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DEVICE FOR CENTRALIZING STRIP MATERIAL

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FIG. 1

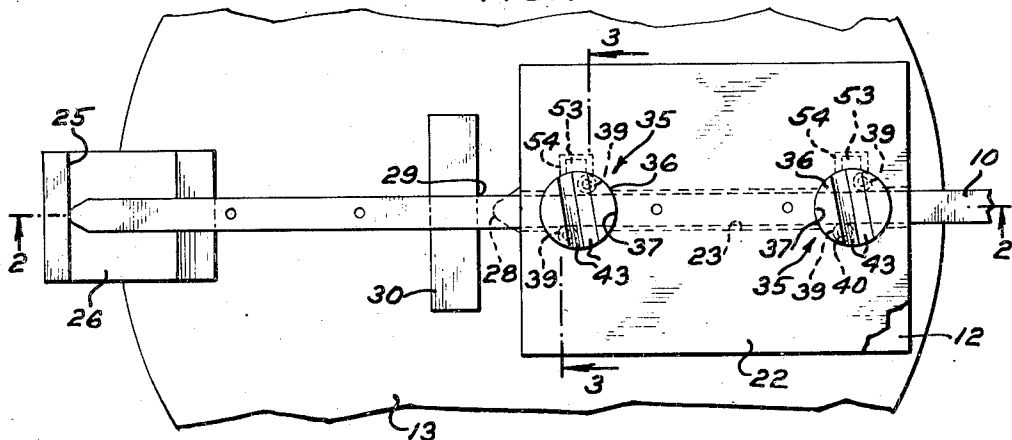
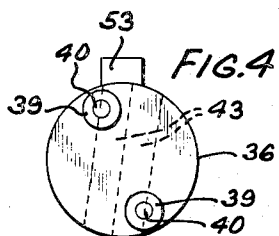


FIG. 2

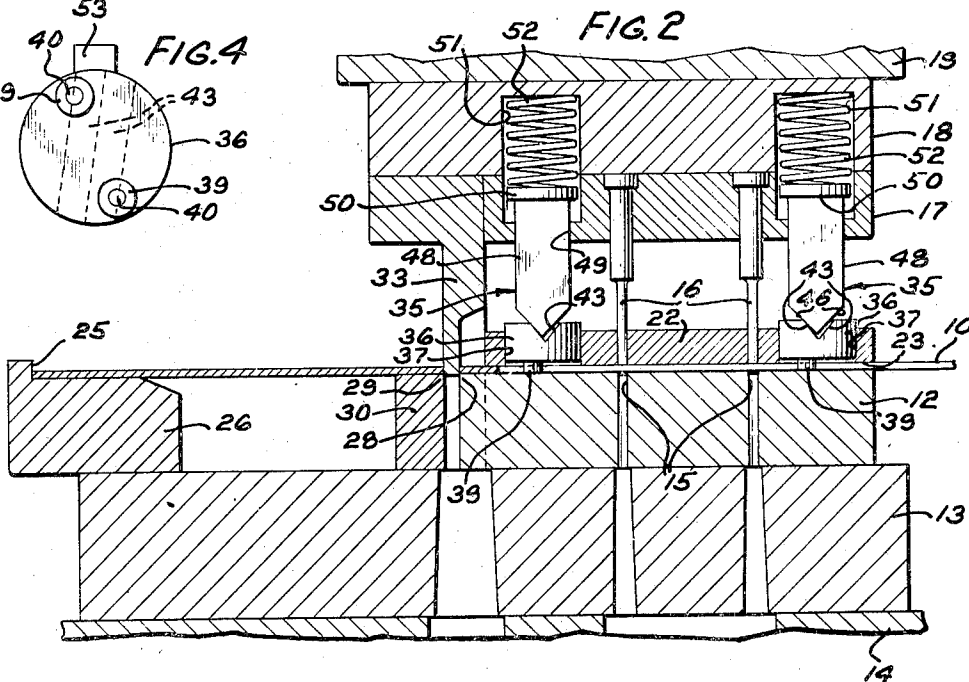
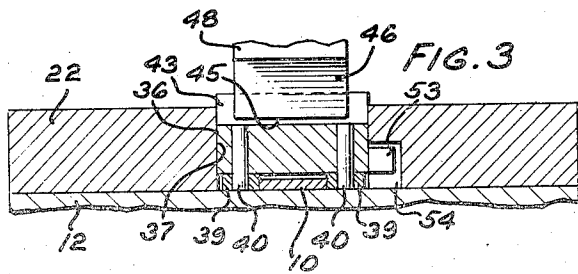


FIG. 3



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DEVICE FOR CENTRALIZING STRIP MATERIAL

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This invention relates to a device for centralizing a strip material and more particularly to a centering device applicable to a punch press for centering strip material on a predetermined center line in the punch press in response to the downstroke of the ram of the press.

It is an object of the present invention to provide a centralizing device of simple construction for centralizing strip material relative to a predetermined center line.

In one embodiment of the invention as applied to a punch press having a die and a plurality of punches for punching the strip material into contact springs having a plurality of perforations on its longitudinal center line, there is provided a pair of centralizing devices on the die in spaced relation to each other, each comprising a cylindrical member mounted for rotation about an axis located on the predetermined center line. A pair of rollers are mounted on the lower side of each cylindrical member diametrically opposite and equi-distant from the axis of the cylindrical member and spaced apart a distance greater than the width of the strip material to receive the strip material therebetween. The upper surface of each cylindrical member is provided with cam surfaces which are engageable with cooperating actuating cam members yieldingly mounted on the punch holder for reciprocation movement therewith whereby, at a predetermined point in the downward movement of the ram of the press, the cooperating cam members will engage the cam surfaces on the cylindrical members and cause the cylindrical members to rotate and thereby urge the rollers thereon simultaneously in opposite directions toward the center line into engagement with the opposite edges of the strip to centralize the strip.

The invention will be more fully understood by reference to the following detailed description thereof and the accompanying drawings illustrating a preferred embodiment of the invention, wherein

Fig. 1 is a fragmentary plan view of the lower portion of a punch and die mechanism with the centralizing device therein;

Fig. 2 is a vertical sectional view through the punch and die mechanism showing the die in its lower or operative position and taken on the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary sectional view through a portion of the strip equalizing mechanism taken on the line 3—3 of Fig. 1; and

Fig. 4 is a detailed bottom plan view of one of the centralizing members.

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In the processing of strip material with the aid of a punch press wherein a plurality of perforations are formed in the strip and the strip cut into predetermined lengths to form contact springs for electrical relays, it is important that the perforations be located accurately along the center line of the strip. Due to the slight variations in the overall width of the strip material, it is necessary to centralize the strip relative to a predetermined center line passing through the axis of the perforating punches.

In the drawings illustrating one embodiment of the invention applied to a punch and die mechanism for forming contact springs from strip material, the strip material 10 is fed over a die 12 mounted on a die holder 13, which, in turn, is secured to a bolster plate 14 of a punch press. The die block 12 is provided with punch apertures 15 forming cutting edges which cooperate with a pair of punches 16 to form perforations on the longitudinal center line of the strip 10. The punches 16 are secured by a retaining plate 17 to a punch holder 18 which, in turn, is mounted on a ram 19 of a punch press for reciprocation therewith. A stationary stripper plate 22 is secured to the die block 12 and is provided with a longitudinal slot or passageway 23 for loosely receiving and guiding the strip 10.

The strip 10 may be advanced manually or by suitable feeding mechanism until the forward edge engages the stop surface 25 of a stop member 26 secured to the die holder for stopping the strip in a predetermined position relative to the punch and die. A curved cutting edge 28 is formed on the left hand end of the die block 12 as viewed in Fig. 1 and a straight cutting edge 29, in spaced relation to the cutting edge 28, is formed on a die block 30 mounted on the die holder 13. The cutting edges 28 and 29 cooperate with similar cutting edges formed on the punch 33 secured to the punch holder 18 for reciprocation therewith to punch out a slug or blank from the strip 10, thus to sever a completed spring contact member from the strip 10 and form the leading end on the remainder of the strip.

A pair of centralizing devices 35—35 are provided in spaced relation to each other along a predetermined center line passing through the axes of the punches 16 to accurately align the center line of the strip 10 with the axis of the punches 16. Each centralizing device comprises a cylindrical member 36 mounted in a cylindrical aperture 37 in the stripper plate 22 for oscillation about its axis on said predetermined center

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line. A pair of rollers 39—39 engaging the upper surface of the die 12 are mounted on a pair of downwardly projecting pins 40—40 mounted on the cylindrical member 36 diametrically opposite and equi-distant from the axis of the member 36. The rollers 39 are spaced apart a distance slightly greater than the width of the strip 10 and are positioned on opposite sides of the strip for engagement with the edge portions thereof.

A V-groove is formed in the upper portion of the cylindrical member 36 providing a pair of inclined cam surfaces or elements 43—43, which are adapted to be engaged by the edge 45 and angularly disposed cam surfaces 46—46 of a cam member 48 yieldably mounted for reciprocation with the ram 19. The cam 48 is rectangular in cross section and is received in a rectangular opening 49 in the retaining member 17 and has an enlarged head 50 receivable in a recess 51 formed in the retaining member 17 and the punch holder 18. A spring 52 yieldingly urges the cam member 48 downwardly into its normal position with the head 50 thereof seated against the retainer member 17.

The V-groove in the cylindrical member 36 formed by the cam surfaces 43—43 is disposed obliquely with respect to a vertical plane passing through the axis of the rollers 39—39 on the cylindrical member and the V-groove is normally disposed obliquely with respect to a plane perpendicular to the center line of the strip 10. The edge 45 of the cam member 48 is positioned in a plane perpendicular to the center line of the strip 10 and is thus disposed obliquely with respect to the V-groove and on the down stroke of the ram is adapted yieldingly to engage points on opposite cam surfaces 43—43 and impart to the member 36 a limited rotary movement sufficient to accomplish the centralizing of the strip 10. To limit the cylindrical members 36 against excessive turning movement when no strip 10 is in position in the centralizing device the members 36 are provided with laterally extending lugs 53—53 fitting in recesses 54—54 in the stripper member 22 and engageable with opposite walls thereof.

In the operation of the device after a contact spring member has been punched from the strip, the strip is advanced until the leading end thereof engages the stop 25, as shown in Fig. 1. The rollers 39 of each of the centralizing devices 35 are positioned on opposite sides of the strip with no force acting through them on the strip so that the strip is loosely positioned therebetween. At a predetermined point in the downward movement of the ram during the punching operation, the edges 45 of the cam 48 engage the opposite inclined cam surfaces 43 of the cylindrical members 36 and impart rotary motion to the cylindrical members 36. This rotary motion serves to move the rollers 39 in arcuate paths in opposite directions toward the center line and into engagement with the opposite edges of the strip 10 to accurately centralize the strip on the predetermined center line. The centralizing of the strip 10 is completed before the punches 16 and 33 engage the strip so that the strip is held in predetermined accurate alignment before the actual punching of the strip occurs.

What is claimed is:

1. A device for centralizing strip material on a predetermined center line on a punch press having a reciprocable ram comprising a support for said strip, a pair of centralizing means in spaced relation to each other on said center line,

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one of said means comprising an oscillatable member mounted for rotation about an axis on said center line, a pair of positioning members mounted on said oscillatable member diametrically opposed and equi-distant from the axis thereof and spaced apart a distance greater than the width of said strip for receiving said strip therebetween, and means for yieldably imparting rotation to said oscillatable member in response to the down stroke of said ram to cause said positioning elements to move arcuately in opposite directions toward the center line to engage and centralize said strip.

2. A device for centralizing strip stock on a predetermined center line in a punch press having a reciprocable ram comprising a stationary member mounted above the path of movement of said strip and having a pair of spaced apertures therein on said predetermined center line, cylindrical members mounted in said apertures in said member for oscillating movement about an axis on said center line, a pair of rollers mounted on the lower side of each of said cylindrical members diametrically opposite and equi-distant from the axis thereof and spaced apart a distance greater than the width of said strip for receiving said strip therebetween, a V-shaped cam groove formed transversely across the upper end of each of said cylindrical members, a non-rotatable cam member axially aligned with each of said cylindrical members and having a V-shaped end thereon, and means for yieldingly mounting said cam members on said ram with the V-shaped ends thereof obliquely disposed about the axes of said cylindrical members relative to the normal position of the V-grooves in said cylindrical members whereby at a predetermined point in the down stroke of the ram the V-shaped end of the cam member engages the walls of the V-shaped groove and imparts rotation to said cylindrical member for centralizing said strip on said predetermined center line.

3. A device for centralizing strip stock on a predetermined center line of a punch press having a reciprocable ram comprising a support for said strip, a pair of centralizing means in spaced relation to each other on said center line, one of said means comprising an oscillatable member mounted for rotation about an axis on said center line, a pair of positioning members mounted on said oscillatable member diametrically opposite and equi-distant from the axis thereof and spaced apart a distance greater than the width of said strip for receiving said strip therebetween, a cam element on said oscillatable member, a cam member movable relative to said oscillatable member and engageable with said cam element to impart rotary movement to said oscillatable member, and means yieldably mounting said cam member for actuating movement in response to the downward movement of said ram whereby said cam member acts to impart rotation to said oscillatable member to cause the positioning elements thereon to move arcuately in opposite directions toward the center line into engagement with the opposite edge of said strip to centralize said strip.

4. In a device for centralizing strip material on a predetermined center line in a punch press having a reciprocable ram, the combination of means for supporting the strip, an oscillatable member pivotally mounted for turning movement about an axis on said center line, a pair of rollers mounted on said oscillatable member diametrically opposite and equi-distant from said

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axis and spaced apart a distance greater than the width of said strip for receiving the strip therebetween, a cam portion on said oscillatable member, a cam member movable relative to said oscillatable member and engageable with said cam portion thereon to impart rotary movement to said oscillatable member, and means yieldably mounting said cam member for actuating movement in response to the downward movement of said ram whereby said cam member acts to stress said oscillatable member for rotation about said axis to cause the rollers thereon simultaneously to move in opposite directions toward the center line to centralize the strip therebetween.

5. A device for centralizing strip stock on a predetermined center line of a punch press having a reciprocable ram comprising a support for said strip, a pair of centralizing means in spaced relation to each other on said center line, each of said means comprising an oscillatable member mounted for rotation about an axis on said center line, a pair of positioning elements diametrically opposite and equi-distant from the axis thereof and spaced apart a distance greater than the width of said strip of receiving said strip therebetween, a cam element on the upper portion of said oscillatable member, and a cam member yieldably mounted for movement with the ram of said press for engaging said element on the down stroke of said ram to yieldingly stress said oscillatable member for rotation, thereby to cause the positioning elements to move in opposite directions toward the center line into engagement with the edges of said strip to centralize said strip.

6. In a device for centralizing strip material on a predetermined center line in a punch press having a reciprocable ram, the combination of a supporting means for supporting said strip in substantial alignment with said predetermined

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center line, a cylindrical member mounted for turning movement about an axis of said center line, a pair of rollers mounted on said cylindrical member diametrically opposite and equi-distant from said axis and spaced apart a distance greater than the width of said strip for receiving the strip therebetween, cam elements formed on said cylindrical member, a cam member yieldably mounted on said ram for movement therewith for engaging said cam element on the down stroke of said ram, thereby to yieldingly stress said cylindrical member for rotation to cause the rollers to move in opposite directions toward the center line into engagement with the edges of said strip to centralize said strip.

7. A device for centralizing strip stock on a predetermined center line in a punch press having a reciprocable ram comprising a support for supporting said strip for movement along said center line, a pair of centralizing means in spaced relation to each other on said center line, each of said centralizing means comprising an oscillatable member mounted above said support for rotation about an axis on said center line, a pair of rollers mounted on said oscillatable member diametrically opposite and equi-distant from the axis thereof and spaced apart a distance greater than the width of said strip for receiving said strip therebetween, a cam element on said oscillatable member, and a cam member yieldably mounted for movement with the ram of said press for engaging said cam element on the downstroke of said ram to yieldingly stress said oscillatable member for rotation thereby to cause the rollers to move in opposite directions toward the center line into engagement with the edges of said strip to centralize said strip.

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No references cited.