June 25, 1957 G. J. LAMOUREUX 2,796,965

DEVICE FOR GAGING STRIP MATERIAL AND INDICATING EXCESSIVE VARIATIONS IN WIDTH AND CAMBER THEREOF

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FIG. 1

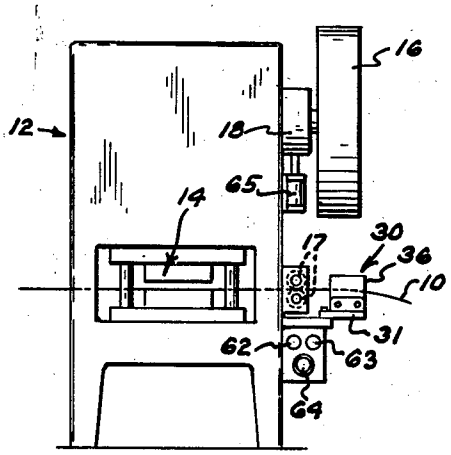
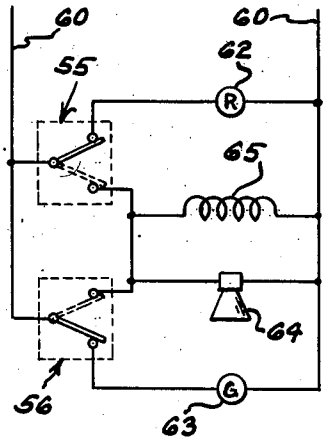


FIG. 8



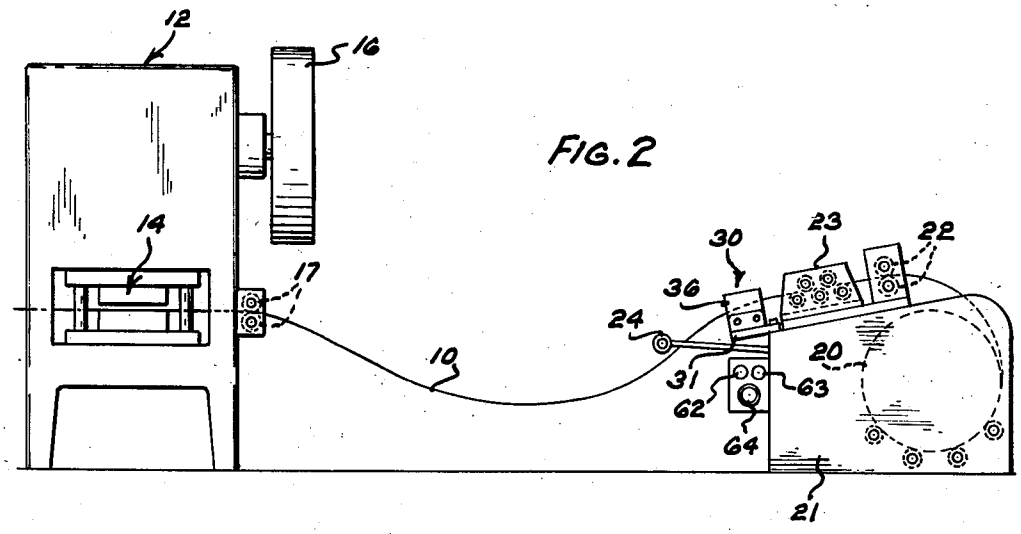


FIG. 2

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FIG. 3

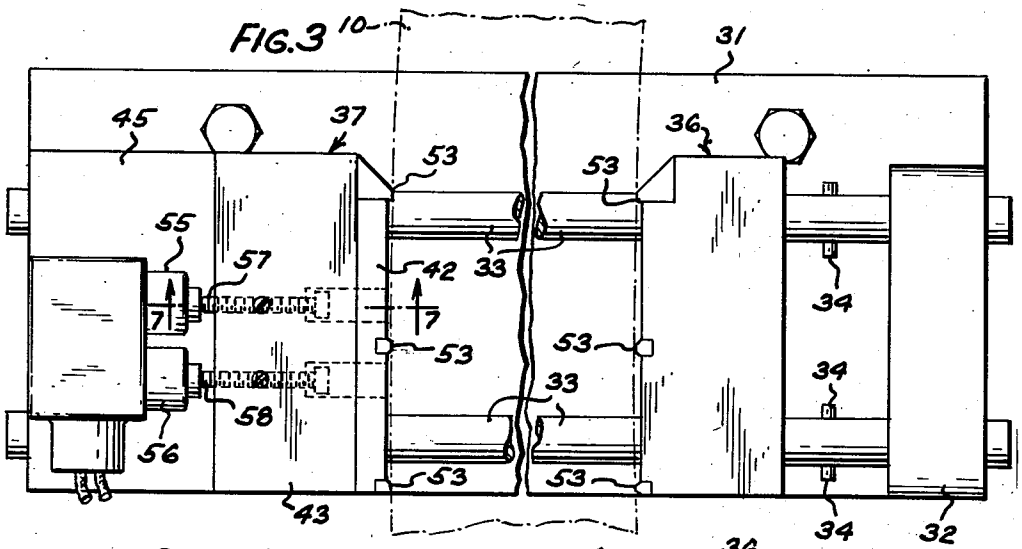


FIG. 4

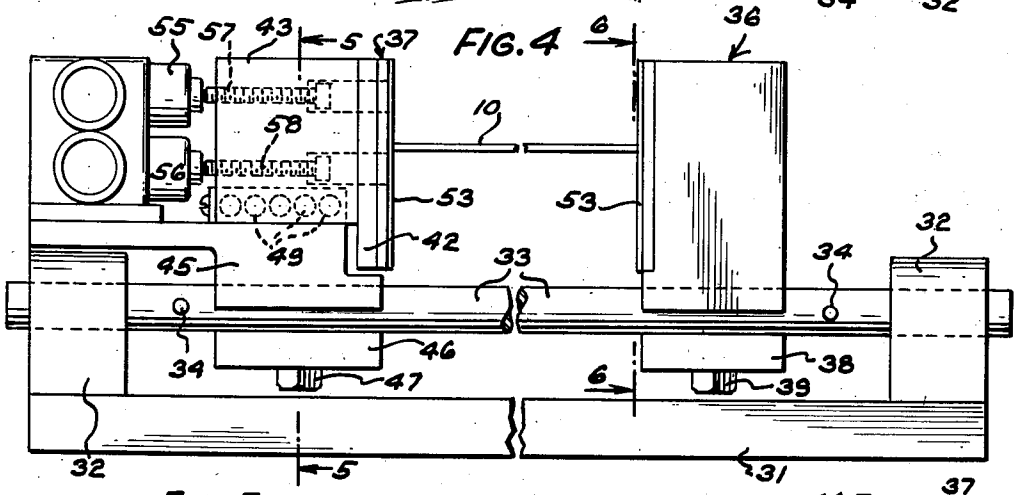


FIG. 5

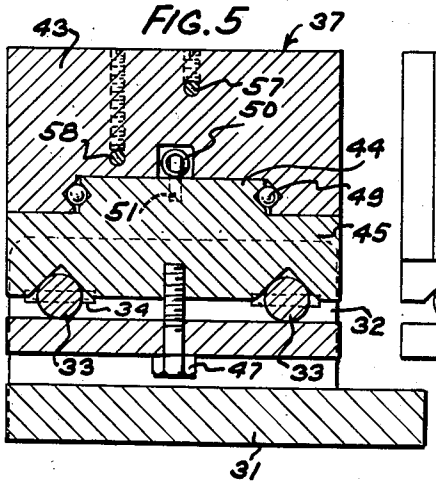


FIG. 6

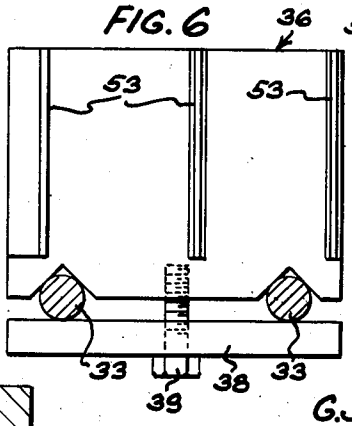
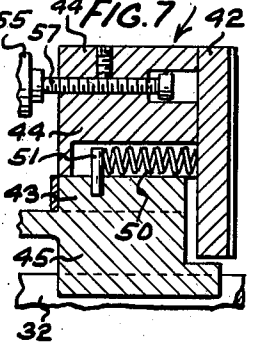


FIG. 7



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DEVICE FOR GAGING STRIP MATERIAL AND INDICATING EXCESSIVE VARIATIONS IN WIDTH AND CAMBER THEREOF

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Application March 1, 1954, Serial No. 413,373

9 Claims. (Cl. 192—127)

This invention relates to a device for indicating excessive variations in width and camber of strip material and more particularly to a device for gaging the width and camber of a strip as it is fed into a punch press and for actuating a control means for operating a signal and stopping the press in response to excessive variations in width and camber of the strip.

Flat stock strip invariably is not absolutely straight and of uniform width but has a slight camber or lateral curvature and has variations in width. A strip having excessive variations in camber and width is objectionable when used in some machines such as punch presses for fabricating parts therefrom in that excesses in camber and width greater than a predetermined maximum will cause the strip to wedge in the dies of the press, and less than a predetermined minimum will also cause damage to the dies.

An object of the invention is to provide a device for gaging the width of a strip and actuating a control circuit in response to excessive variations below a predetermined minimum or above a predetermined maximum.

Another object of the invention is to provide a device for gaging the variations in the width and camber of a strip and for actuating a signal in response to variations beyond a predetermined minimum or maximum width and camber of the strip.

A further object of the invention is to provide a device for gaging the width and camber of a strip being fed into a machine and for actuating a control means for stopping the machine in response to excessive variations in the strip beyond a predetermined minimum or maximum of the combined width and camber of the strip.

A device illustrating certain features of the invention may include a pair of gaging members engageable with opposite edges of a strip of material being advanced into an apparatus for fabricating parts therefrom. One of the gaging members is fixedly mounted on a floating support and the other gaging member is movably supported thereon and stressed for movement toward the other gaging member for yieldably maintaining the gaging members in engagement with the strip. The floating support is mounted on a stationary frame for movement laterally of the strip to accommodate transverse weaving movement of the strip and supply thereof. A pair of actuating members adjustably mounted on the movable gaging member actuates a pair of switches on the floating support in response to movement of the movable gaging member to predetermined positions by portions of the strip greater than a predetermined maximum width and camber or less than a minimum width and camber for closing control circuits to operate visual and audible signals, whereby the operator may stop the machine and remove the undesirable portions of the strip. The device may include means for disconnecting the drive to the apparatus to stop it when the device is actuated by portions of the strip having excessive variations beyond predetermined maximum or minimum widths and cambers.

Other objects and advantages of the invention will

become apparent by reference to the following detailed description and the accompanying drawings illustrating a preferred embodiment thereof, in which

Fig. 1 is a front elevational view of a punch press with the gaging device associated therewith;

Fig. 2 is a front elevational view of a punch press for fabricating piece parts from strip material showing the gaging device mounted on a stock cradle for the strip material positioned in spaced relation to the punch press;

Fig. 3 is a plan view of the gaging device;

Fig. 4 is a front elevational view of the device;

Figs. 5 and 6 are transverse sectional views taken on the lines 5—5 and 6—6, respectively, of Fig. 4;

Fig. 7 is a fragmentary longitudinal vertical sectional view of the device taken on the line 7—7 of Fig. 3; and

Fig. 8 is a diagram showing the electrical system of the device.

Referring to the drawings (Figs. 1 and 2), there is shown a flat strip **10** of material adapted to be fed into a punch press **12** which has cooperating punch and dies **14** for fabricating parts from the strip. The punch and dies are actuated relative to each by a drive including a fly wheel **16** and a clutch **18** for disconnecting it. Feed rolls **17**, actuated in timed relation to the press, advance the strip step by step into the press. As shown in Fig. 2 the strip **10** is unwound from a coil **20** of strip stock supported in a stock cradle **21** which is mounted in spaced relation to the punch press. The stock **10** is advanced by a pair of driven feed rolls **22** through a straightener **23** and forms a loop intermediate the stock cradle and the punch press on which rides a control arm **24** for controlling the feed of the stock from the stock cradle to maintain a predetermined slack in the strip between the stock cradle and the punch press.

A gaging device **30** for gaging the variations in the width and camber of the strip **10** may be mounted adjacent the punch press **12** as shown in Fig. 1 or may be mounted on the stock cradle **21** in spaced relation to the punch press as shown in Fig. 2. The device **30** comprises a stationary frame or base plate **31** suitably secured to the press **12** or the stock cradle **21** and on the ends of the base plate are mounted a pair of apertured blocks **32** in the apertures of which are mounted a pair of rods **33** for limited axial movement. The rods **33** and the base plate **31** of the gaging device are disposed beneath and transversely of the strip **10** and the rods **33** have pins **34** therein at opposite ends engageable with the blocks **32** for limiting the extent of movement of the rods relative to the base plate **31**. The rods **33** form a floating support for carrying a pair of gaging members **36** and **37** which are engageable with opposite edges of the strip **10**.

The gaging member **36** is in the form of a rectangular block which is clamped to the rods **33** by a plate **38** and a screw **39**. The gaging member **37** is in the form of a plate **42** secured to a slide member or block **43** which is mounted for sliding movement on a guide member **44**. The guide member **44** is fixed to or formed on a bracket **45**, which in turn is adjustably secured to the rods **33** by a clamping plate **46** and a clamping screw **47**. Portions of the slide **43** and the guide **44** are provided with V-shaped grooves in which are mounted rows of balls **49** which serve to support the gaging member **37** for rectilinear movement on the bracket **45** toward and away from the gaging member **36**. A spring **50** disposed in a slot in the slide member **43** has one end engaging a pin **51** fixed to the guide member **44** and the other end engaging the plate **42** of the gaging member **37** for urging the gaging members **36** and **37** towards each other into engagement with opposite edges of the strip **10**.

The faces of the gaging members **36** and **37** which engage the edges of the strip **10** are relatively wide so as to engage a substantial portion of the edges of the strip, whereby the gaging members serve to measure the camber as well as the width of the strip **10** passing therebetween. As shown herein the faces of the gaging members **36** and **37** are not continuous but are provided with three hardened bar inserts **53** extending vertically and positioned at the ends and at the center of each face as shown in Figs. 3 and 6. Thus, as the strip **10** advances between the gaging members the concave edge of the strip will engage the two end inserts of one gaging member and the opposite convex edge of the strip will engage the middle insert of the other gaging member. If it is desired to gage only the width of the strip **10**, gaging members having a single insert may be used.

From the description thus far, it will be seen that the gaging members **36** and **37** are carried on a floating support and are yieldably urged into engagement with opposite edges of the strip **10** and that the floating support is movable transversely of the strip **10** to permit lateral shifting of the coil **20** and the strip **10** during the feeding of the strip. Any variation in the width of the strip **10** will cause the gaging member **37** to move relative to the gaging member **36** and the bracket **45**.

Means cooperable with the gaging member **37** are provided for either signaling the operator or stopping the press **12**, or both, when a portion of the strip passing through the gaging device **30** is greater in width and camber than a predetermined maximum or when it is less in width and camber than a predetermined minimum. The control and indicating means includes a pair of microswitches **55** and **56** mounted on the bracket **45** for movement therewith as shown in Fig. 4. A pair of threaded actuating or trip elements **57** and **58** are adjustably mounted in threaded apertures in the movable gage member **37** for actuating the switches **55** and **56** in response to movement of the gage **37** to predetermined positions. A template having portions corresponding to the desired minimum and maximum widths and cambers of the strip is placed in one position between the gage elements **36** and **37** and the trip element **57** is adjusted to actuate the switch **55** when the gage member **37** is moved to a predetermined position by a portion of the strip greater in width and camber than the predetermined maximum, and the template is moved to another position and the trip element **58** is set to actuate the switch **56** when the gage member **37** is moved to another predetermined position by a portion of the strip having a width and camber less than a predetermined minimum.

When the portions of the strip **10** within the specified acceptable limits are passing between the gaging members **36** and **37** the switch **55** is so positioned as to complete a circuit from a powerline **60** through a red light **62** to indicate that the strip is not greater than a predetermined maximum width and camber, and the switch **56** is in a position completing a circuit through a green light **63** to indicate that the strip is not below the predetermined minimum width and camber. Each of the switches **55** and **56** are adapted to be moved to a second position indicated in dotted lines in Fig. 8 when actuated by the trip elements **57** and **58** to complete a circuit through a horn or other signal device **64** for signaling the operator that a portion of the strip in excess of the predetermined limits is passing through the gaging device **30**, and to complete a circuit through a solenoid **65** for throwing out the clutch **18** and stopping the press **12** as disclosed in the embodiment of the invention shown in Fig. 1.

In the arrangement of the mechanism shown in Fig. 2 where the gaging device **30** is disposed in spaced relation to the punch press **12** the solenoid **65** for actuating the clutch **18** may be omitted and use of the audible signal **64** and the visual signal lights **62** and **63** may be relied upon for indicating the condition of the strip **10** and when the horn **64** is actuated to indicate the passage of a portion of the strip **10** in excess of the specified requirements, the operator has sufficient time to manually stop the press **12** and the strip feed at the stock cradle **21** and the cut off and removal of the portion of the strip which is either too wide or too narrow.

It is to be understood that the above-described arrangements are simply illustrative of the application of the principles of this invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. A device for gaging a flat strip and indicating excessive variations in the width and camber thereof comprising a fixed supporting means, a movable supporting means mounted on said fixed supporting means for movement in a direction transversely of said strip, a first gaging member fixedly supported on said movable supporting means and engageable with one edge of said strip, a movable gaging member mounted on said movable supporting means for movement toward the other gaging member and engageable with the other edge of said strip, said gaging members being relatively wide for engaging the edges of the strip at spaced points, resilient means for stressing said movable gage member toward the other gaging member, signal means, and means for operating said signal in response to movement of the movable gage to a predetermined position by a portion of the strip having a width and camber different from predetermined limits of width and camber for said strip.

2. A device for indicating excessive variations in the width and camber of a flat strip comprising a support, a movable supporting means mounted on said support for movement in a direction transversely of said strip, a first gaging member fixedly supported on said movable supporting means and engageable with one edge of said strip, a movable gaging member mounted on said movable supporting means for movement toward said first gaging member and engageable with the other edge of said strip, one of said gaging members having a pair of spaced gaging elements for engaging the strip at longitudinally spaced portions thereof, resilient means urging said movable gage member toward said first gaging member, signal means, means for operating said signal means in response to movement of the movable gaging member to a predetermined position by a portion of the strip having a width or camber different from predetermined limits of width and camber for said strip.

3. A device for gaging a flat strip and indicating excessive variations in the width thereof comprising a fixed supporting means, a movable supporting means mounted on said fixed supporting means for movement in a direction transversely of said strip, a first gaging member fixedly supported on said movable supporting means and engageable with one edge of said strip, a movable gaging member mounted on said movable supporting means for movement toward said first gaging member and engageable with the other edge of said strip, resilient means for stressing said movable gage member toward the other gaging member, signal means, means for operating said signal means including a pair of switches mounted on said movable supporting means, and a pair of actuating elements adjustably carried by said movable gage member and settable to actuate one of said switches in response to movement of the movable gage to a predetermined position by a portion of the strip having a width greater than a predetermined maximum and to actuate the other switch in response to movement of the movable gage member to a second predetermined position by a portion of the strip having a width less than a predetermined minimum.

4. A device for gaging flat strip and indicating excessive variations in the width and camber thereof comprising supporting means, a first gaging member fixedly mounted on said supporting means and engageable with one edge

of said strip, a movable gaging member mounted on said supporting means for movement toward said first gaging member and engageable with the other edge of said strip, said gaging members being relatively wide for engaging the edges of the strip at points in spaced relation to each other, resilient means for stressing said movable gage member toward said first gaging member, signal means, means for operating said signal means including a pair of switches mounted on said movable supporting means, and a pair of actuating elements adjustably carried by said movable gaging member and settable to actuate one of said switches in response to movement of the movable gage to a predetermined position by a portion of the strip having a width and camber greater than a predetermined maximum and to actuate the other switch in response to movement of the moveable gaging member to a second predetermined position by a portion of the strip having a width and camber less that a predetermined minimum.

5. A device for gaging a flat advancing strip and indicating excessive variations in the width and camber thereof comprising a fixed supporting means, a movable supporting means mounted on said fixed supporting means for movement in a direction transversely of the movement of said strip, a first gaging member fixedly supported on said movable supporting means and engageable with one edge of said strip, a movable gaging member mounted on said movable supporting means for movement toward said first gaging member and engageable with the other edge of said strip, resilient means for stressing said movable gaging member toward said stationary gaging member, signal means, means for operating said signal means including a pair of switches mounted on said movable supporting means, and a pair of actuating elements adjustably carried by said movable gage member and settable to actuate one of said switches in response to movement of the movable gage to a predetermined position by a portion of the strip having a width or camber greater than a predetermined maximum and to actuate the other switch in response to movement of the movable gage member to a second predetermined position by a portion of the strip having a width and camber less than a predetermined minimum.

6. In an apparatus for fabricating parts from strip material and having a device for disconnecting the drive thereto, the combination therewith of a support, a first gage member fixed to said support and engageable with one edge of said strip, a second gaging member movably mounted on said support for engagement with the other edge of said strip, said gaging members being relatively wide and engageable with the edges of the strip at spaced points, resilient means for stressing said movable gage member toward said stationary gage member for pressing said movable gage member into engagement with the strip and for moving the strip into engagement with said stationary gaging member, and means for actuating said device to disconnect the drive to the apparatus in response to movement of the movable gage to a predetermined position by a portion of said strip having a width and camber different from predetermined limits of width and camber for said strip.

7. In an apparatus for fabricating parts from strip material and having a clutch for disconnecting the drive thereto, the combination therewith of a fixed supporting means, a movable supporting means mounted on said fixed supporting means for movement transversely of said strip, a first gage member fixed to said movable supporting means and engageable with one edge of said strip, a second gaging member movably mounted on

said movable supporting means for engagement with the other edge of said strip, resilient means for stressing said movable gage member toward said first gage member for pressing said movable gage member into engagement with the strip and for moving the strip into engagement with said first gaging member, means for actuating the clutch to disconnect the drive, control means for actuating said clutch disconnecting means including a pair of switches mounted on said movable supporting means, and a pair of actuating trip elements carried by the movable gage member and settable to actuate one of said switches in response to movement of the movable gage to a predetermined position by a portion of said strip having a width and camber greater than a predetermined maximum and to actuate the other switch in response to movement of the movable gage member to a predetermined position by a portion of the strip having a width and camber less than a predetermined minimum.

8. In an apparatus for fabricating parts from strip material and having a device for disconnecting the drive thereto, the combination therewith of a fixed supporting means, a movable supporting means mounted on said fixed supporting means for movement transversely of the direction of movement of said strip, a first gage member fixed to said movable supporting means and engageable with one edge of said strip, a second gaging member movably mounted on said movable supporting means for engagement with the other edge of said strip, one of said gaging members having a pair of spaced gaging elements for engaging the strip at longitudinally spaced portions thereof, resilient means for stressing said movable gaging member toward the other gaging member for urging said gaging members into engagement with opposite edges of the strip, and means for actuating said device to disconnect the drive to the apparatus in response to movement of the movable gage to a predetermined position by a portion of said strip having a width or camber different from predetermined limits of width for said strip.

9. In an apparatus for fabricating parts from strip material and having a device for disconnecting the drive thereto, the combination therewith of a fixed supporting means, a movable supporting means mounted on said fixed supporting means for movement transversely of said strip, a first gaging member fixed to said movable supporting means and engageable with one edge of said strip, a second gaging member movably mounted on said movable supporting means for engagement with the other edge of said strip, said gaging members being relatively wide for engaging the edges of the strip at spaced points, resilient means for stressing said movable gage member toward the other gaging member, and means for actuating said device to disconnect the drive to the apparatus in response to movement of the movable gage to a predetermined position by a portion of said strip having a width and camber greater than a predetermined maximum and in response to movement of the movable gage member to a second predetermined position by a portion of the strip having a width and camber less than a predetermined minimum.

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