May 10, 1960 R. E. EDMINSTER 2,936,172

LOAD DETECTOR

Filed May 22, 1957

FIG. 1

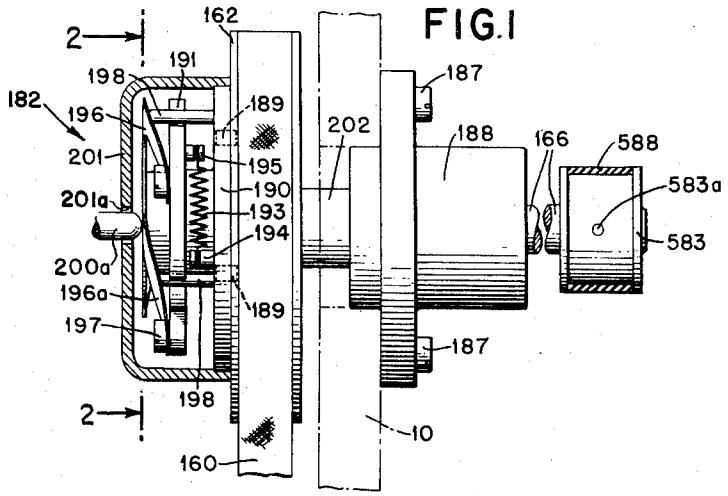


FIG. 2

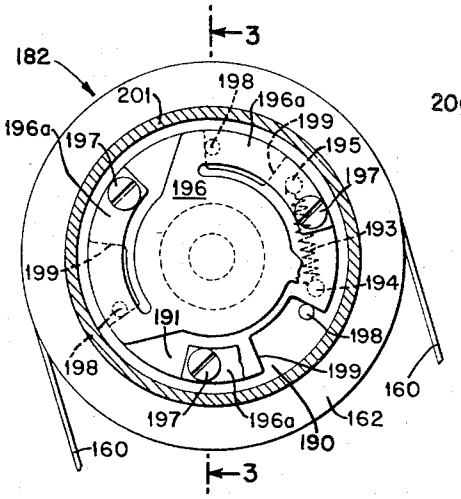
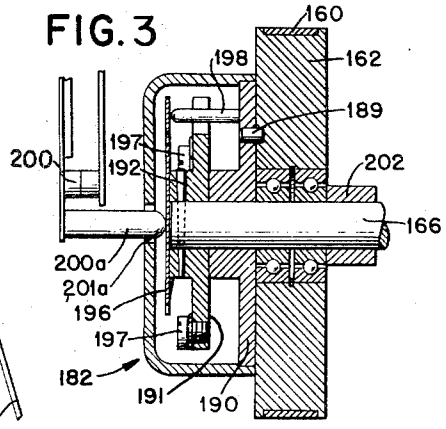


FIG. 3



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2,936,172

LOAD DETECTOR

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Application May 22, 1957, Serial No. 660,863

2 Claims. (Cl. 271—47)

This invention relates to a device for detecting an overload condition and more particularly to a torque responsive type overload device particularly adapted for use with document transport apparatus.

Many forms of detector devices have been incorporated in document handling machines to detect jams caused by improper feeding of documents.

Usually these devices operate on the principle of the document crumpling in a restricted area and thereby raising a lever which operates electrical contacts or other mechanisms to stop the machine.

The subject device is designed for use in a transport system comprising driven belts which is not readily adaptable to the use of the usual contact operating devices. Instead, a jam produces an increased load on the belt transport system which, through the jam detector device, causes contacts to be operated to shut off the machine. In some instances this overload may represent only a small degree of increase over the normal load.

It is the principal object of this invention to provide an improved overload detector device having a high degree of sensitivity and by which a document jam is detected as an overload condition on a document transport system and is translated into a mechanical movement to stop the transport system.

Other objects of the invention will be pointed out in the follow description and claims and illustrated in the accompanying drawings, which disclose, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawings:

Fig. 1 is an elevation partly in section showing the overload detector device.

Fig. 2 is a vertical section taken on the trace 2—2 in Fig. 1.

Fig. 3 is a vertical section taken on the trace 3—3 in Fig. 2.

The subject torque responsive overload detector device is shown and described in U.S. patent application Serial No. 631,925, filed December 31, 1956, on behalf of Robert E. Edminster et al. Figs. 1, 2 and 3 listed above correspond to Figs. 8*a*, 8*b* and 8*c*, respectively of the above cited application and corresponding reference numbers are used there and herein.

Only so much of that machine as is necessary to the description of the jam detector device is shown and described herein. Reference may be made to the cited application for other details.

Referring to the figures, the overload detector drive is provided through a belt **160** and a pulley **162** rotatably mounted on a shaft **166**. The output from the device is provided through the shaft **166** and a pulley **583** fixed thereto by a pin **583***a* and driving a belt **588**. The overload detector is indicated at **182**. The entire assembly is supported on a plate **10** by a bearing **188** attached thereto by screws **187** within which the shaft **166** is rotatably mounted.

The drive pulley **162**, rotatably mounted on the shaft

166, is fixed by pins **189** to a disc **190** also rotatable on the shaft **166**. A disc **191** is fixed to the shaft **166** by a pin **192**. The disc **190** and the disc **191** are connected by a spring **193** fixed to the disc **190** by a pin **194** and to the disc **191** by a pin **195**. A spring member **196** in the form of a disc having three flexible fingers **196***a*, spaced about its periphery and inclined from the plane of the disc, is fixed to the disc **191** by screws **197** extending through the ends of the fingers **196***a*. Three pins **198**, mounted at intervals of 120° about the disc **190**, extend through cutouts **199** similarly spaced in the disc **191**. A stud **200***a* is mounted on one spring leaf of a pair of electrical contacts **200** mounted adjacent the jam detector unit for actuation in a manner described hereinafter. A cover member **201**, having a hole **201***a* adapted to receive the stud **200***a*, is mounted on the disc **190**, for example by screws (not shown), to cover parts of the jam detector unit. The jam detector unit is spaced from the plate **10** by a spacer member **202**.

As described hereinbefore, the drive to the transport belt **588** is through the belt **160** and the pulley **162** and through the disc **190** pinned to the pulley **162**. The pins **198** mounted on the disc **190** and projecting into the cutouts **199** in the disc **191**, normally rest near one side of the cutout **199**. The drive from the pulley **162** and disc **190** to the disc **191** is through the spring **193**. Under normal load conditions the pins **198** rest near the counterclockwise edge of the corresponding cutouts **199** in the disc **191**. However, when an excess load is applied to the belt **588** due to any excess of normal torque such as a check jam or a belt jam, the pulley **583** and the shaft **166** are retarded. The disc **191** carrying the spring **196** also is retarded. The effect of this retarding action is to shift the disc **191** counterclockwise relative to the disc **190** thereby causing the pins **198** to bear against the fingers **196***a* of the spring **196**, and moving the center portion of the spring **196** to the left, as viewed in Fig. 1. The center portion of the spring **196** moves the stud **200***a* thereby opening the contacts **200**. The contacts **200** may be connected in the energizing circuits of a transport drive motor to control motor shutoff when a jam condition is detected.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to a preferred embodiment, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. An overload device comprising rotatable driving means, rotatable driven means, yielding means joining said rotatable means for transfer of load therebetween, elongated flexible means having one of its ends affixed to one of said rotatable means and having the other of its ends extending therefrom in a substantially circular direction and in a direction inclined from the radial plane thereof, cam means extending from the other of said rotatable means and engaging said flexible means, the direction of incline of said flexible means and the direction of yielding of said joining means providing, in response to yielding of said joining means upon overload, camming displacement of said flexible means by said cam means, and control means responsive to said displacement of said flexible means.

2. An overload detecting device comprising a shaft, a first pulley fixed to said shaft, a second pulley rotatably mounted on said shaft, a first disc rotatably mounted on said shaft and fixed to said second pulley a second disc fixed to said shaft adjacent to said first disc, a spring

yieldingly connecting said discs for the transfer of load therebetween whereby the driving of one of said pulleys will result in the other of said pulleys being yieldingly driven, a flat member having flexible fingers spaced about its periphery and inclined from its plane, means fixing the ends of said fingers to said second disc, means mounted on said first disc positioned to engage said fingers, the direction of incline of said fingers and the direction of yielding of said spring providing, upon yielding of said spring in response to an overload, camming displacement of said flexible fingers by said finger engaging means displacing said flat member, and control means responsive to said displacement of said flat member.

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