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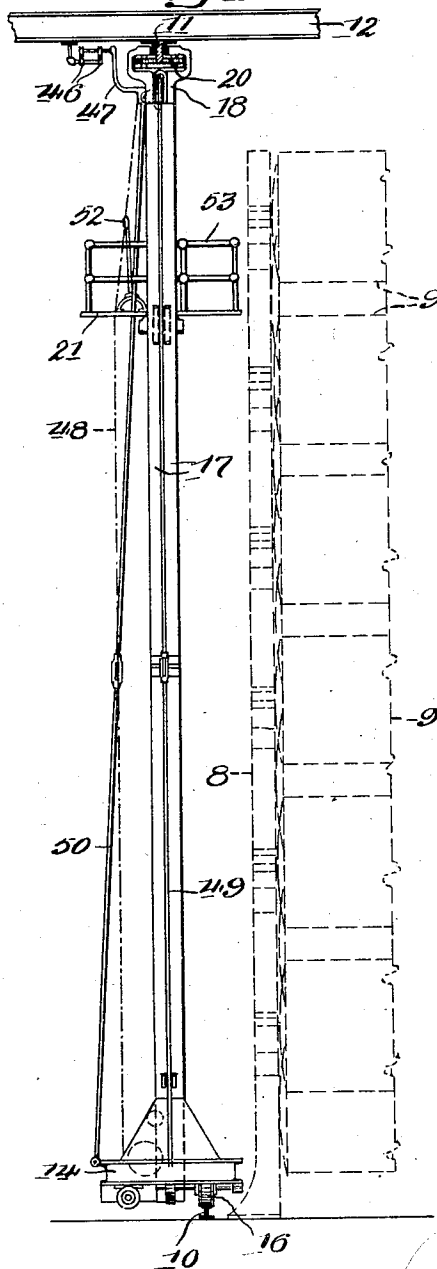
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PORTABLE ELEVATOR

Filed July 18, 1925

4 Sheets-Sheet 1

Fig. 1



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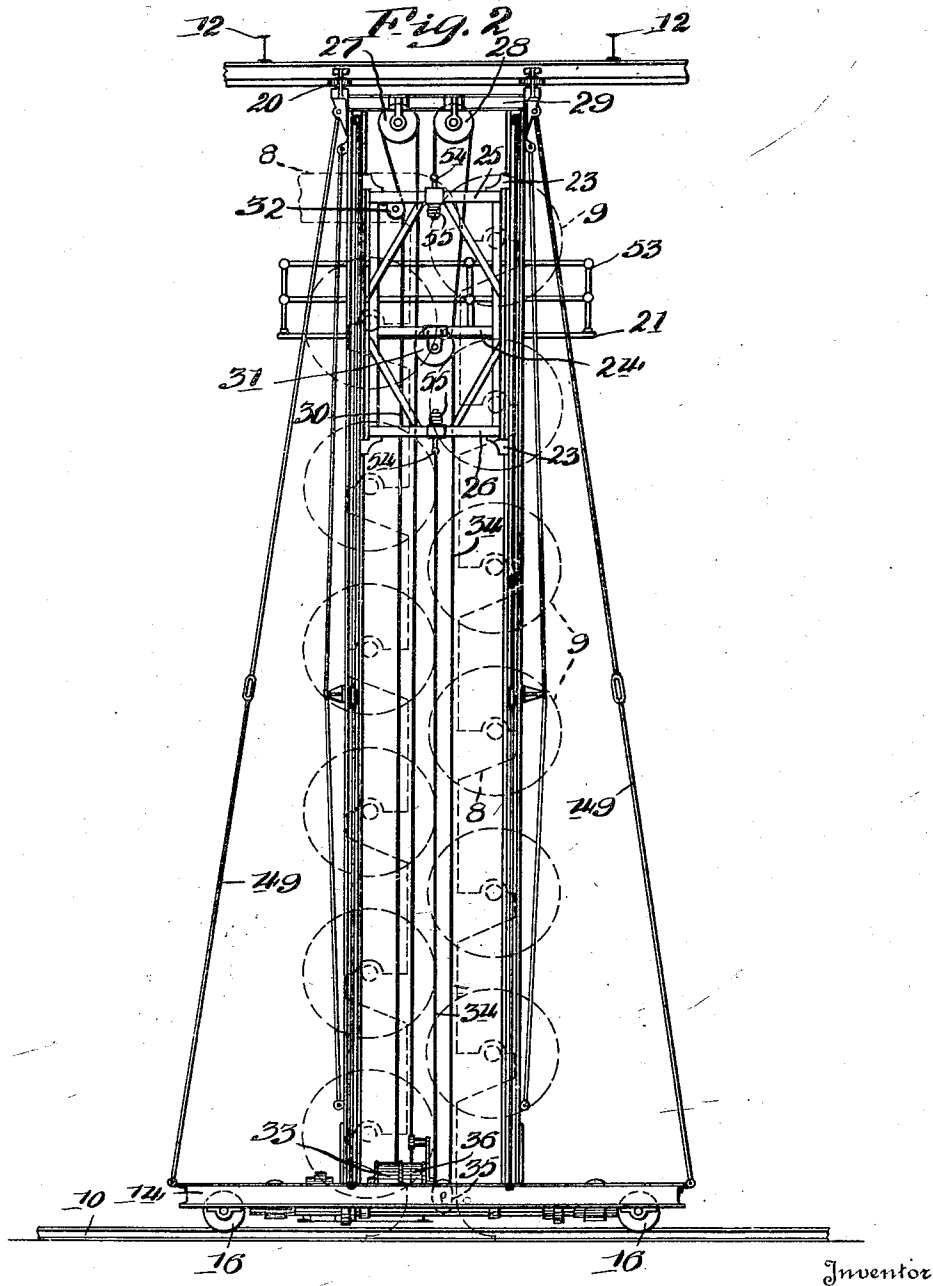
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Fig. 5

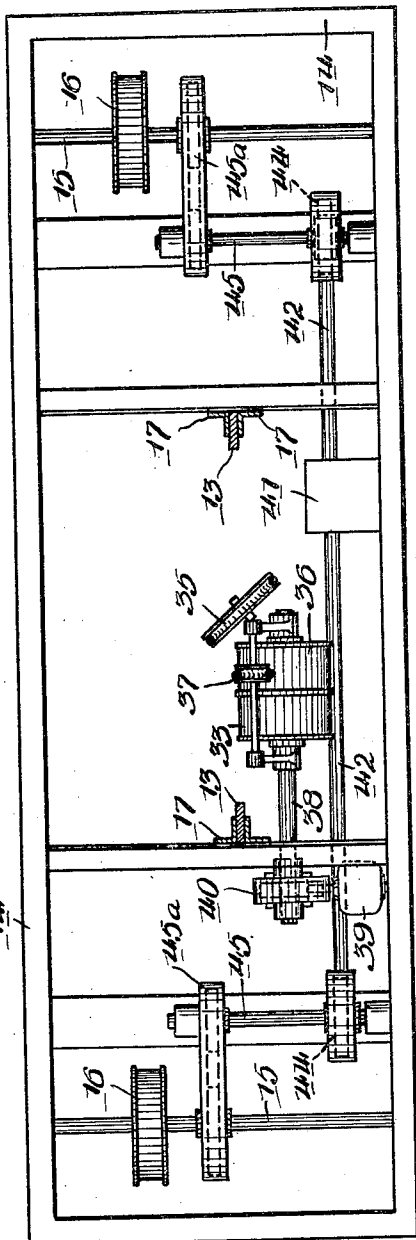
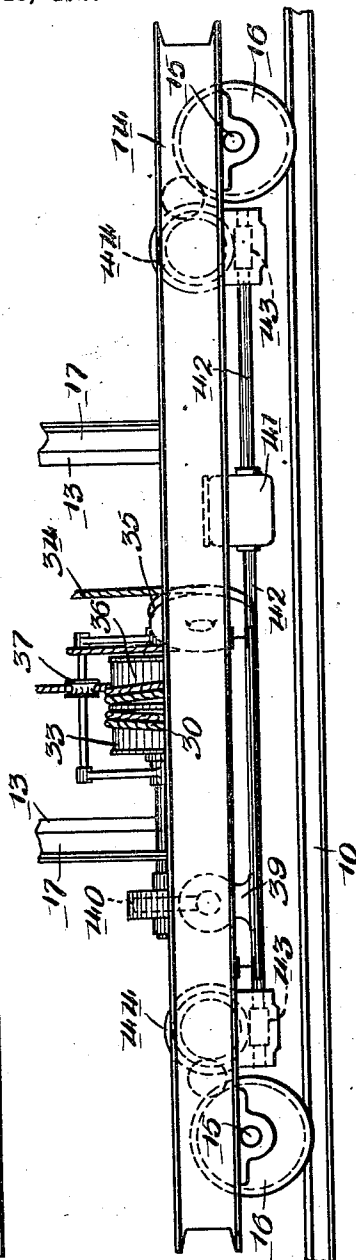


Fig. 24



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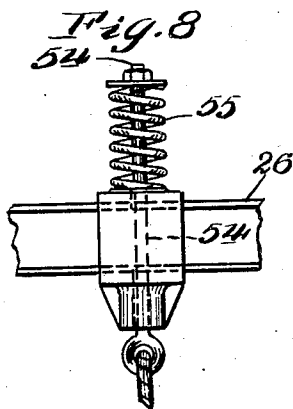
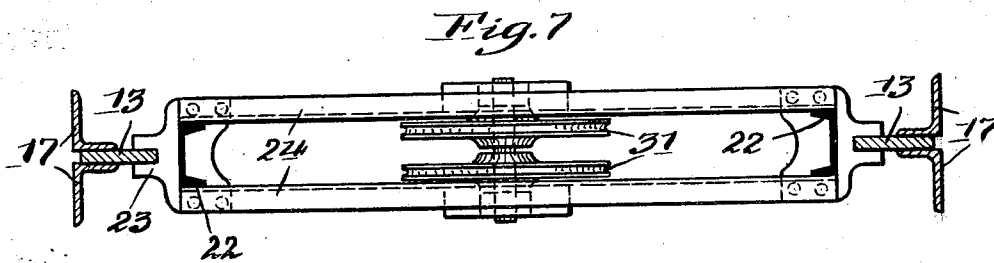
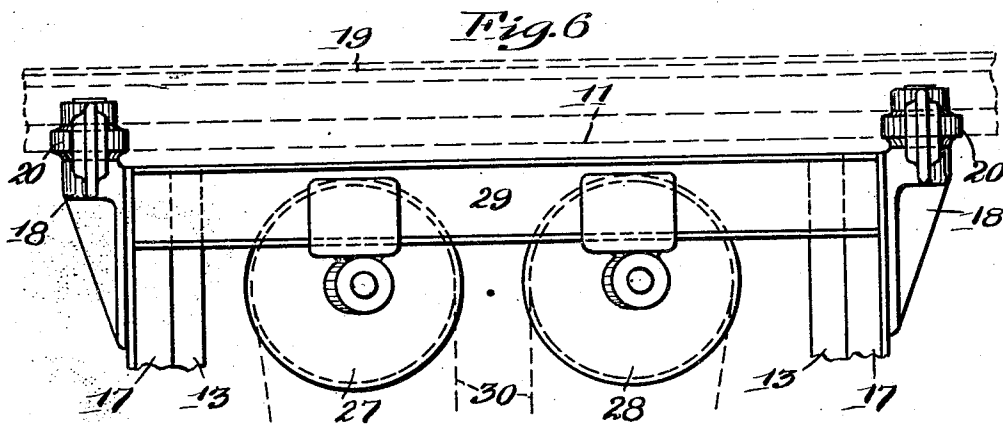
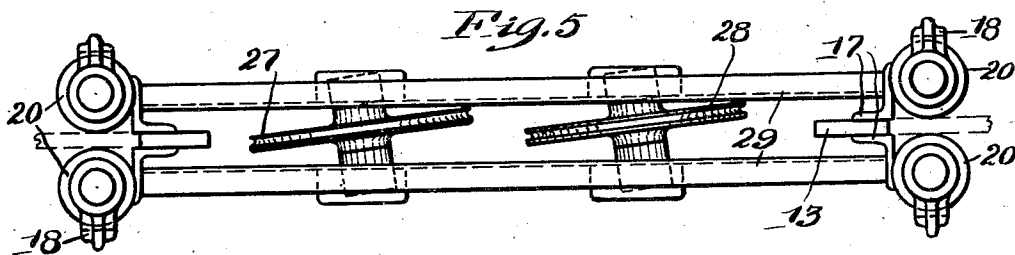
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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE.

NELS SANDBERG, OF ST. PAUL, MINNESOTA, ASSIGNOR TO WALDORF PAPER PRODUCTS COMPANY, OF ST. PAUL, MINNESOTA, A CORPORATION OF MINNESOTA.

PORTABLE ELEVATOR.

Application filed July 18, 1925. Serial No. 44,538.

This invention relates to web threading apparatus consisting of an elevator, adapted to facilitate manual threading of the web in paper dryers of the vertical or stack type.

5 Paper dryers of this type are provided with a large number of horizontally disposed drying rolls, arranged in a plurality of vertical series. The height of the several series of dryers varies according to the space available, but frequently exceeds 25 or 30 feet. While dryers of this type are compact and efficient in other respects, their use is attended by difficulties in handling the paper web, because of the great height of the stacks of rolls and the excessive heat produced in the upper parts of the drying room.

Heretofore, machines have been provided for automatically feeding the web between and about the several rolls of a stack dryer, but such machines are adapted only for feeding certain kinds of paper, being unsuited for carrying the web for the heavier grades of paper, such as that used in the manufacture of cartons and other fibre containers.

25 As far as applicant is aware, no efficient, automatic means for threading the heavier webs has been devised heretofore, and it has been common practice to erect a ladder adjacent to the end of each stack of dryers for use in threading the web by hand. Such ladders are unsatisfactory, because they require workmen engaged in threading the web to grasp the ladder in ascending or descending from one drying roll to the next, when both their hands should be occupied with the web. Further, the intense heat produced in the drying room by the hot rolls renders the work of threading the web extremely tedious, especially when the workmen are required to climb a ladder simultaneously with the threading of the web, while the ladder is so hot that protective covering for the hands and bodies of the men is necessary. The use of ladders also hampers the operators to such an extent that the drying rolls must be run at a substantially reduced speed during the operation of threading the web.

It is my object to facilitate the tedious work of manually threading the web by providing means for quickly transporting those engaged in the work from one elevation to another and from one stack of dryers to another, and at the same time to make it possible for the workmen to be wholly occupied in handling

the web, and thus minimize the danger of injury to operators.

More particularly, it is my object to provide a power driven elevator, adapted to be operated vertically adjacent to the ends of the stacks, and also arranged to be traversed upon rails extending transverse the rolls of the dryer along the ends of the several groups of dryers.

This invention also includes certain novel features of construction which will be more fully pointed out in the following specification and claim.

In the accompanying drawings, which illustrate the best form of my device at present known to me, Figure 1 is an end elevation of my improved elevator; Fig. 2 is a side elevation of the same; Fig. 3 is a plan view of the traversable base, upon which the tower is supported; Fig. 4 is a side elevation of said base; Fig. 5 is a detail plan view of the tower; Fig. 6 is a side elevation of the upper part of the tower; Fig. 7 is a horizontal section through the vertical guides and showing the platform supports and sheaves; and Fig. 8 is a detail side view of one of the springs and adjacent parts for maintaining the cables under tension.

As illustrated, this invention is mounted adjacent to the frame or standard 8, supporting a series of cylindrical drying rolls 9, shown in dotted lines in Figs. 1 and 2. Extending transverse the axes of the several rolls 9 near the base of the standard 8, is a rail 10, adapted to support the elevator frame or tower, while a second rail 7 is mounted above the dryers as a guide for the upper end of the tower. This upper rail 11 is adapted to be rigidly secured in parallel relation with the rail 10 upon I beams 12 or other frame work upon the ceiling or upper part of the drying room. A pair of vertical guide rails 13 for the elevator car are supported upon the base frame 14, provided with flanged wheels 16, adapted to run upon the rail 10. As clearly shown in Figures 1 and 3, these wheels 16 and the rail 10 are offset toward the standard 8 from the vertical plane through the rails 13. Axles 15 are journaled in suitable bearings upon the bottom of the frame 14 and have the wheels 16 rigidly fixed thereon. Each of the vertical rails 13 is held between angle bars 17, which are riveted at their lower ends to the frame 14 and carry a

forked member 18 upon their upper ends. The members 18 project a sufficient distance at opposite sides of the horizontal rail 7 to prevent the tower from falling should the traction wheels 16 become derailed. The rail 11 is held between a pair of angle bars 19 for securing the same to the I beams 12. Rollers 20 are journaled in each of the forked members 18 for engagement with respectively opposite sides of the guide rail 11.

An elevator car or platform 21 is arranged for vertical movement between the rails 13. The platform is supported upon a frame consisting of a pair of vertical channel bars 22, carrying shoes 23, arranged in pairs to engage the rails 13, and having a pair of horizontal bars 24, secured to the lateral sides of the members 22, to which the platform 21 is secured. The upper and lower ends respectively of the members 22 are connected by transverse members 25 and 26.

To support the elevator platform, I provide sheaves 27 and 28, which are journaled in a pair of horizontal members 29, connecting the upper ends of the guides 13, as shown in detail in Fig. 5. A cable 30 for operating the elevator, is secured at one end to the member 25. Mounted between the members 24, supporting the platform 21, is a pair of sheaves 31 for the cable 30. As illustrated, the cable 30 extends from the member 25 successively over the upper periphery of the sheave 28, downward around one of the sheaves 31, upward over the sheave 27 and finally down again over a guide roller 32 to a power driven drum 33. A second or counter cable 34 is secured to the horizontal member 26 on the elevator frame and extends downward from said member to a sheave 35, which is journaled in the base 14. The cable 34 extends upward from the sheave 35 to the second sheave 31 and then downward to a drum 36, which is revoluble with the drum 33. The cable 34, in passing to and from the drum 36, is guided upon a laterally movable wheel 37 (Figs. 2, 3 and 4). The drums 33 and 36 are fixed upon a horizontal shaft 38, supported in suitable bearings in the frame 14. Power for driving the shaft 38 is transmitted from a motor 39 through a suitable worm and worm wheel in a housing 40.

Driving mechanism for the traversing wheels 16 is transmitted to the supporting shafts 15 of said wheels. This mechanism is driven by an electric motor 41, mounted on the frame 14, which drives a long shaft 42 carrying a worm 43 on each end. The worms 43, drive worm wheels 44 on counter shafts 45, and these shafts 45 in turn are connected by a suitable chain of gears in a housing 46 with the shaft 15.

Electric current for the motors 39 and 41 is transmitted to a pair of conductors 46, extending parallel to the rail 11. A trolley

27, mounted on the fork member 18, is adapted to make contact with the conductors 46, and to transmit current to a cable 48, containing electrical conductors leading to the motors 39 and 41. Suitable controls 52 for the motors 39 and 41 are located on the platform 21 and connected in circuits with said motors and also through the cables 48 with the power conductors 46. Suitable stays 49 and 50 are provided to brace the tower of the elevator, and trusses 51 are also mounted on the tower to reinforce the same.

The platform 21 is arranged at its side distant from the dryers to accommodate an operator for the controls 52. At the side of said platform, adjacent to the rolls, the same is adapted to carry at least two workmen for threading the paper web between the drying rolls. In order to allow the workmen to be wholly occupied in threading the web, a railing 53 is provided, over which the operators reach in manipulating the web.

Pins 54 are severally slidable in the members 25 and 26 of the elevator car, the cables 30 and 34 being secured to ends of said pins. To maintain the cables under tension, compression springs 55 are placed between suitable abutments on the ends of the pins 54 and the inner surfaces of the members 25 and 26.

In operation, the cables 30 and 34 are always maintained under tension by the springs 55, which actuate the pins 54 connected to said cables. The drums 33 and 36 are so arranged that the cable 30 is unwound from the drum 33 when the cable 34 is being wound upon the drum 36, and the latter drum winds the cable 34 thereon when the drum 33 is unwinding the cable 30. The elevator platform or car is positively operated, whether moving upward or downward, and the need for counter-weight is obviated. By maintaining the cables under tension, all lashing of the cables, which might otherwise cause the same to run off of the several sheaves, is prevented.

As will now be readily understood, the motor 39 may be operated under control of an operator on the platform 21, to raise or lower said platform. Independently of this vertical movement of the elevator car, the frame 14 carrying the elevator tower may be traversed across the ends of the drying rolls by means of the motor 41. Thus, in operation, when the paper web breaks, or whenever the same must be threaded between the rolls, the required number of operators are stationed on the platform 21, and the tower is quickly run to the place where attention is required. The platform is raised as the paper web is threaded upward in one stack or series of dryers, then the tower carrying the platform is traversed by operating the motor 41, while the workmen carry said web across at the top of the rolls to the next vertical

series, through which they now thread the paper in a downward path simultaneously with the downward movement of the elevator. As the workmen's hands are free to be wholly engaged in threading the paper, the work is greatly facilitated and the time required is reduced to a minimum. Thus, it is unnecessary to reduce the speed of the rolls during the threading operation. Further, the elevator car is only run up into the hotter, upper portion of the drying room during the operation of threading the paper and is normally kept in the cooler part of the room so that the railings and platform are prevented from becoming excessively hot.

By reason of the offset arrangement of the rail 10, the weight of the tower is so carried that the guide wheels 20 on one side of the rail 11 are in continuous engagement therewith, thus preventing lateral vibration of the tower in operation.

This invention has a further important use with paper dryers in facilitating the removal of what is known as a "dryer wrap". When the paper web breaks during the drying operation, it frequently occurs that a loose end of the web is wound upon a roll and should be quickly freed therefrom. Two men are required to free such a wrap from the rolls. Where ladders are provided at the ends of the stacks of dryers, the men must, after climbing the ladder, use long spears or poles to reach between the rolls and clear away the wrapped paper. Obviously, it is extremely difficult for an operator to maintain his hold on the hot ladder and simultaneously manipulate a spear which requires the use of both hands. These difficulties result in accidents, causing injury to operators when they lose their hold on the ladders and fall. By the use of the present invention, such

difficulties are obviated and the work of clearing the rolls is rendered safe, while the time required is reduced to a minimum. Thus, in case of a dryer wrap, two workmen and the elevator operator mount the platform 21 and are quickly transported to the affected roll. Every move of the workmen can be readily observed by the elevator operator, who is stationed close behind them, so that it is easy to maintain the platform in the position where the men can work most efficiently.

Having described my invention what I claim as new and desire to protect by Letters Patent is:

In an elevator capable of horizontal and vertical movement adjacent to overhead portions of a machine to be operated, a single supporting rail, an electric conductor and horizontal, overhead guides extending parallel to said machine, a long and relatively narrow car traversable upon said rail, a pair of vertical guides spaced longitudinally on said car, and disposed in a plane offset laterally from said rail, guide wheels revoluble in horizontal planes upon the upper end of said tower and arranged to engage opposite sides of said horizontal guides, a platform for a plurality of operators movable along said vertical guides, said platform being arranged to project adjacent to relatively inaccessible parts of said machine, electric motors supported upon said car and under control of an operator on said platform for severally traversing said car and for actuating said platform vertically and a trolley carried by the elevator in contact with said conductor for transmitting electrical energy to said motors.

In testimony whereof, I have hereunto signed my name to this specification.

NELS SANDBERG.