annular rings of rubber encircling the hubs of the disks and having their peripheries engaging within the ends of the shells, the ends of the shells being counterbored and the hubs being grooved, as shown, so as to prevent sidewise displacement of the rubber rings, the office of these

springs being to tend to hold the shells concentric with the disks, but to permit them to yield to exterior pressure and take up positions eccentric to the disks; 19, short shells, similar in construction and performance to the shells 15 and 16, disposed outside an end slitting-disk on each shaft where such disk has an inside engagement with its fellow-disk on the other shaft, this occurring at one end of each series of slitters when the disks are arranged in the manner shown, and 20 the usual table of the machine to support the sheets as they are fed between the slitters. No feed-rolls need be employed in this arrangement. The two slitter-shafts with their disks and shells form virtually two cylinders running together, and the sheets in being slitted pass between these cylinders, and the portions of the cylinders formed by the shells will yield vertically to permit the passage of the sheet which they squeeze between them, thus feeding the sheet and freeing it of all buckles. Each pair of slitter-disks overlap to produce the shearing action, and consequently the edges of the disks will produce an eccentric displacement of the shells, with which they are in peripheral contact. The elastic yielding of the shells permit such displacement to take place as effected by the lap of the disks and the thickness of the metal being sheared. At the points where the disks lap, the points where the shearing takes place, and the point where the edges of the metal being sheared are apt to turn and produce trouble with ordinary arrangements the shells hold the edges of the strips tightly compressed between the shells and the peripheries of the disks, the result being a fair running of the sheet and the shearing of it into truly parallel strips.

With the shells made in halves they can be readily removed and replaced by others of length to suit new settings of the disks, and this without removing the shafts from the housings. The shells may of course each be formed in one piece, and this will be no serious inconvenience if the machine is not to be employed for slitting a variety of widths; but with such construction changes in width of slitting would obviously call for the removal of the shafts from the housings and the stripping of the disks from the shafts in order to permit the change of shells.

I claim as my invention—

1. In a rotary shearing-machine, the combination, substantially as set forth, of two slitter-shafts, slitting-disks mounted thereon and arranged for shearing coaction in pairs, and radially-yielding circular shells, of rigid inelastic material, disposed on the shafts and fitting endwise between the slitting-disks.

2. In a rotary shearing-machine, the combination, substantially as set forth, of a pair of shafts, slitting-disks mounted thereon and arranged for shearing coaction in pairs, rings surrounding the shafts between the slitting-disks, and yielding circular shells formed in halves and secured to said rings and having their ends in engagement with the faces of the slitting-disks.

3. In a rotary shearing-machine, the combination, substantially as set forth, of a pair of slitter-shafts, slitting-disks mounted thereon and arranged for shearing coaction in pairs, shells surrounding the shafts between the slitting-disks and having their ends engaging the faces of the disks, and radially-acting springs arranged within the shells.

4. In a rotary shearing-machine, the combination, substantially as set forth, of two shafts, slitting-disks mounted thereon and arranged for shearing coaction in pairs, shells surrounding the shafts between the slitting-disks and having their ends in engagement with the faces of the disks, and annular elastic rings disposed within the ends of the shells and inwardly abutting on the hubs of the disks.

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