

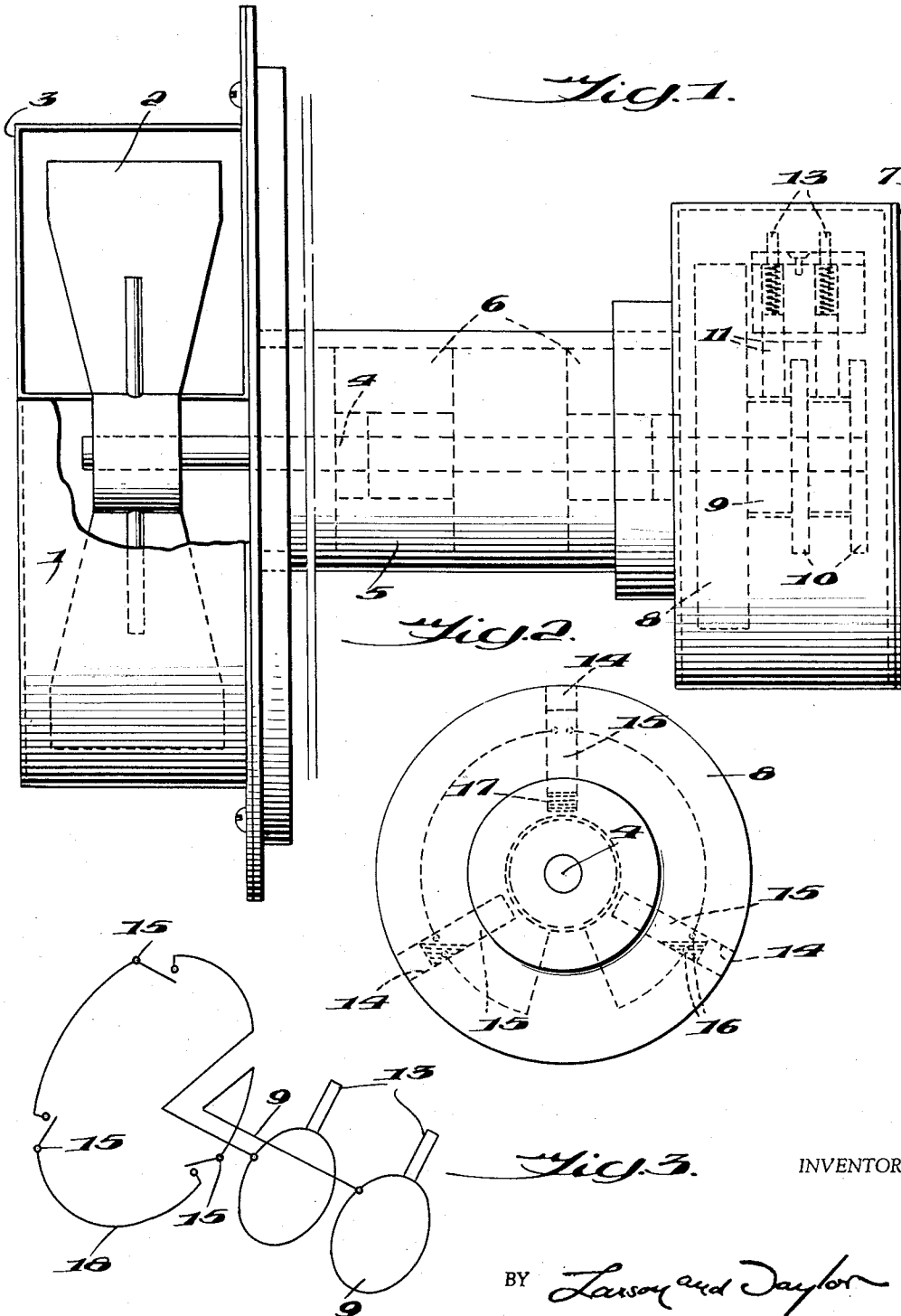
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SAFETY SWITCH

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1

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SAFETY SWITCH

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1 Claim. (Cl. 200—80)

This invention relates to a safety switch and more particularly to a mechanism which is adapted to be used in connection with an air dryer or like equipment in providing means for shutting off the power supply in the event of mechanical or electrical failure of the equipment.

Heretofore, there have been a number of devices commercially available which function to provide means for interrupting the power supply to an electrical equipment in the event of a mechanical failure. Such devices have utilized centrifugal switches and when the electrical equipment is operating the centrifugal switch is maintained in closed position thereby maintaining the power supply closed. However, such devices have not been found to be completely effective under all operating conditions. Under some circumstances, if the rotating element is stopped in certain positions, the centrifugal switch will be maintained closed by gravity and thus the power supply will not be interrupted.

According to the present invention, there is provided a switching means which is operative under any conditions to cut off the power supply to the electrical equipment in the event of failure of the equipment to function properly. The present invention is specifically designed for use in connection with a dryer or like equipment wherein an air stream is utilized to dry metal painted ware and like articles. There is provided an impeller which is adapted to be disposed within the drying air stream and which will rotate under normal operating conditions. A shaft extends from this impeller and mounted on the shaft is a plurality of centrifugal switches which are series connected and are in a circuit which operates a circuit breaker to interrupt the current supply to the dryer. Thus, should the air stream velocity drop to a level which is insufficient to perform the desired drying operation, then the impeller will cease to rotate thus opening one or more of the centrifugal switches and operating the circuit breaker to interrupt the power supply to the equipment. It is evident that the impeller and centrifugal switch arrangement disclosed herein could be used with equal facility in connection with an alarm or warning signal circuit.

An object of the present invention is to provide a safety switch for a dryer or like equipment which switch will function to cut off the power supply to the electrical equipment under all operating conditions.

Another object of the present invention is to provide a flow switch for a dryer including an impeller which is adapted to be disposed in an air stream of the dryer and a plurality of centrifugal switches which will open when the impeller speed drops below a predetermined level.

Other objects and many of the attendant advantages of the present invention will become apparent upon consideration of the following detailed specification when considered in connection with the accompanying drawings wherein:

Fig. 1 is a side elevation of the safety switch with some parts shown in section;

Fig. 2 is an end elevation showing the mounting for the centrifugal switches; and

2

Fig. 3 is a schematic view of the circuit arrangement according to the present invention.

Referring now in detail to the drawing wherein like numerals indicate like parts throughout the several views, there is shown at 1 in Fig. 1 a housing for an impeller 2. The ends of the impeller housing are provided with openings 3 so that the housing may be connected in a conduit for the air stream of a dryer or the like. The impeller is mounted on a shaft 4 and is adapted to rotate with this shaft when the air stream passing through the impeller housing is of sufficient velocity. Obviously, by varying the size of the impeller and associated equipment, the switch may be made responsive to varying selected air velocities.

Shaft 4 extends outwardly as shown through a tubular housing 5 containing anti-friction bearings 6 of any suitable variety. On the outer end of housing 5 there is provided a tubular casing 7 which is adapted to contain the electrical components of the presently disclosed invention. Mounted on shaft 4 is a circular plate 8 and adjacent thereto is a pair of commutators 9 separated by an insulating disk 10. Brushes 11 are retained in position against the commutator rings by means of springs 12 and contacts 13 provide a means for connecting the centrifugal switches in a circuit for interrupting the power supply to the dryer.

As shown in Fig. 2 plate 8 is provided with three equidistantly spaced bores 14 into which are fitted the centrifugal switches 15 comprising a tube of insulating material having spaced electrodes 16 therein and having a pool of mercury 17. It can be seen from Fig. 2 that the mercury will serve to maintain the pairs of electrodes of the centrifugal switches closed when the plate 8 is rotated at sufficient speed.

As more clearly shown in Fig. 3, the switches 15 are connected in series by conductor 18 each end of which is connected to one commutator ring 9. Thus, it can be seen that the three centrifugal switches and the commutator rings form a single circuit and that opening any one of the three centrifugal switches will interrupt the circuit. The contacts 13 may be connected in any suitable circuit incorporating a circuit breaker or the like so that the interruption of the current flow through the conductor 18 will cause the circuit breaker to function and interrupt the power supply to the dryer equipment. It is equally obvious that the contacts 13 could be connected in an alarm or warning system. It can be seen that at least one of the centrifugal switches 15 will be opened when the impeller rotation drops below a predetermined level irrespective of the position of the mounting plate 8. This is due to the spacing of the centrifugal switches at approximately 120° around the plate.

Obviously, many modifications and variations of the present invention are possible in the light of the above teachings without departing from the spirit of the invention as defined in the appended claim. For example, the invention has obvious application in any type of equipment wherein a stream of gas or liquid is required to maintain the equipment operative. What is claimed as new and desired to be secured by Letters Patent is:

In a safety device of the class described for an equipment including a fan to produce an air stream in combination, an impeller adapted to be disposed in an air stream of the equipment, a shaft mounted on said impeller, a plurality of centrifugal switches mounted on said shaft, said switches being in series and in a circuit connected to a circuit breaker for the equipment whereby during normal operation of the equipment the centrifugal switches are closed and when the impeller is slowed by a decreasing air stream the centrifugal switches open to break the circuit to the equipment.

References Cited in the file of this patent

UNITED STATES PATENTS

1,400,870	Croninger	Dec. 20, 1921
1,615,853	Slayton	Feb. 1, 1927
2,196,005	Bariffi	Apr. 2, 1940

2,336,209
2,516,215
2,583,273
2,607,221
2,649,712

5

Anderson	Dec. 7, 1943
Jennings	July 25, 1950
Miller	Jan. 22, 1952
Babson et al.	Aug. 19, 1952
Dale	Aug. 25, 1953