

June 5, 1951

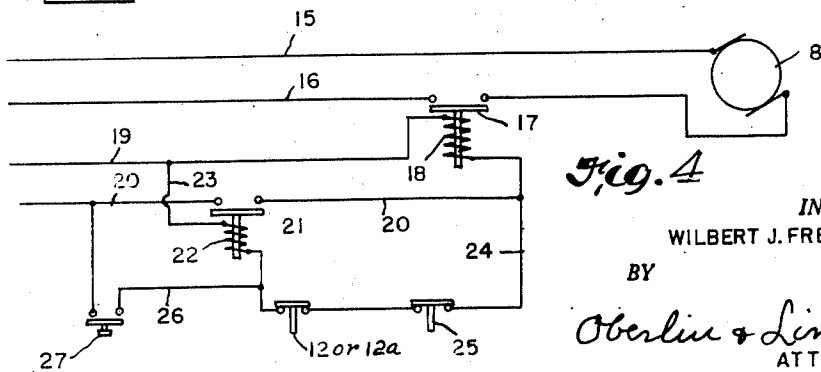
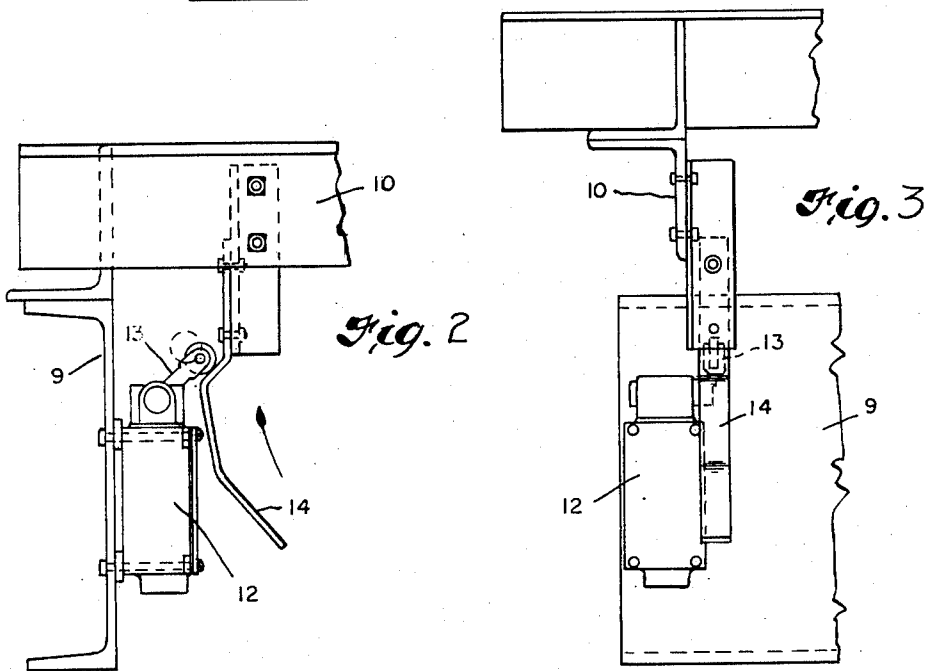
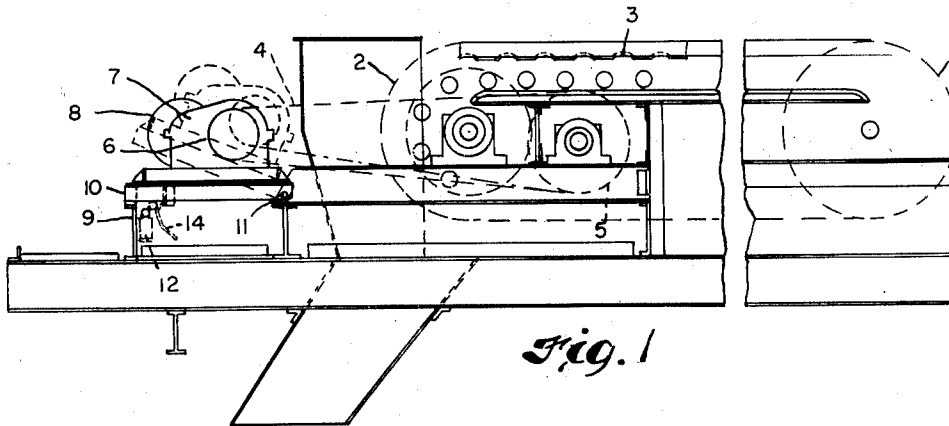
W. J. FRUECHTEL

2,555,880

SAFETY DEVICE

Filed May 11, 1945

2 Sheets-Sheet 1



INVENTOR.
WILBERT J. FREUCHTEL

BY

Oberlin & Limbach.
ATTORNEYS

June 5, 1951

W. J. FRUECHTEL

2,555,880

SAFETY DEVICE

Filed May 11, 1945

2 Sheets-Sheet 2

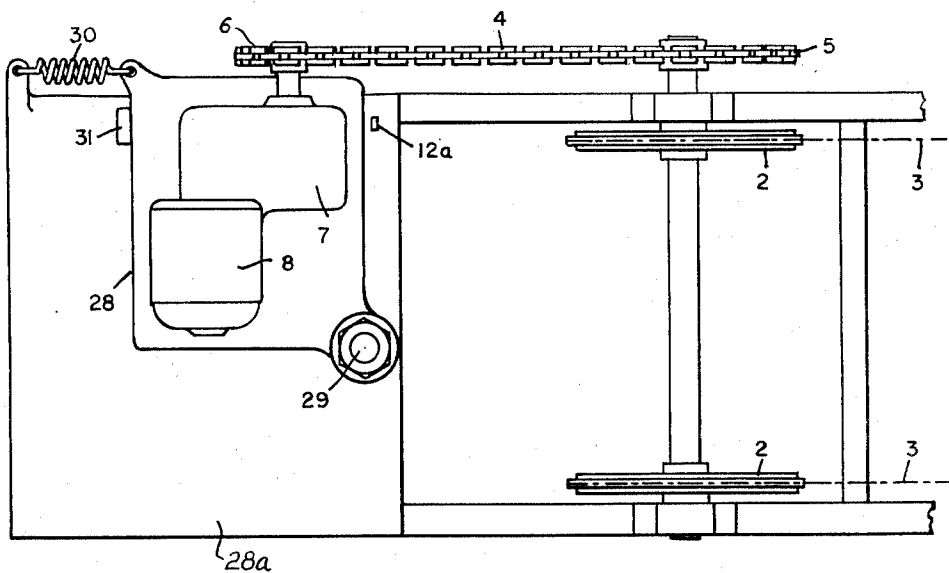


Fig. 5

INVENTOR.
WILBERT J. FREUCHTEL

BY

Oberlin & Limbach.
ATTORNEYS

UNITED STATES PATENT OFFICE

2,555,880

SAFETY DEVICE

Wilbert J. Fruechtel, Cleveland, Ohio, assignor to
The C. O. Bartlett & Snow Company, Cleveland,
Ohio, a corporation of Ohio

Application May 11, 1945, Serial No. 593,238

6 Claims. (Cl. 198—232)

1

This invention relates as indicated to safety devices and more especially to such devices which may be used in conjunction with endless conveyors.

The common form of endless conveyor is usually driven by means of an electric motor acting through a speed reducing device, which latter device is connected to the conveyor by a belt or chain driving connection. Since there is always a possibility of a foreign object becoming lodged in the conveyor mechanism, some means should be provided to deenergize the driving means when the resistance to driving the conveyor reaches a predetermined value so as to prevent damage to the conveyor parts when such breaking or other derangement of the conveyor occurs.

Heretofore, it has been the practice to provide a metal shear pin in the driving means for the conveyor so that such pin will shear off under a predetermined load to disconnect the driving means from the conveyor. Shear pins, however accurately produced, are inclined to vary in their breaking loads and when a shear pin has once broken, there is a strong tendency on the part of workmen to insert a rigid pin in its place, thus eliminating all safety provision.

It is a principal object of my invention to provide a safety device which is more positive and sensitive in its reaction to overloads than such shear pins as have been previously used and, likewise, more sensitive than conventional overload relays which have been used on occasion in the power line to the motor.

It is a further and more particular object of my invention to provide a safety device of the character described which is relatively inexpensive and which cannot be readily tampered with.

Other objects of my invention will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, said invention then comprises the features hereinafter fully described and particularly pointed out in the claims, the following description and the annexed drawings setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principle of the invention may be employed. In said annexed drawings:

Fig. 1 is a fragmentary side elevational view of a conveyor provided with driving means incorporating the safety device of my invention;

Fig. 2 is a fragmentary view of the apparatus

2

illustrated in Fig. 1 showing said safety device drawn to an enlarged scale;

Fig. 3 is a side elevational view of the structure illustrated in Fig. 2;

Fig. 4 is a wiring diagram showing the manner in which my safety device is connected in the power circuit to the driving motor for the conveyor; and

Fig. 5 is a plan view of a conveyor showing an alternative arrangement of parts embodying the principles of my invention.

Referring now more specifically to the drawings and more especially to Fig. 1, the conveyor here illustrated for purposes of convenience in describing my invention comprises spaced sprockets generally indicated at 1 and 2 about which is trained an endless conveyor belt 3 of conventional design and forming no part of this invention. The conveyor which may be thus of any standard form of construction is driven through the medium of a non-slipping web, generally indicated at 4 and which usually consists of an endless chain trained about a sprocket 5 on the conveyor and a corresponding sprocket 6 on a speed reducing device 7 which is driven by means of an electric motor 8.

Positioned adjacent the conveyor is a supporting frame generally indicated at 9, on which there is mounted a base 10 which carries the speed reducing device 7 and the motor 8.

The base 10 is pivotally secured to its supporting frame by means of a pivot pin 11 so that the base 10 and the mechanism supported thereon may rotate in a clockwise direction, as viewed in Fig. 1, about the axis of the pin 11.

Mounted on the framework 9 beneath the base 10, and as most clearly illustrated in enlarged Figs. 2 and 3, is a switch box 12 having a projecting switch actuating handle 13 adapted to be actuated by a cam member 14 connected to and extending downwardly from the base 10.

The switch 12 may be of any well-known construction and will be connected in the control circuit for the power line leading to the motor 8 in the manner illustrated, for example, in Fig. 4.

In Fig. 4, the power lines to the motor 8 are shown at 15 and 16. In the line 16 there is the main switch 17 controlled by means of a relay 18 energized by the control circuit. The control circuit consists of leads 19 and 20 across which the relay 18 is adapted to be connected by means of a switch 21 actuated by a control relay 22. The relay 22 is connected across the lines 19

and 20 by means of leads 23 and 24 in series with which are switches 12 and 25.

The relay 22 may be connected to the control circuit lead 20 by means of a lead 26 in series with which is a starting switch 27. The operation of the circuit illustrated in Fig. 4 is briefly as follows.

When the parts are in the position illustrated in Fig. 4, i. e. the conveyor is not in operation, the main switch 17 will be open, likewise, the switch 21 in the control circuit. The operator then closes the normally open "start" switch 27 which will energize the relay 22 by connecting it across the lines 19 and 20. Energization of the relay 22 will close the switch 21 and thereafter the operator may open the start switch 27 and the relay 22 will keep the switch 21 closed because of the back contact lead 24 through normally closed "stop" switch 25 and the normally closed limit switch 12.

When now there is some obstruction to the normal movement of the endless conveyor 3, continued operation of the motor 8 will result in the sprocket 6 "crawling" toward the conveyor on the tight side of the non-slipping web or chain 4. This will result in a rotation of the base 10 in a clockwise direction about the axis of the chain pin 11 and will cause the cam 14 to move the switch arm 13 from its full line position, as illustrated in Fig. 2, to its dotted line position, i. e. it will open the normally closed switch 12.

Since during the normal continuous operation of the conveyor the start switch 27 is open, opening the limit switch 12 will deenergize the relay 22, opening the switch 21, resulting in deenergizing the relay 18, opening the switch 17 and stopping the motor 8.

Even though the base 10 should later settle back down on its supporting framework, permitting the switch 12 to close, the conveyor would not start because of the normally open control switch 21 and thus, before the conveyor can be started again, it is necessary for the operator to close the start button 27.

Instead of having the driver means, i. e. the motor 8 and speed reducer 7 mounted on a base such as 10 which is pivotally supported to oscillate in a vertical plane, it may be convenient in certain instances to have the base such as 28, Fig. 5, carrying the motor 8 and the speed reducer 7 oscillate in a horizontal plane, by having the same pivotally secured to a vertically extending shaft or pin 29 on the fixed support 28a. It will be observed that when an arrangement such as illustrated in Fig. 1 is employed, the weight of the base 10 and the mechanism supported thereby maintains the parts in their normal relation; however, when an expedient such as is illustrated in Fig. 5 is employed, a spring such as that illustrated at 30 may be utilized for a corresponding purpose, i. e. for the purpose of maintaining the base 28 in proper location by urging the same against a fixed stop 31. A limit switch, generally indicated at 12a in Fig. 5 extending, for instance, through an opening in the fixed support 28a and constructed and operable similar to that of switch 12 previously illustrated and described, may be employed for a similar function.

In its general aspects, the drive de-energizing means, while illustrated by a switch as aforeindicated, may be of other forms accomplishing the action (with electrical operation or wholly mechanical unclutching operation), as set off by

displacement of the drive means from its normal operating position.

While the invention has been illustrated and described in connection with an endless conveyor, its application to other types of equipment where similar problems are encountered will be apparent to those familiar with the art.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims or the equivalent of such be employed.

I therefore particularly point out and distinctly claim as my invention:

1. In a conveyor provided with a non-slipping drive, a prime mover for actuating said non-slipping drive, and control means including a movable base supporting said prime mover mounted to swing horizontally when the driving resistance to said non-slipping drive exceeds a predetermined value, means responsive to such movement of said base for deenergizing said non-slipping drive, and means tending to swing said base back to its normal position.

2. In a conveyor provided with an endless non-slipping web, means for driving said conveyor comprising a prime mover, a driver member actuated by said prime mover and about which said non-slipping web is trained, a movable base supporting said prime mover, said base being pivoted to swing in a horizontal plane with said driver member relatively to said conveyor when the resistance to movement by said non-slipping web exceeds a predetermined value, means responsive to such movement of said base for deenergizing said prime mover, and means tending to swing said movable base back to its original position.

3. In a conveyor provided with an endless non-slipping web, means for driving said conveyor comprising a prime mover, a driver member actuated by said prime mover and about which said non-slipping web is trained, a fixed support, a movable base thereon supporting said prime mover, said base being pivoted to swing in a horizontal plane with said driver member relatively to said conveyor when the resistance to movement by said non-slipping web exceeds a predetermined value, means on said fixed support in the path of such movement of said base adapted to be tripped in swinging movement of said base to deenergize said prime mover, and means tending to swing said movable base back to its original position.

4. In a conveyor provided with an endless non-slipping driving web, a pivotally mounted base on which is driving means comprising a motor and a sprocket wheel about which said non-slipping web is trained, said base pivoted so as to move with said driver means relatively to said conveyor when the resistance to movement by said non-slipping web exceeds a predetermined value, and means for stopping the drive motor consisting of circuit breaker means including an initial stop control switch operated by such movement of said base, and a relay switch in circuit with said control switch and deenergized by the operation thereof.

5. In a conveyor provided with an endless chain drive, a driving unit for said conveyor comprising a motor, a speed reducer and a sprocket about which said endless chain is trained, a base carrying said driving unit, means movably supporting said base whereby it may move relatively toward said conveyor as the resistance to move-

5

ment by said endless chain exceeds a predetermined value, and means for stopping the drive motor shaft consisting of circuit breaker means including an initial stop control switch operated by such movement of said base, a relay switch and an electrically operated motor feed switch both in circuit with said control switch and deenergized by the operation thereof, and a starting switch in another circuit in series with said relay switch.

6. In a conveyor provided with an endless chain drive, a driving unit for said conveyor comprising a motor, a speed reducer and a sprocket about which said endless chain is trained, a base carrying said driving unit, means supporting said base whereby it may swing horizontally relatively to said conveyor as the resistance to movement by said endless chain exceeds a predetermined value, and means for stopping the drive motor shaft

6

consisting of circuit breaker means including an initial stop switch in the path of such movement of said base, a relay switch and an electrically operated motor feed switch in circuit with said control switch and deenergized by the operation thereof, and a starting switch in another circuit in series with said relay switch.

WILBERT J. FRUECHTEL.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

15	Number	Name	Date
	1,398,790	Ogur	Nov. 29, 1921
	2,022,007	Moore	Nov. 26, 1935
	2,082,052	Frost et al.	June 1, 1937