

[54] **PILE DELIVERY WITH SAFETY DEVICE**

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[22] Filed: **June 12, 1973**

[21] Appl. No.: **369,155**

[30] **Foreign Application Priority Data**

June 14, 1972 Germany..... 2228839

[52] U.S. Cl..... 187/29 R, 192/129 A, 318/481

[51] Int. Cl..... H02h 5/12

[58] Field of Search..... 187/29; 318/481; 200/85,
200/86, 86.5; 192/129 A, 129 B, 131 H;
340/258, 272

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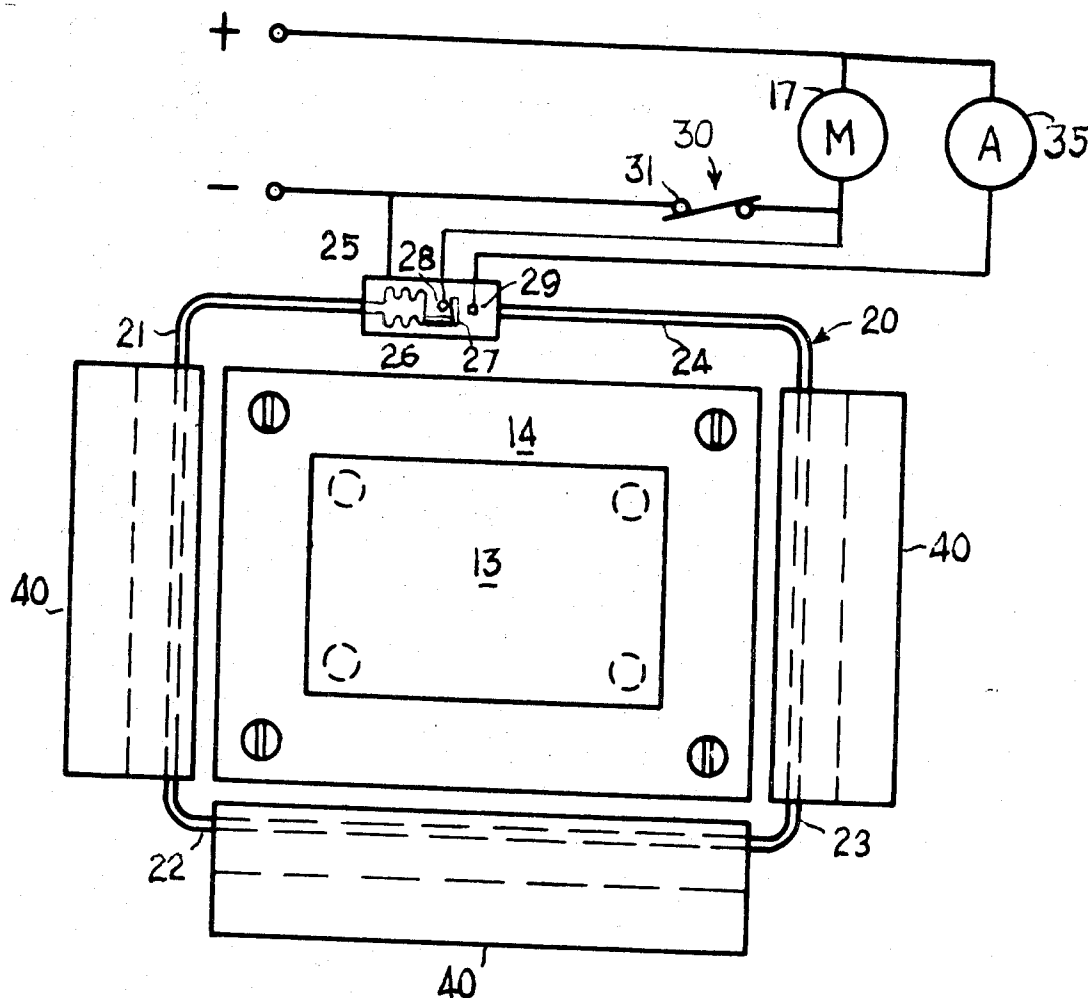
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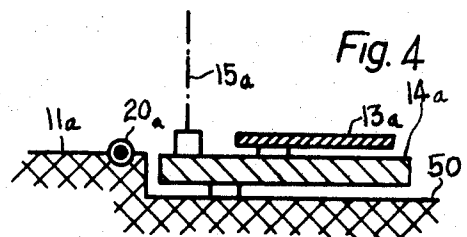
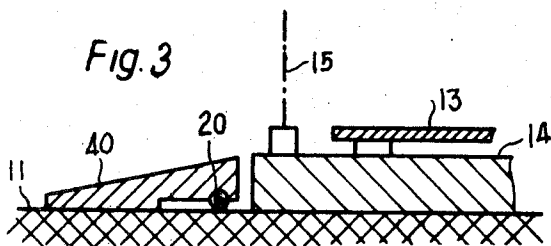
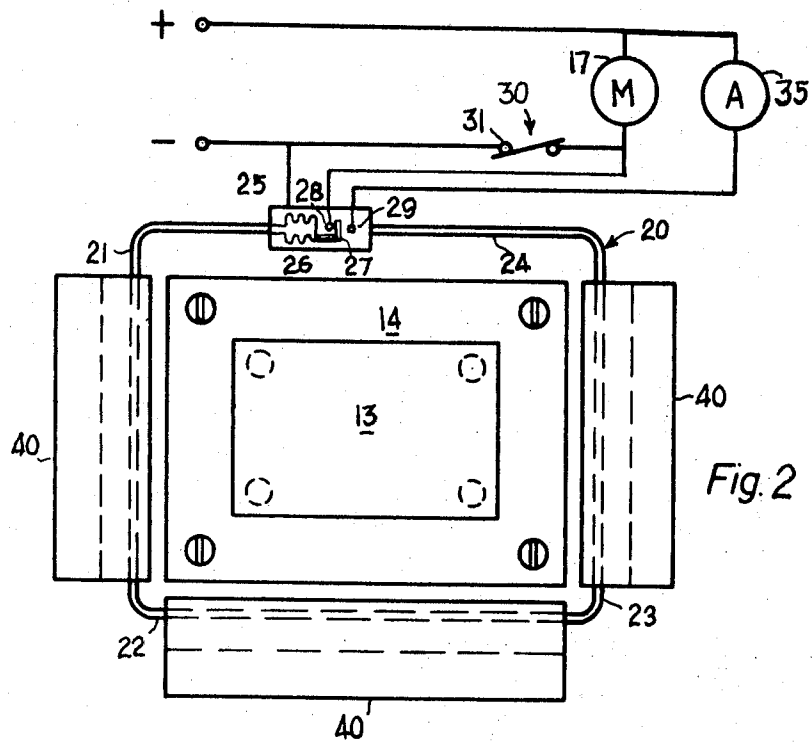
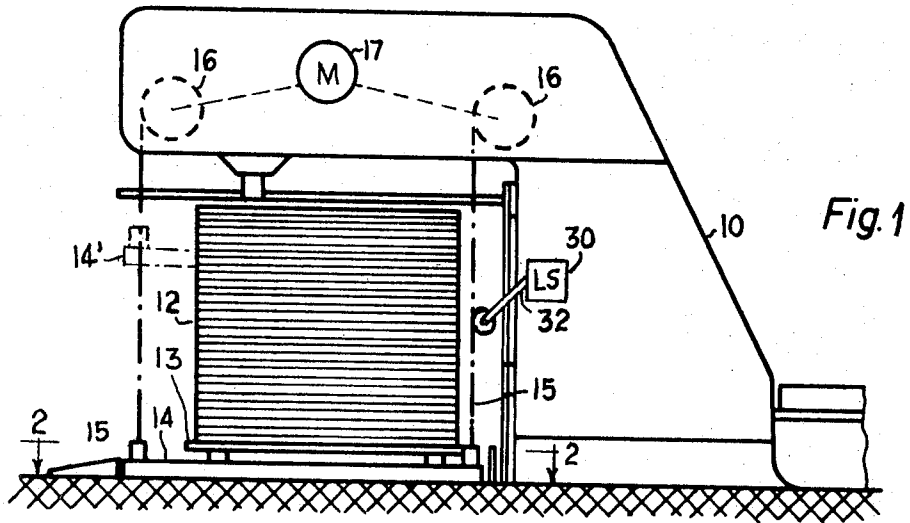
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[57] **ABSTRACT**

A delivery pipe installation for a sheet fed printing press or the like which includes a delivery platform of the floor-seating type with means for raising the platform and for lowering the platform to the floor as copies are deposited. Surrounding the platform location is an elastically deformable, fluid filled conduit, preferably in the form of a rubber hose, arranged at the floor in such a position that it will be stepped on by the operator in the event that he stands too close to the platform as it is being lowered to floor level. An electric switch responds to an increase in pressure within the hose, preferably for the purpose of disabling the motor which lowers the platform but alternatively to sound an audible or visible alarm to indicate to the operator that he is standing in a dangerous position.

1 Claim, 4 Drawing Figures





PILE DELIVERY WITH SAFETY DEVICE

It is an object of the present invention to provide a delivery pile installation for a sheet fed printing press or the like which seats directly upon the floor and thus provides a maximum pile height before removal becomes necessary but which protects the operator against inadvertently standing too close to the platform position with the result that the platform may be deposited upon his foot resulting in possible serious injury. It is another object of the present invention to provide a delivery pile installation including a safety device for protecting the operator which is highly efficient, substantially precluding the possibility of accident, but which is nevertheless extremely simple to install, long-lived and free of maintenance problems and which does not interfere in any way with the normal duties of the operator.

Other objects and advantages of the invention will become apparent upon reading the attached detailed description and upon reference to the drawings in which:

FIG. 1 is a side elevation of a conventional pile delivery associated with a sheet fed printing press.

FIG. 2 is a plan view of the platform and safety device looking along the line 2—2 in FIG. 1.

FIG. 3 is a fragmentary elevation showing a portion of FIG. 1.

FIG. 4 is a view similar to FIG. 3 but showing a modification of the present invention.

While the invention has been described in connection with certain preferred embodiments, it will be understood that it is not intended to be limited to the particular embodiments shown but it is intended, on the contrary, to cover the various alternative and equivalent constructions included within the spirit and scope of the appended claims.

Turning now to the drawings a typical delivery pile installation is shown, intended for receiving sheets from a sheet fed printing press (not shown). The installation includes a frame 10 which is seated upon a floor or foundation 11, with the sheets being deposited upon a pile 12. The pile is supported upon a removable pallet 13 which rests upon a vertically movable platform 14. The platform is supported upon chains diagrammatically indicated at 15. For raising the lowering the platform the chains are wound about pulleys 16 driven by a motor 17.

In the normal operation of a sheet delivery mechanism of the type illustrated, the platform 14 is initially raised to the dotted position indicated at 14a to receive the first of the sheets. As the sheets gradually pile up upon the pallet, the platform is lowered so as to accommodate the stack. In a conventional installation feet, or a pedestal, are provided under the platform so that the platform itself never seats directly upon the floor. It is desired, however, to seat the platform directly against the floor in order to accommodate a maximum height of pile before removal of the pallet to begin a new cycle.

In accordance with the present invention there is combined, with a platform of the floor-seating type, an elastically deformable conduit or hose which is arranged on the floor around the platform to define an unsafe area, and in a position to be unavoidably stepped on when one is in such area, the hose being filled with a pressure responsive fluid and connected to

a pressure switch for sounding an alarm whenever the operator, or other person, steps close enough to the platform to be in a dangerous position. Thus referring to FIG. 2 a hose 20 is provided resting upon the floor and having portions 21, 22, 23 which extend around the operator-accessible sides of the delivery pile as well as a final, or non-accessible, portion 24. The hose 20 is connected at at least one end to a pressure responsive safety switch 25 having a bellows or the like 26. The hose is filled with a liquid or gas so that when the hose is stepped on the resulting pressure expands the bellows to operate a switch having a movable contact 27 and which may have a normally closed contact 28 and a normally open contact 29 cooperating therewith.

In accordance with one of the aspects of the invention the switch contacts may be utilized either to disable the motor 17 which lowers the pile or to indicate that a dangerous condition exists by operating an audible alarm, warning light, or the like. Where the switch 25 is used to interlockingly control the motor 17, the normally closed contact 28 may be connected in series with the motor as shown. In such event, stepping upon the hose opens the contact to turn off the motor, with operation of the motor being reestablished when the pressure is removed. In such an installation provision may be made for effectively disabling the safety device when the platform, although being lowered, is still at a safe height. For this purpose a limit switch 30 is provided having a normally closed contact 31 and a feeler arm 32 which may, simply for the sake of illustration, be actuated by the presence of one of the chains 15 in front of the switch. When the platform is above switch level, then, the contact 31 will be closed, completing the motor circuit and bypassing the contact 28 of the safety switch. This completes a circuit to the motor without reliance upon the safety switch so that the hose may be stepped on without affecting motor operation. However, as the platform is progressively lowered to, and below, the level of the limit switch, the normally closed contact 31 is opened so that the safety switch becomes effective, that is, so that stepping on the hose will thereafter interrupt the motor circuit.

In lieu of, or in addition to, the motor interlock circuit, the normally open contact 29 of the pressure responsive switch may be connected in series with an alarm device 35 which, for example, may be in the form of a loud horn. Stepping upon the hose will rather forcibly indicate to the operator that he is in a dangerous situation and should step back as the platform lowers.

As a convenient term to denote the interlocking control of the lowering motor or the actuation of a horn, warning light, or similar device, the generic expression "sounding an alarm" has been used.

In accordance with one of the aspects of the present invention the conduit, or hose, is protected and made more effective by superimposing, above it, a treadle which extends continuously along the side being protected. In the illustrated installation, which has three operator-accessible sides, three treadles 40 of identical cross section are used. Referring to the cross section in FIG. 3, the treadle 40 has a first portion 41 which rests directly upon the floor 11, and a longitudinally recessed portion 41 which is spaced above floor level, with the hose 20 being sandwiched in the space between the treadle and the floor. It will be apparent, then, that stepping anywhere upon that portion of the treadle which is above the hose will cause the treadle

to squeeze downwardly upon the hose to operate the pressure switch 25. It will be understood by one skilled in the art that the treadle may either be of rigid construction or may be made of resilient material, for example, an extrusion of rubber or the like. Where the treadle is rigid, stepping upon the inner edge of the treadle will cause it to pivot about a central axis 43. Where the treadle is made of resilient material the portion 41 may be anchored to the floor and the overhanging portion, when stepped upon, will compress the corresponding portion of the hose to sound the alarm.

While the invention has been described in connection with a platform which is seated at floor level, it will be apparent that the invention is equally applicable and equally protective where the platform is lowered into a recessed position in the floor. Thus, referring to FIG. 4, where corresponding parts are indicated by corresponding reference numerals, with addition of subscript *a*, the platform 14*a* is seated in a conforming recess 50 slightly below the level of the floor 11*a*. In this case the conduit, indicated at 20*a*, is positioned around the lip of the recess, and use of the treadle 40 may be considered optional.

It will be apparent that the invention amply fulfills the objects set forth above, providing a simple and positive solution to a hazardous condition which has gone uncorrected in the past.

The term "floor" as used herein refers to any surface about the periphery of a delivery pile upon which the operator might step. The term "floor-seating", in reference to the platform, refers to the fact that the platform is nested, in lowered position, closely against the floor

or recessed with respect to it. The term "surrounding" as used herein shall be understood to mean encircling on all the operator-accessible sides.

What is claimed is:

1. In a delivery pile installation for a sheet fed printing press or the like, the combination of a delivery platform, means including a motor for raising the platform from the floor to receive copies and for lowering the platform to the floor as copies are deposited thereon, an electric circuit for supplying the motor, means defining an elastically deformable conduit containing a pressure-responsive medium, means including a pressure switch connected to the conduit and having normally closed contacts in series with the motor circuit for opening the circuit in response to pressure in the conduit, the conduit closely surrounding the platform and located at floor position so as to be unavoidably stepped on by the operator thereby to disable the motor in the event the operator stands too close to the platform as it is being lowered to floor level, and means including a normally closed limit switch responsive to the height of the platform and having contacts connected effectively in parallel with the contacts of the pressure switch for keeping the motor circuit energized as long as the platform is at more than a safe height above the floor, thereby to permit close attendance by the operator as long as the platform is elevated but with automatic stoppage of the motor when the feet of the operator are jeopardized by closing movement of the platform against the floor.

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