June 2, 1964 W. H. BEDINGHAUS 3,135,152

ROTARY PERFORATING ROLL UNITS SUPPORTED FOR MOVEMENT TOWARDS AND AWAY FROM EACH OTHER

Filed March 18, 1963 2 Sheets-Sheet 1

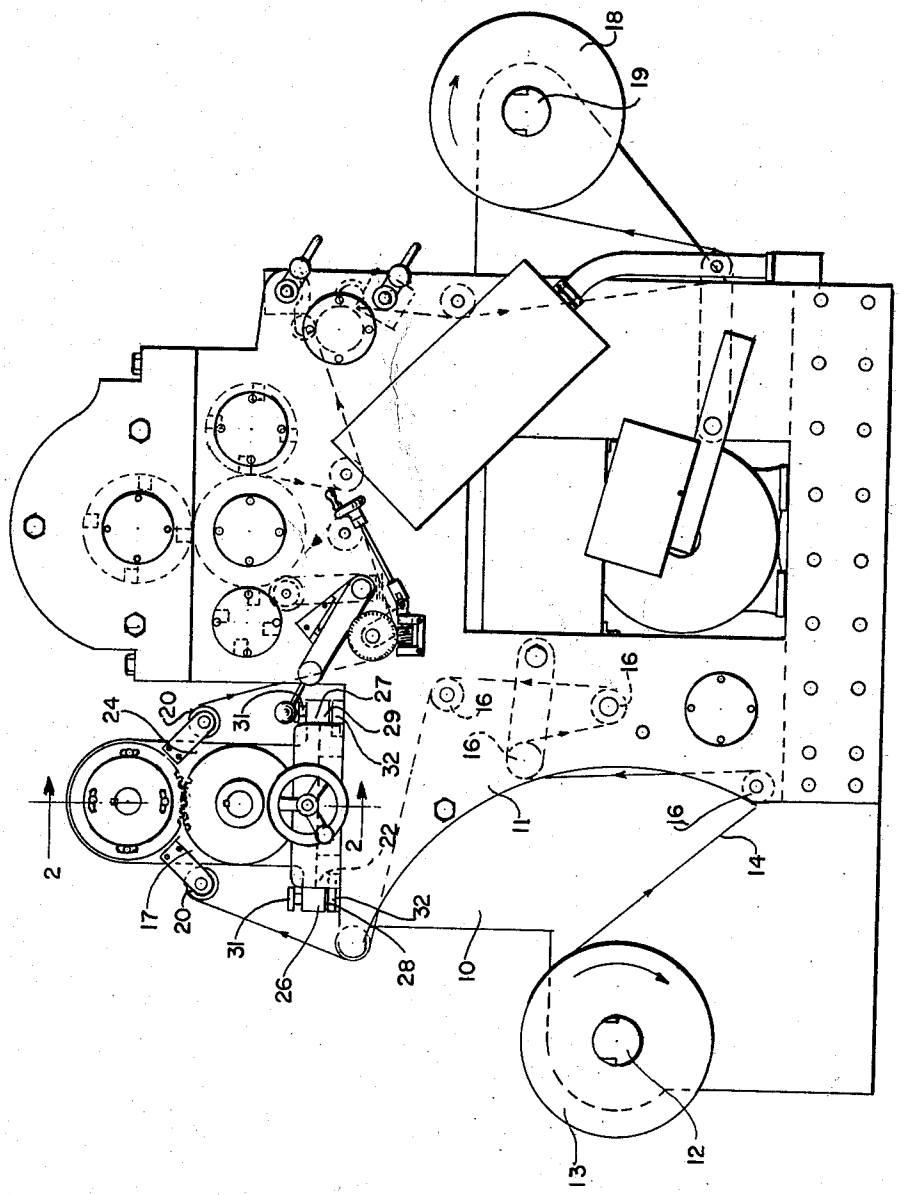


FIG. 1

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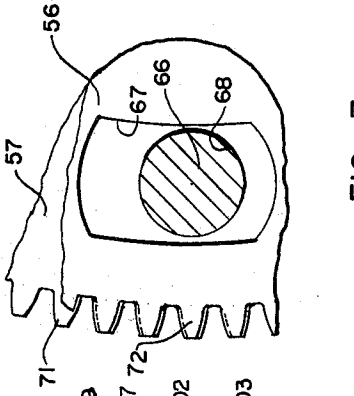


FIG. 7

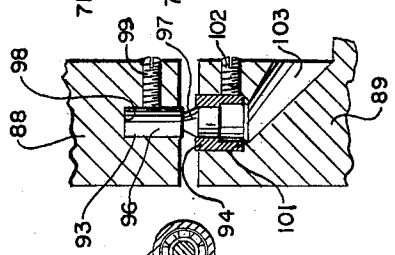


FIG. 6

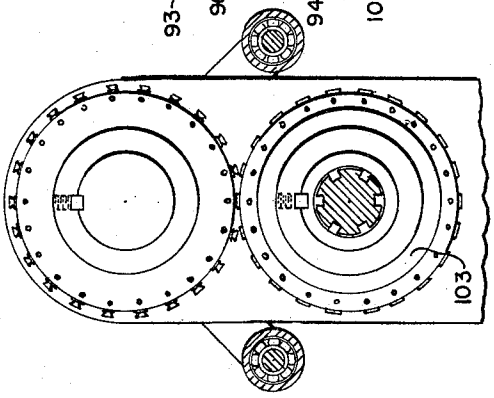


FIG. 5

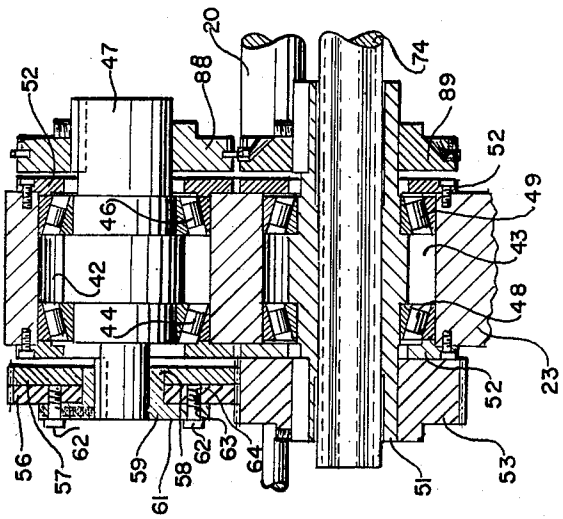


FIG. 4

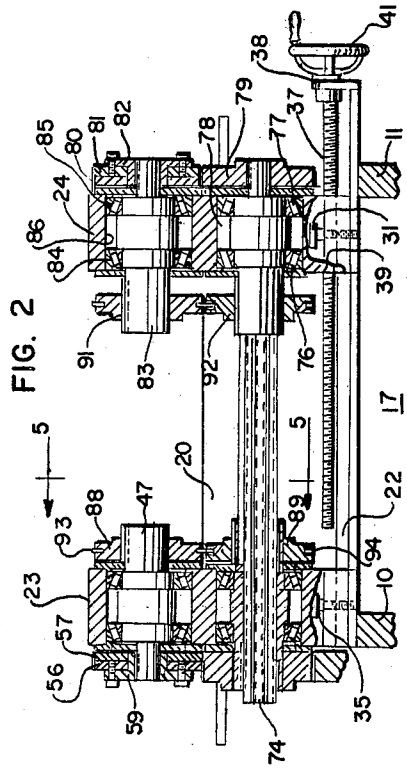


FIG. 2

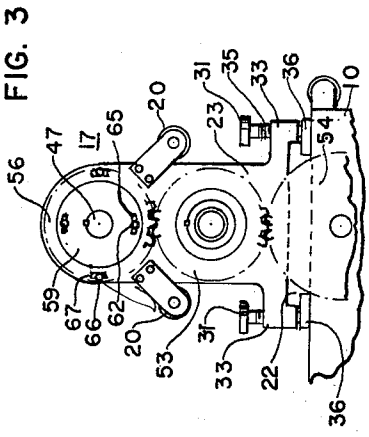


FIG. 3

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3,135,152

ROTARY PERFORATING ROLL UNITS SUPPORTED FOR MOVEMENT TOWARDS AND AWAY FROM EACH OTHER

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Filed Mar. 18, 1963, Ser. No. 265,871
1 Claim. (Cl. 83—345)

This invention relates to a machine for forming rows of perforations in webs. More particularly, this invention relates to a machine for forming rows of perforations along edges of webs for use in aligning one web with another.

An object of this invention is to provide a machine for forming rows of perforations which has means for precisely adjusting the positions of rows of perforations.

A further object of this invention is to provide a machine of this type which includes two perforating heads, means for causing the heads to rotate in unison, and means for adjusting the heads toward and away from each other.

A further object of this invention is to provide a machine of this type having lower rolls having a splined interconnection to cause the lower rolls to turn together, cantilever supported upper rolls, and gearing driving the upper rolls in unison with the lower rolls but in opposed direction thereto.

The above and other objects and features of the invention will be apparent to those skilled in the art to which this invention pertains from the following detailed description, and the drawings, in which:

FIG. 1 is a view in front elevation of a perforating machine constructed in accordance with an embodiment of this invention;

FIG. 2 is a view in section taken generally on the line 2—2 in FIG. 1;

FIG. 3 is a view in rear elevation of the perforating section of the machine shown in FIG. 2;

FIG. 4 is an enlarged fragmentary sectional view taken on the same line as FIG. 2;

FIG. 5 is a view in section taken on the line 5—5 in FIG. 2;

FIG. 6 is an enlarged fragmentary view in section taken on the same line as FIGS. 2 and 4, showing details of perforating rolls; and

FIG. 7 is an enlarged fragmentary view in side elevation partly broken away and in section showing split gears in an adjusted position.

In the following detailed description and the drawing, like reference characters indicate like parts.

In FIG. 1 is shown a perforating machine including frame plates 10 and 11, a spindle 12 on which a roll 13 of paper, or the like to be perforated is mounted. A web 14 from the roll on the spindle passes over rolls 16 to an edge-perforating section 17. After leaving the edge-perforating section 17, the web progresses through other portions of the machine, not shown in detail, and finally is wound on a take-up roll 18 mounted on a spindle 19. The web is guided through the edge-perforating section by rolls 20.

Details of construction of the edge-perforating section 17 are shown in FIGS. 2 to 6, inclusive. The edge-perforating section 17 is mounted on the frame plates 10 and 11 as shown in FIGS. 2 and 3. The edge-perforating section 17 includes a generally T-shaped track 22 which is attached to the frame plates 10 and 11 by appropriate fasteners, not shown. On the track 22 are mounted upstanding housings 23 and 24. Flanges 26 and 27 (FIG. 1) of the housing 24 have downwardly extending portions 28 and 29, respectively, which fit on either side of the track 22. The flanges 26 and 27 receive bolts 31. Each of the bolts 31 is threaded to a

plate 32 which can be drawn against the underside of the track 22 by the bolt 31 to hold the housing 24 in position on the track. Similarly, the housing 23 (FIG. 3) has flanges 33 and downwardly extending projections 34 thereon which fit on either side of the track 22. The flanges 33 carry bolts 35. Plates 36 threaded to the bolts 35 can engage the underside of the track 22 to hold the housing 23 in position thereon. An adjusting shaft 37 (FIG. 2) is rotatably mounted in a bracket 38, which is mounted at one end of the track 22. The shaft 37 is threaded in an opening 39 in the housing 24 so that, when the bolts 31 are loosened and a handwheel 41, mounted on the shaft 37, is turned, the housing 24 is moved to the left or to the right as shown in FIG. 2.

As shown in FIG. 4, the housing 23 has bearing openings 42 and 43. Bearings 44 and 46 are mounted in the opening 42 and rotatably support an upper shaft 47. Bearings 48 and 49 mounted in the lower opening 43 rotatably support a hollow lower shaft 51. The bearings are held in place in the bearing openings by bearing retainer rings 52, which are attached to the housing 23. A drive gear 53 is mounted on and keyed to the lower shaft 51. As shown in FIG. 3, the drive gear 53 meshes with an idle gear 54. The idle gear 54 is driven by a chain of gears (not shown) driven by an appropriate motor. The drive gear 53 also meshes with a pair of split gear halves 56 and 57 (FIG. 4). The gear halves 56 and 57 are mounted on a hub portion 58 of a flanged bushing 59. The bushing 59 is mounted on and keyed to the upper shaft 47. The gear half 56 is attached to a flange 61 of the flanged bushing 59 by screw fasteners 62, which extend through arcuate slots 63 in the flange 61 and into threaded sockets 64 in the gear half 56 so that, when the screw fasteners 62 are loosened, the upper shaft 47 and the flanged bushing 59 can be turned a limited amount for adjusting the position of the shaft 47 with respect to the gears. The gear half 57 is adjustably attached to the gear half 56 by screw fasteners 66 (FIGS. 2 and 7) which extend through arcuate slots 67 in the gear half 56 and are threaded in sockets 68 in the gear half 57. When the screw fasteners 66 are loosened, the gear halves can be turned with relation to each other so that teeth 71 (FIG. 7) of the gear half 57 can overlap a portion of the space between teeth 72 of the gear half 56, as shown in FIG. 7, in order that the play between the gear 53 (FIG. 3) and the gear halves 56 and 57 (FIG. 4) can be taken up.

The hollow lower shaft 51, on which the gear 53 is mounted, is internally splined to receive a portion of an externally splined shaft 74. As shown in FIG. 2, the splined shaft 74 is rotatably mounted in bearings 76 and 77 mounted in an opening 78 in the housing 24. A gear 79 mounted on the splined shaft 74 meshes with gear halves 80 and 81 which, in turn, are mounted on a flanged bushing 82. The flanged bushing 82 is mounted on an upper shaft 83 rotatably mounted in bearings 84 and 85 which are received in an opening 86 in the housing 24 and are so arranged that the upper shafts 83 and 47 are coaxial.

On the upper shaft 47 (FIG. 4) is mounted an upper perforator roll 88 and on the hollow lower shaft 51 is mounted a lower perforator roll 89. Similarly, on the upper shaft 83 is mounted a second upper perforator roll 91 (FIG. 2) and on the splined shaft 74 is mounted a second lower perforator roll 92. Each of the upper perforator rolls includes a plurality of punch members 93, which are equally spaced angularly around the periphery of the upper perforator roll. Each lower perforator roll includes a plurality of socket members 94 equally spaced around the roll.

Details of construction of the punch and socket members are shown in FIG. 6. Each punch member 93

includes a cylindrical body **96** and a frusto-conic head **97**. The body **96** is held in place in a socket **98** in the upper perforator roll by a set screw **99**. Each socket member **94** is received in a bore **101** in the lower perforator roll and is held in place therein by a set screw **102**. The socket members **94** are hollow so that discs of paper (not shown) which are cut by the heads of the punch members, can pass therethrough. An annular slot **103** in the lower perforator roll **89** permits discharge of such paper discs.

The punch members must be precisely aligned with the socket members. The construction of the flanged bushings **59** and **82** (FIG. 2) and the gear halves **56—57** and **80—81** makes possible accurate aligning adjustment of the perforator rolls.

The perforating machine illustrated in the drawings and described above is subject to structural modification without departing from the spirit and scope of the appended claim.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

A perforating machine which comprises a base, a pair of spaced upright bearing housings, coaxial upper shafts rotatably mounted in the housings, an externally splined shaft rotatably mounted in one of the housings, an internally splined shaft rotatably mounted in the other of the housings, the splined shafts being in engagement to rotate in unison, means for moving one of the housings toward and away from the other housing, a gear mounted on each splined shaft, a bushing mounted on and keyed to each upper shaft, each bushing having a hub portion and an outwardly extending flange portion, a pair of gear halves pivotally mounted on the hub portion of each bushing, means for attaching one of the gear halves of each pair to the flange associated therewith in selected angular positions with the gear halves in mesh with the gear associated therewith, means for attaching the other gear half of each pair to the first gear half associated therewith in selected angular positions, an upper perforator roll mounted on each upper shaft, and a lower perforator roll mounted on each splined shaft and cooperating with the upper perforator roll associated therewith for gripping and engaging a web to cut perforations therein.

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