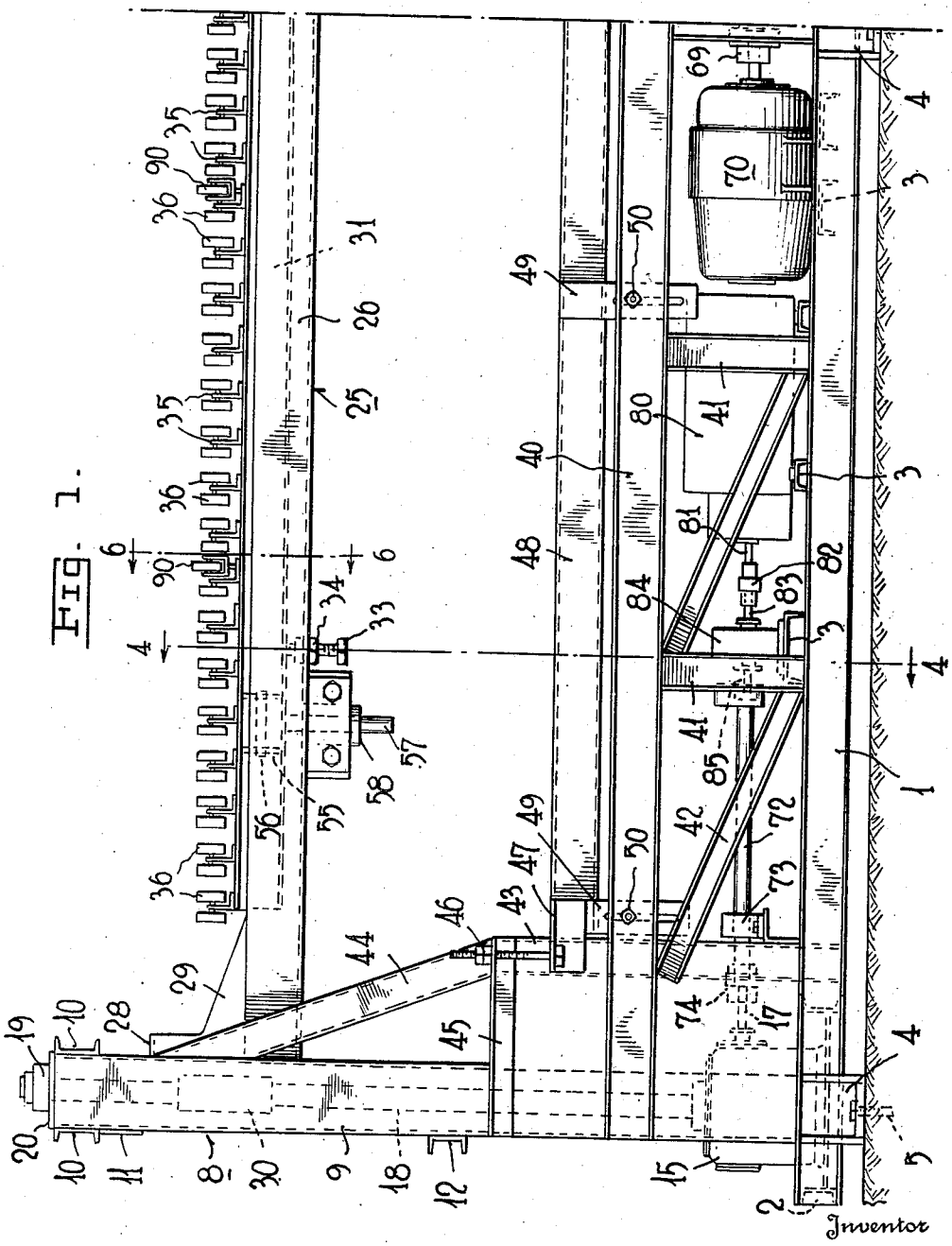
Nov. 5, 1940. H. W. WYLIE 2,220,191

ELEVATOR

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Fig. 1.



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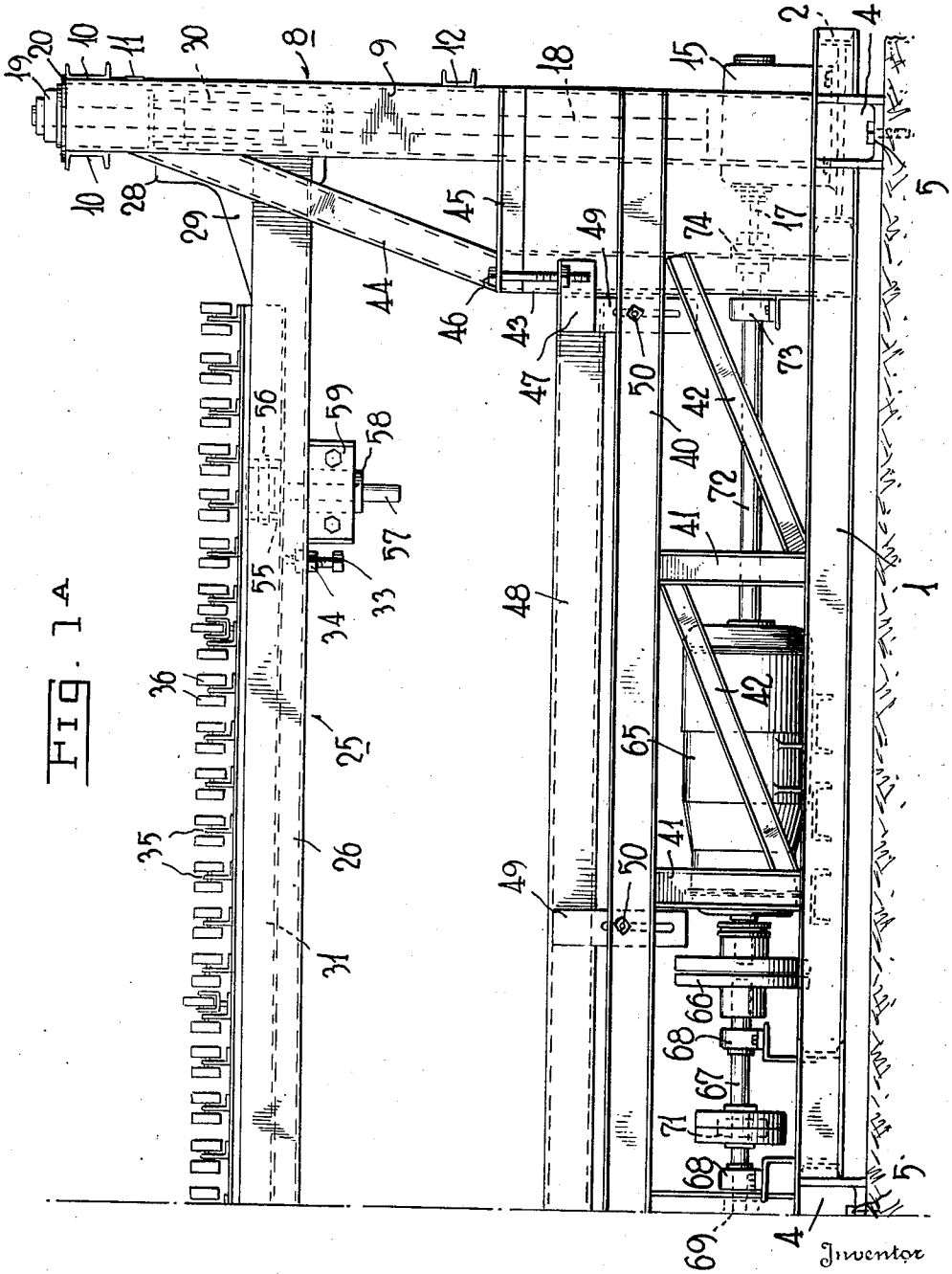


FIG. 1A

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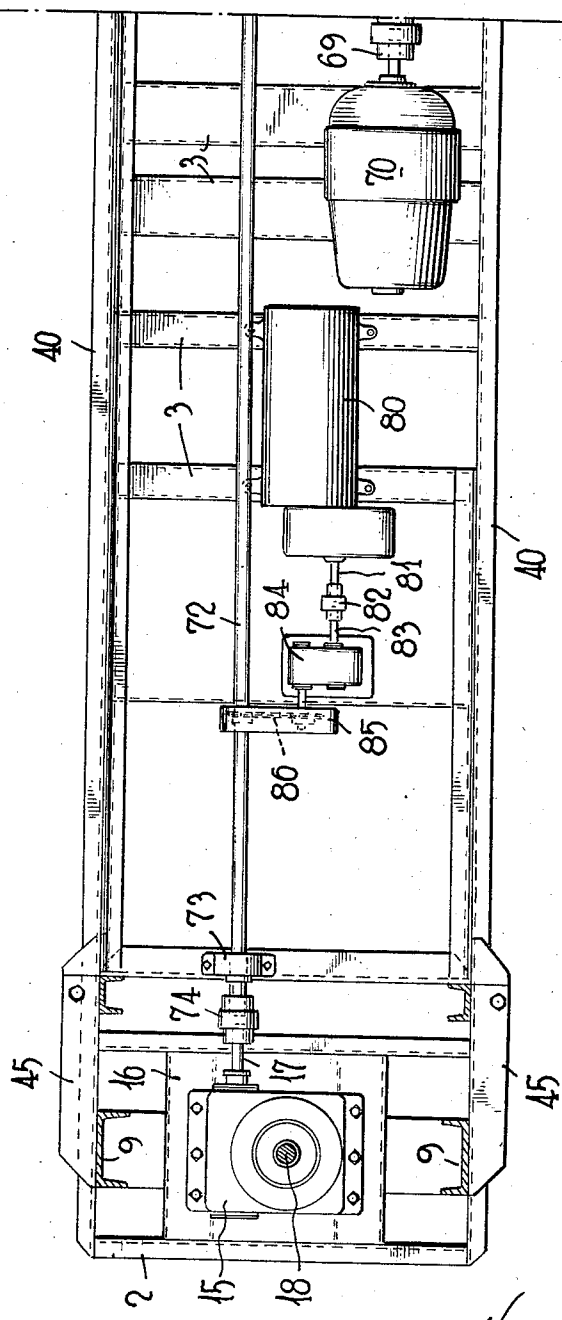
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Nov. 5, 1940. H. W. WYLIE 2,220,191

ELEVATOR

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Fig. 2.



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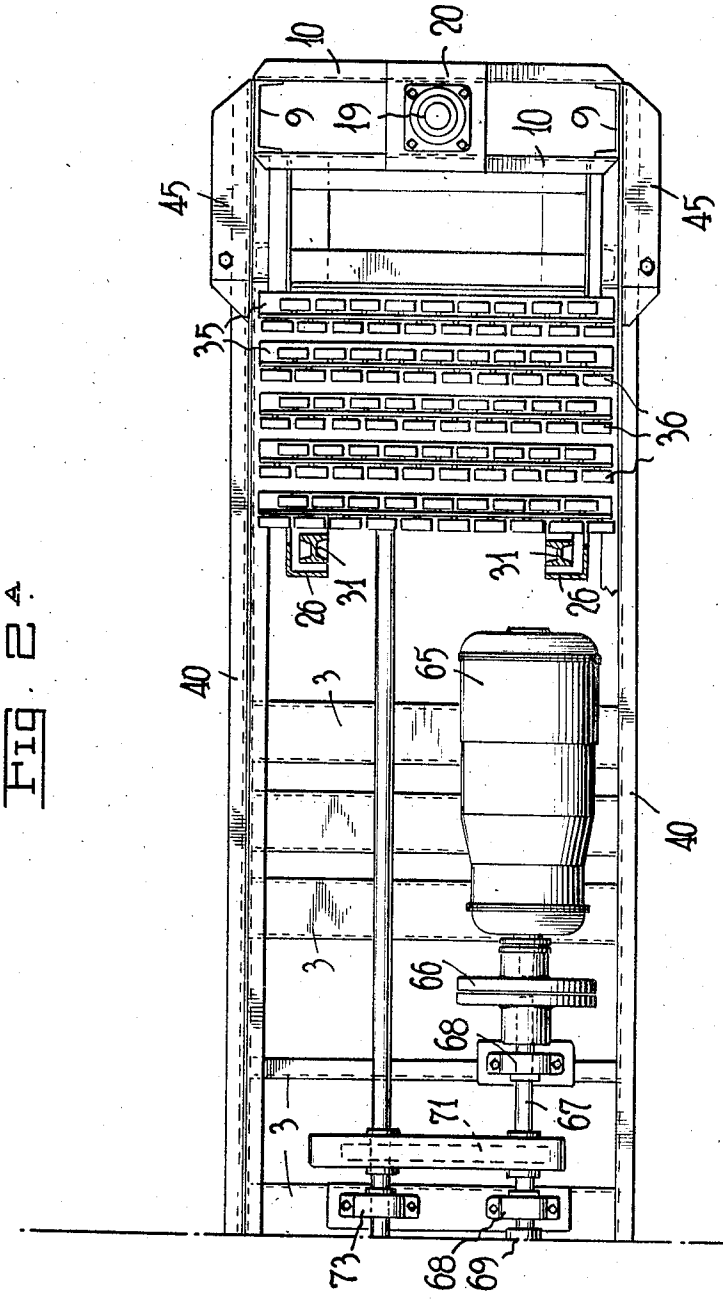
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ELEVATOR

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Fig. 2A.



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Fig. 3.

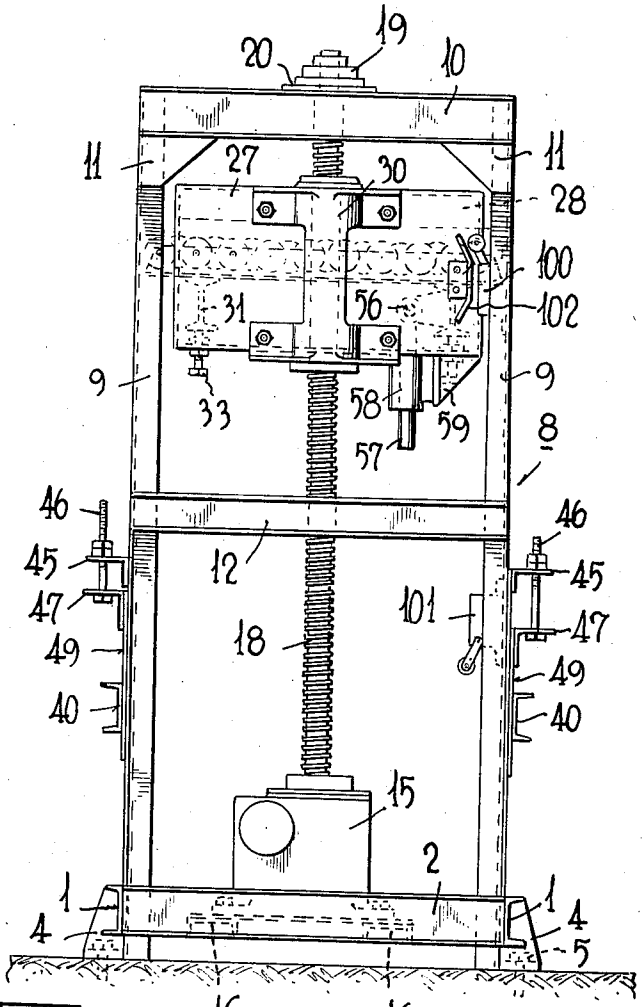


Fig. 6.

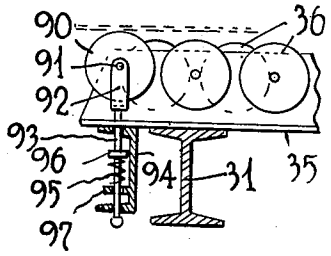
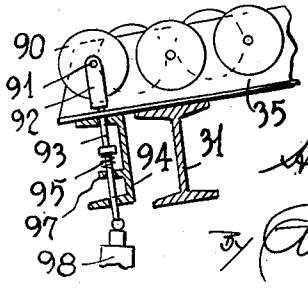


Fig. 7.



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ELEVATOR

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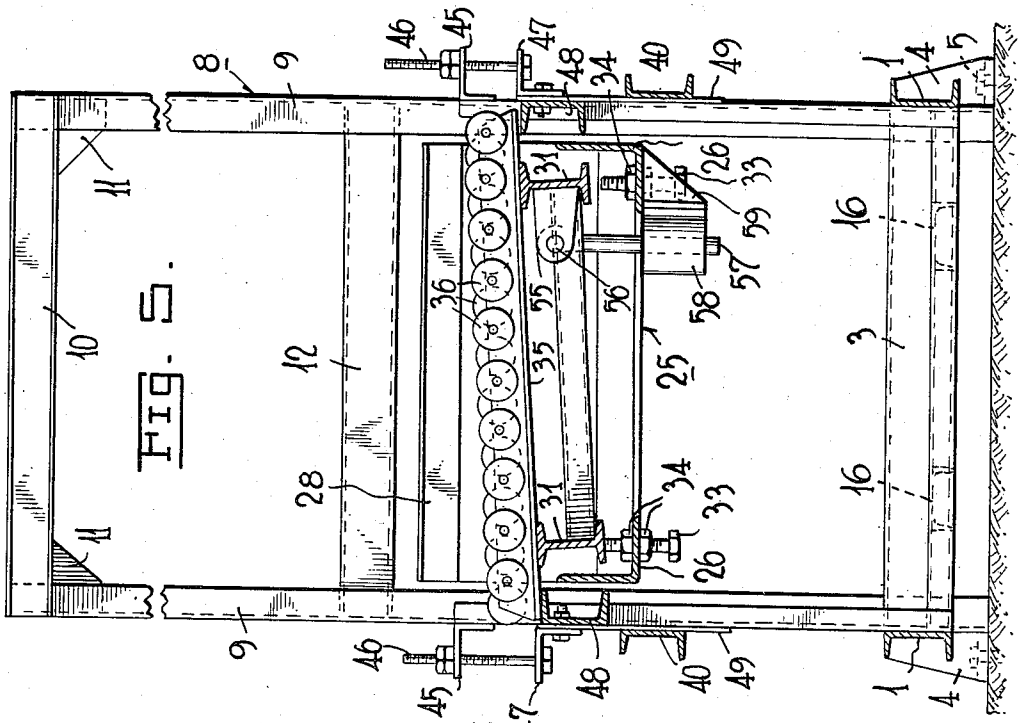


Fig. 5.

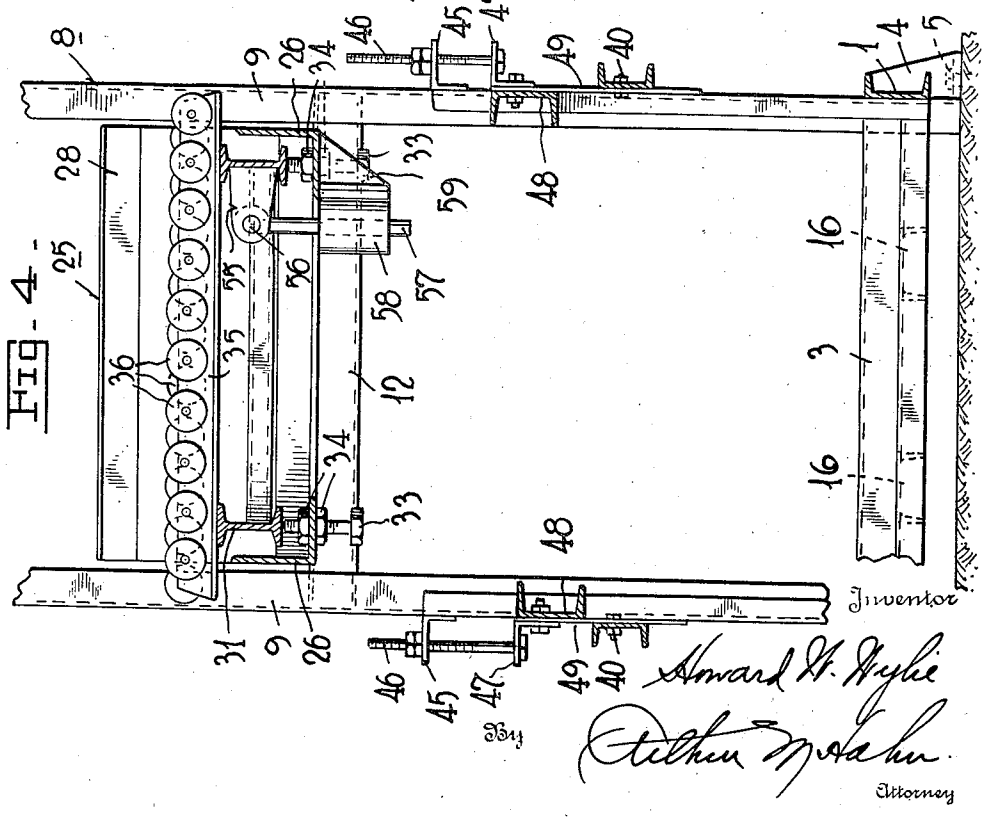


Fig. 4.

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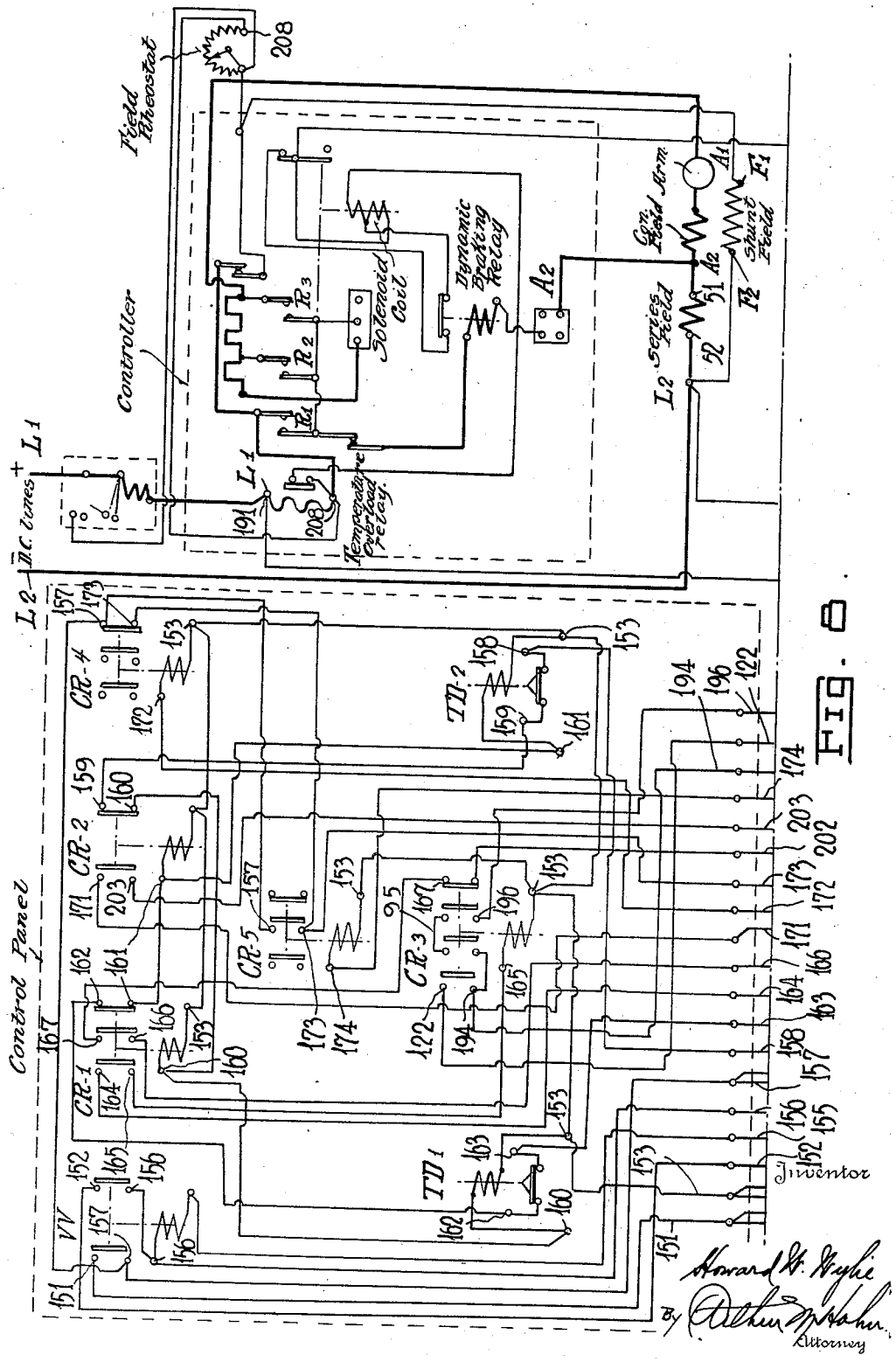


FIG. 8

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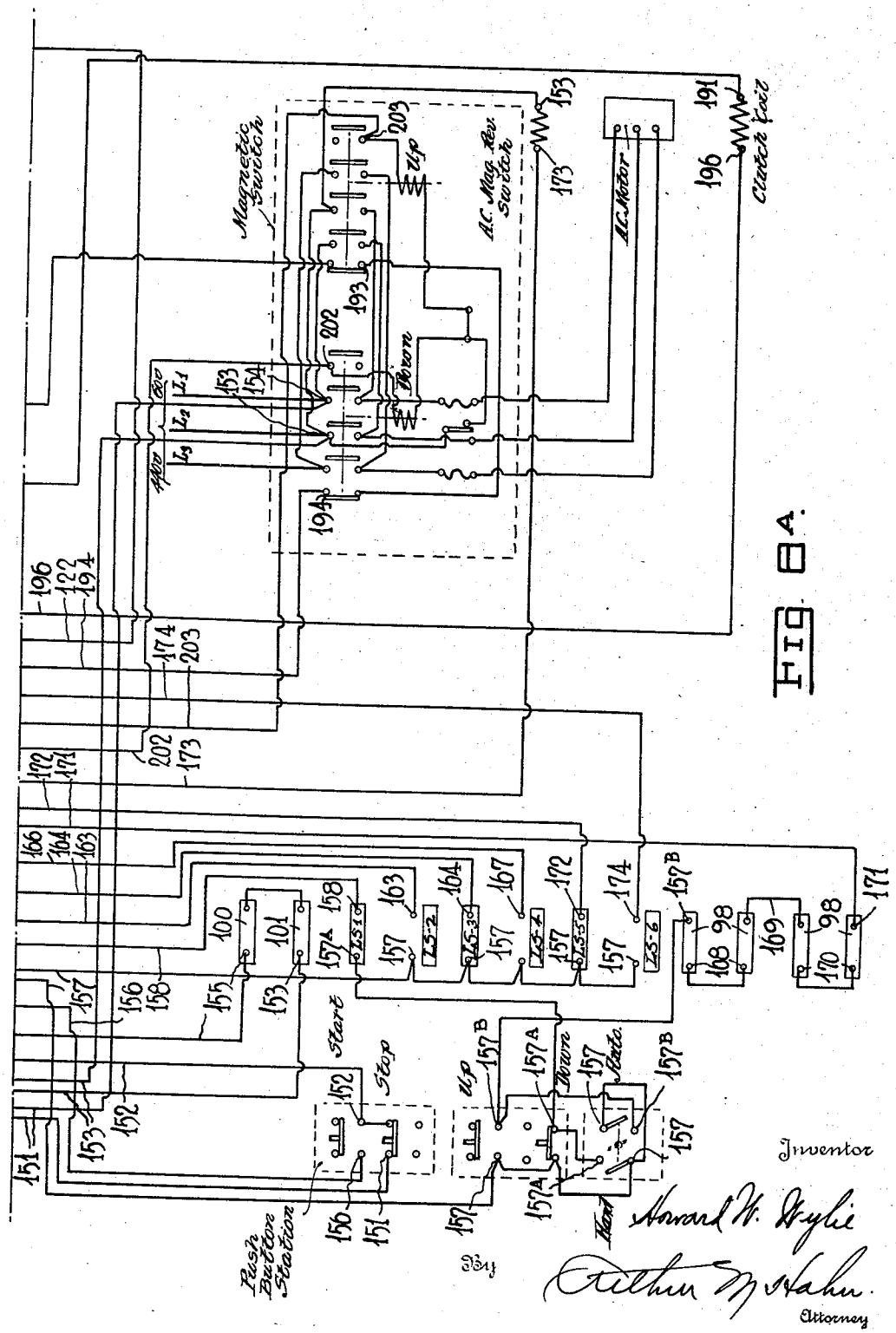


FIG. 8A.

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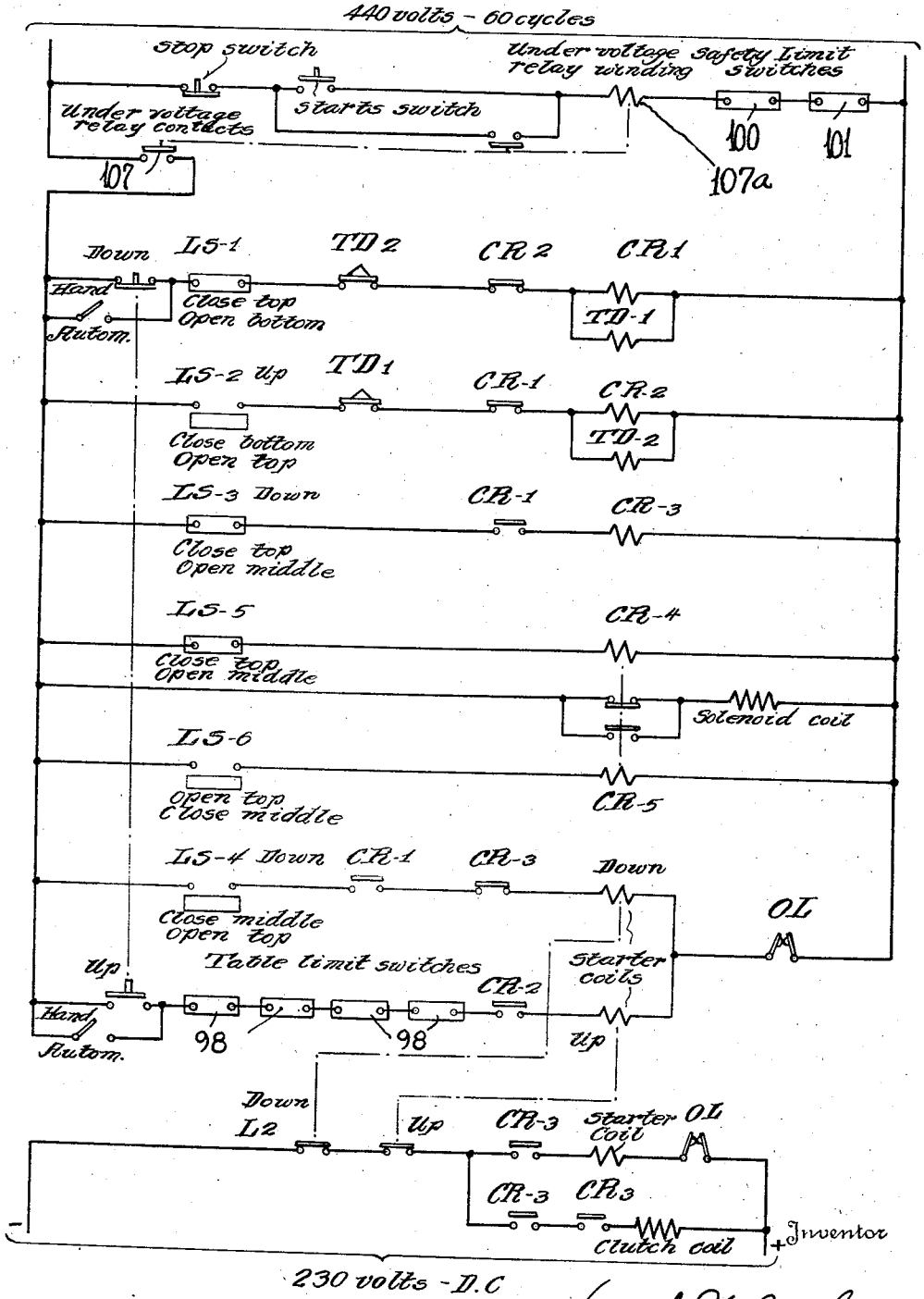


Fig. 9.

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Patented Nov. 5, 1940

2,220,191

UNITED STATES PATENT OFFICE

2,220,191

ELEVATOR

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Application February 21, 1938, Serial No. 191,773

18 Claims. (Cl. 214—6)

This invention relates to elevators and is directed more particularly to an elevator such as used in sheet pulp handling systems and commonly termed a layboy.

In systems of this character, a large continuous pulp sheet is formed by the usual or any suitable process, and this sheet is fed to a cutting mechanism known as flying shears where it is cut into a plurality of smaller sheets. In one particular installation, for example, the large sheet emerges 12 feet 6 inches wide and the aforesaid cutting mechanism cuts this sheet into a plurality of smaller sheets 30 inches square that are five abreast. These smaller sheets are discharged continually from the cutting mechanism onto the layboy where they are accumulated into piles of a predetermined height or number of sheets, then discharged onto other mechanism where the individual piles are weighed, wrapped and tied into bundles.

The present invention is directed to the layboy for receiving the aforementioned sheets and accumulating these sheets into stacks, and the primary object of the present invention is to provide a layboy which shall include a platform of novel construction for receiving the individual cut sheets thereon as they are discharged from the cutting mechanism, and having means for causing the platform to slowly descend in accordance with the rate of discharge from the cutting mechanism, whereby the tops of the stacks of accumulated sheets are constantly maintained at a level to receive the sheets as they are discharged thereonto.

Another object is to provide a layboy which shall receive the sheets in stacks of a predetermined height or number, then quickly descend to a predetermined position and automatically tilt the platform to discharge the stacks, then quickly ascend to receive and accumulate the next piles of sheets.

A further object is to provide a layboy of the aforesaid character which shall be variable in adjustment and operation to suit the particular installation and speed of the associated apparatus, and which shall be capable of manual or automatic control in operation.

A still further object is to provide a layboy which shall consist of relatively few parts that are simple in construction and easy to assemble, and the controls of which are readily accessible for adjustment.

With the foregoing and other objects and advantages in view, the invention may be stated to consist in the various novel features of construction and arrangement or combination, all of which will be fully described hereinafter and pointed out in the appended claims.

In the drawings accompanying and forming a part of this application:

Figures 1 and 1*a* are jointly a side elevation of a layboy constructed in accordance with my invention;

Figures 2 and 2*a* are jointly a top plan view thereof, with parts in section;

Figure 3 is an end elevation of the device;

Figure 4 is a vertical sectional view taken on the line 4—4 of Figure 1 and showing the table in elevated position;

Figure 5 is a similar view showing the table in discharge position;

Figure 6 is a fragmentary sectional view taken on the line 6—6 of Figure 1 and illustrating one of the roller mechanisms for controlling the operation of its table limit switch;

Figure 7 is a similar view but with the table in discharge position and illustrating the limit switch in engagement with the roller control mechanism;

Figures 8 and 8*a* are jointly diagrammatic views of the wiring for the electrical control of the layboy; and

Figure 9 is a simplified wiring diagram of the electrical control mechanism.

A layboy constructed in accordance with my invention comprises a substantially rectangular base frame consisting of longitudinally disposed channel members 1 which are tied together at each end by transverse channels members 2 that are preferably welded thereto. A plurality of intermediate transverse channel members 3 are welded to members 1 and these intermediate members not only serve to strengthen and impart rigidity to the base frame, but also form convenient supports for the electric drive motors to be referred to more fully hereinafter. Each longitudinal channel member is provided with a plurality of feet 4 that extend below the plane of the base frame as clearly shown in Figures 1 and 1*a* and by means of suitable fastening elements such as lag bolts 5 extending therethrough, the device is fastened to its foundation.

An upright rectangular frame, denoted generally at 8, rises adjacent each end of the base frame. Each of these upright frames comprises a pair of spaced vertically disposed channel members 9 which are preferably arranged with their open or channel sides facing each other. The lower ends of these channel members are fastened, as by welding, to the base frame, and the upper ends are tied together by a pair of horizontally disposed channels 10 which have their bases welded to the side flanges of the channels 9. Suitable gusset plates 11 are also welded in the angles defined by the outer channels 10 and the upright channels 9 as shown in Figure 3. An intermediate horizontally disposed strengthening channel 12 is also welded at each end to the uprights 9.

As shown particularly in Figures 2 and 3, a

worm gear reduction housing 15 is mounted on a suitably arranged sub-base frame member 16 of the main base frame. This housing has a worm drive shaft 17 projecting horizontally therefrom, and a relatively long and vertically disposed screw shaft 18 which is concentric with the worm gear in the housing 15. The screw shaft 18 of each housing is also in substantial alignment with the vertical axis of its respective end frame 8. Each screw shaft 18 is journalled at its upper end in a thrust bearing 19 that is carried by a plate 20 bridging the channels 10.

The vertically movable table or elevator is indicated generally at 25. As shown particularly in Figures 1, 1a, 3 and 4 and 5, the table is substantially rectangular in shape and extends between the vertical end frames 8. The table comprises a pair of laterally spaced and longitudinally disposed angle members 26 which are welded at each end to a vertically disposed end plate 27. To the inner surface of each plate 27 and along the upper horizontal edge thereof, there is welded an angle member 28. Suitable gusset plates 29 are welded to the vertical edges of the end plates and also to the upper edges of the table angle members 26. An elongated threaded nut 30 is bolted (Figure 3), or otherwise secured to the outer face of each end plate 27, and these nuts are engaged on their respective threaded shafts 18.

Extending longitudinally of the table and within the confines of the angle members 26 are a pair of laterally spaced and longitudinally extending I beams 31. These I beams, each normally rests on the ends of a plurality of adjusting or leveling screws 33 which are threaded in the horizontal flange of the angle members 26, as clearly shown in Figures 1, 1a and 4. The adjusting screws are locked in adjusted position by nuts 34 in the usual manner.

Arranged transversely of the I beams 31 and welded or otherwise secured to the top surfaces thereof are a plurality of angle members 35. The vertical flange of each angle member has mounted thereon a plurality of closely spaced small wheels or rollers 36 each of which is journalled on a stub shaft projecting laterally through said flange. As shown in Figures 2, 4 and 5, the stub shafts and wheels journalled thereon, on one face of the flange of each angle member are staggered with respect to the stub shafts and wheels on the opposite face of the flange of said angle member. In this manner, the bed or upper surface of the table 25 is made up of a multiplicity of wheels in closely grouped relationship.

From the description thus far, it is apparent that when screw shafts 18 are rotated in one direction the table structure 25 will be elevated as a unit in a horizontal position, and when rotated in an opposite direction, the table will be similarly lowered. Provision is made, however, for tilting the table at its lowered position, along one side so as to discharge a load resting on the wheels 36 from the side or long dimension of the table. Referring first to Figures 1 and 1a, it will be noted that the end frames 8 are tied together at each side by a channel member 40. Each of these channel members is further supported by a plurality of vertically disposed channel members 41 welded between channel 40 and channel 1 of the base frame. Diagonally disposed channels 42 are also welded between these channels to impart rigidity and strength to the framework. Adjacent each end of frame 8 and on each side of the main base frame, a vertically disposed channel member 43 rises above the longitudinal channel 40, and the upper end of each channel member 43 is welded to the lower end of a diagonal channel 44 which is welded at its upper end to the end frame 8. A relatively short horizontal angle member 45 extends between the upper end of each channel 43 and the vertical channel 9 of the end frame.

Supported by the horizontal flange of each angle member 45 is an adjusting bolt 46 which extends through the flange of a stub angle member 47 that is welded to the end portion of a vertically adjustable and longitudinally extending channel shaped stop member 48. It will be understood, of course, that a stop member 48 is positioned, one on each side of the device, as clearly shown in Figures 3, 4 and 5. Each of these stop members 48 is independently adjustable vertically by means of the aforementioned bolts 46 and each stop member is guided in its vertical movement and maintained in adjusted position by a plurality of straps 49 depending therefrom. Each strap is formed with a vertically disposed slot through which a bolt 50 is engaged that serves to clamp the same to its respective longitudinal channel member 40.

In use, the rear longitudinal stop bar 48 is adjusted to a predetermined position which is higher than the selected position for the front stop bar as clearly shown in Figures 4 and 5, whereby when the table 25 descends, the ends of angle members 35 will engage these stop bars as shown particularly in Figure 5, and thereby tilt the table. This tilting of the table serves to discharge by gravity, the load resting on rollers 36. It will be noted from Figure 5, that the rear I beam 31 is no longer supported by its leveling screws 33, and in the particular position illustrated, the front I beam 31 is still supported by its leveling screws 33. It will be understood, however, that the angle members 26 and associated parts of the table descend still further in operation, so as to completely clear the front I beam from its leveling screws, as will be more fully described hereinafter.

In order to maintain the roller top and associated I beams 31 in operative relation to the leveling screws 33 when the table ascends as a unit, I provide a pair of guides each comprising a pair of forwardly projecting arms 55 that are welded to rear I beam 31 as illustrated in Figures 1, 1a, 4 and 5. A rod 56 extends between the arms 55 and journalled thereon is a T-shaped guide element 57, the depending portion of which is slidable through an aperture in a guide block or dead eye 58. The guide block 58 is bolted or otherwise secured to an angle bracket 59 that is welded to the rear angle member 26 of the table assembly. As shown in Figures 4 and 5, it is thus apparent that the roller top and I beam portions of the table will be maintained in operative relation to the lower portions of the table even when separated for purpose of tilting the roller top to discharge a load thereon, and hence when the table ascends, the I beams 31 will be properly positioned on the leveling screws 33.

The source of power for operating the table comprises two independently operated prime movers which are connected to a common drive shaft. One of these prime movers is indicated at 65 and is preferable in the form of a variable speed D. C. motor. In actual use, this prime mover is a 1 H. P., 230 volt D. C. motor having a built in reduction gear so that the drive shaft thereof will have a variable speed of between 58 and 174 R. P. M. A D. C. motor of this character

is preferred because the speed thereof can be more readily controlled than an A. C. motor. It will be understood, however, that any similar or suitable source of variable speed prime mover could be used. The drive shaft of this motor is coupled through a standard magnetic clutch 66 to a shaft 67 which is journalled in suitable bearings 68 carried by the base frame. The opposite end of this shaft is connected through a standard flexible coupling 69, which in turn is connected to the drive shaft of the second prime mover 70. This second prime mover is in the form of an A. C. motor and in actual use, this motor is a 3 H. P. 220/440 volt three phase 1750 R. P. M. motor. It will be understood, however, that any other similar or suitable source of power could be used.

The drive shaft 67 is coupled through suitable sprockets and an enclosed silent chain indicated at 71 to a driven shaft 72 arranged parallel with drive shaft 67. The driven shaft is journalled in suitable bearings 73 that are carried by the base frame, and this shaft interconnects at each end through a flexible coupling 74 with the aforementioned respective worm drive shaft 17 as clearly shown in Figures 2 and 2a. It is thus apparent that either motor 65 or 70 may drive the shaft 72 and the vertical raising and lowering screws 18. In actual use, the D. C. variable speed motor 65 is the driving means for lowering the table while the piles of sheets are being accumulated on the rollers of the table. The speed of this motor is preferably adjusted in accordance with the rate of feed of the sheets from the cutting mechanism so that the sheets may be discharged therefrom onto the table and top of the accumulated pile in substantially a horizontal plane. In other words, as the piles of sheets accumulate on the table, the table gradually descends so as to maintain the top of each pile at a level of substantially the thickness of one sheet below the discharge of the cutting mechanism, thus insuring a smooth even continuous transfer of the sheets from the cutting mechanism to the table. When the several piles of sheets on the table have accumulated to the desired number or height, the table will have reached its discharge position indicated in Figure 5 and the piles will automatically discharge from the table onto a suitable support or transfer mechanism, not illustrated, and which forms no part of this invention. During the time the table is discharging its load and ascending, the cutting mechanism accumulates the sheets discharging therefrom onto retractable arms (not shown) and which forms no part of the present invention. When the table reaches the discharge position illustrated in Figure 5, it is desirable to quickly lower the bottom portion of the table (angle members 26 and associated parts) to effect a separation between the I beams 31 and their leveling screws 33 and thus correctly position the roller bed angles 35 on the stop bars 48, after which it is highly desirable to quickly cause the empty table to ascend to pick up the few sheets that have accumulated on the aforementioned retractable arms, and again start a slow descent as previously described.

In order to accomplish this rapid descent after the table is in discharge position, and the rapid return of the table to receiving position, I provide means for deenergizing the magnetic clutch 66, thereby disconnecting the D. C. motor drive of shafts 67 and 72, and energizing the A. C. motor 70 to drive these shafts at high speed. The means for accomplishing this change of prime movers consists of a drum switch indicated generally at 80 (Figure 2), the drive shaft 81, of which is connected through a flexible coupling 82 to the driven shaft 83 of a standard speed gear reduction mechanism 84. The drive shaft 85 of this mechanism is operatively connected by a chain 86 to a sprocket on driven shaft 72. The specific mechanical details of the drum switch 80 are not illustrated as they form no part of the present invention and such device is obtainable on the market as standard equipment. It is deemed sufficient to state that the device consists, essentially of a plurality of disks carried by a shaft and these disks in turn carry a plurality of cams which actuate a plurality of contacts, the parts being adjustable and so arranged that during a single revolution or less of the drum, certain predetermined electrical circuits will be broken and others established, as will be more fully described hereinafter.

In order to prevent the table from ascending too soon should one or more of the piles of sheets on the rollers be sluggish or for other reasons require more than the ordinary time interval for discharging from the table, I provide an automatic electrical cutout which will hold the circuit to the A. C. motor 70 open until the piles have all discharged. This cut-out operates irrespective of the drum switch control 80. Referring to Figures 1, 1a, 6 and 7, it will be noted that certain of the rollers of the table project slightly above the other rollers. These rollers are indicated at 90 and are preferably arranged along the front discharge edge of the table so that they will be actuated even if only the extreme rear portion of one or more piles of sheets still remain on the table. As shown in detail in Figures 6 and 7, each roller 90 is journalled on a shaft 91 that is supported by a yoke 92, the latter being mounted on the upper end of a rod 93. Rod 93 projects through an aperture in the flange of its angle member 35 and also through aligned apertures in a channel bracket 94 that is welded to the bottom surface of the angle member 35. A coil spring 95 surrounds the rod 93 and is interposed between a collar 96 on the rod and a fixed shelf 97 projecting from the bracket. This spring normally holds the roller 90 slightly above the adjacent rollers 36. The lower end of rod 93 is aligned with the operating plunger of a standard limit switch denoted generally at 98. In operation, the piles of sheets on the table will depress the rollers 90 to the level of the adjacent rollers 36, thereby causing the lower end of each rod 93 to depress the operating plunger of its limit switch and maintain such switch in "open" electrical circuit. Each of the limit switches 98 is in series electrical circuit with the circuit of the A. C. motor 70. It is thus apparent that if for any reason, one or more of the limit switches 98 are in open position, the A. C. motor 70 cannot operate even if the drum switch mechanism 80 is in motor circuit closing position. The table therefore cannot ascend until all the piles of sheets have been completely discharged therefrom. As soon as this occurs, the rollers 90 are returned to normal position by the spring 95 and the rods 93 are elevated, permitting the limit switches to close their electrical circuit which is their normal positions.

As a further safety measure in the operation of the table, I provide an upper limit switch 100 and a lower limit switch 101 as clearly shown in Figure 3. Each of these limit switches is in

series circuit with the circuit for the A. C. motor 70. The normal position of each switch is in circuit closing position and these limit switches do not operate to open the motor circuit unless for some reason the table ascends above normal upper position or descends below normal lower position. The table is normally stopped in each of these positions by the drum switch mechanism 80. However, if for example, the motor circuit contact finger of the drum switch became defective and the motor circuit was not opened at the normal upper or lower positions of the table, serious damage would be done to the machine if it were not for the aforementioned limit switches. These switches are each adapted to be thrown to open circuit position by a contact arm 102 that is secured to the end wall 27 of the table, should the table move beyond its normal range of travel.

Electric control system

In Figure 9, I have illustrated a simplified schematic wiring diagram of the various circuits for controlling the operation of the layboy either by manual push button control or by automatic control.

In this figure, the aforementioned safety limit switches for preventing over travel of the table are also indicated at 100 and 101. Similarly, the previously described table limit switches are indicated at 98 and it will be recalled that these switches are normally closed, but are opened by the weight of the stacks of material discharging from the table. These switches are for the purpose of making certain that the stacks have been completely discharged from the table and are not moving between the table and receiving conveyer.

The various devices connected into the circuits are all of standard construction and are obtainable on the market, hence a detailed description thereof will not be given. These various relays and switches are each labeled on the diagram as follows:

LS—1, LS—2, LS—3, LS—4, LS—5 and LS—6 are the contacts in the rotary cam switch 80. This type of switch is a commercial product and briefly described, it consists of a plurality of contacts for controlling six independent circuits, each set of contacts being actuated by means of cams or dogs supported on six separate disks that are carried by the main shaft. As the shaft rotates, these dogs cause the limit switches or contacts to open and close, the sequence of operation of the contacts depending on the location of the various dogs. Each contact is closed by a closing dog and remains closed until operated by a tripping dog or vice versa. The dogs are adjustably mounted on their respective disks. The particular setting for each switch for the layboy is as follows:

Contact "LS—1—down": Closes at top position and opens at bottom.
Contact "LS—2—up": Closes at bottom and opens at top.
Contact "LS—3—down slow": Closes at top and opens at middle.
Contact "LS—4—down": Closes at middle—and opens at top.
Contact "LS—5—stack arm contact": Closes at top, opens near middle.
Contact "LS—6—stack arm contact": Opens at top and closes near middle.

These limit switch contacts should be slightly overlapped as follows:

Arrange LS—4 so it closes slightly before LS—3 opens.

Arrange LS—2 to close and latch at bottom slightly before LS—1 opens.

Arrange LS—1 to close and latch at top slightly before LS—2 opens.

Arrange LS—3 so it closes and latches at top before LS—2 opens.

Arrange LS—4 so it opens at top before LS—2 opens.

Arrange LS—5 so it opens near middle before LS—6 closes.

Arrange LS—5 so it closes and latches at top before LS—6 opens and also before LS—2 opens.

TD—1 and TD—2 are time delay relays.

CR—1, CR—2, CR—3, CR—4 and CR—5 are control relays.

OL is an overload device.

Operation

Assume carriage is at top position and control is deenergized.

Assume automatic operation is desired.

Operator turns selector switch to "automatic" position.

Operator presses "start" button. This energizes the under-voltage relay winding 107*a*, closing contact 107 and causes the control to be operative.

Limit switch contacts LS—1 and LS—3 are closed. This causes CR—1, TD—1 and CR—3 to be energized. This energizes the D. C. motor and clutch and causes the carriage to slowly move downwards.

At the position where it is desired to stop the slow down movement, limit switch LS—4 first closes and then LS—3 opens. This stops the slow movement down and starts the fast down movement.

As the fast down movement starts LS—5 opens and the LS—6 closes. This energizes the solenoid valve and causes the previously referred to arms to swing to position to receive stacks.

At the end of the fast down movement, LS—2 first closes and then LS—1 opens, thereby stopping the down motion. The opening of LS—1 and consequent deenergizing of CR—1 and TD—1 starts timing relay TD—1 to time. At the end of this timing period TD—1 contact closes thereby energizing CR—2 and TD—2.

Also at the end of the down movement the rolls upon the elevator have reached an inclined position so that the discharging operation starts at once. As the stacks move toward the receiving conveyer, the limit switches 98 momentarily open their contacts and any up motion will be prevented until the stacks are clear of these limit switches.

As the TD—1 timing becomes completed, and assuming the stacks are clear of limit switches 98, the "up" contactor is energized and the carriage starts up. At the end of the "up" travel, LS—3 and LS—1 and LS—5 first close and latch, LS—6 opens, then LS—2 opens. This stops the up movement and as relay TD—2 is deenergized, it starts timing and prevents a "down" movement until its timing cycle is complete.

As LS—5 closes and LS—6 opens the solenoid valve is deenergized causing the arms to swing back and deposit any stacks they may hold on to the conveyer.

At the end of the timing cycle of TD—2, its

contact closes and restarts the cycle. The cycle repeats automatically.

Emergency overtravel limit switches 100 and 101 are placed at the top and bottom of the carriage travel, so that if for any reason the carriage travels too far in either direction, the limit switch will open, deenergizing the undervoltage relay and shut down the equipment.

Manual operation

If manual control is desired, the operator turns the selector switch to the "hand" position. Then the upward and downward movements are controlled by pressing the corresponding "up" or "down" push buttons.

In Figures 8 and 8*a*, I have shown a complete wiring diagram of the electrical circuits. The various relays, time delay devices and undervoltage relays are clearly indicated on the drawings. Also, the contact terminals of the control panel, controller, push button station, magnetic switch, and rotary cam switch are each provided with the same reference characters where such terminals are interconnected by wires. These various control devices are standard units readily obtainable on the market and the details of construction thereof form no part of the present invention. It is believed to be unnecessary to trace each circuit, as the principle of operation has already been described in connection with the simplified wiring diagram shown in Figure 9; and furthermore those skilled in the arts can readily trace the various circuits interconnecting the terminal contacts having like reference characters. The main purpose of Figures 8 and 8*a* is to provide a complete disclosure of an operative device to those skilled in the art.

What I claim is:

1. An apparatus of the character described comprising a framework, a substantially horizontally disposed table movable vertically on rotatable screw shafts with respect to said framework, said table being adapted to accumulate a plurality of articles in stacked relation thereon, means for rotating said screw shafts to lower said table at a rate whereby the top of an article received thereon will be below the plane of discharge of a succeeding article to be stacked thereon, means for accumulating a predetermined number of articles on said table, means for increasing the speed of descent of said table after a predetermined number of articles have been accumulated thereon, and means for tilting said table with respect to said screw shafts at a predetermined point of descent to discharge the accumulated articles in stacked relation.

2. An apparatus of the character described comprising a framework, a substantially horizontally disposed table movable vertically with respect to said framework, said table being adapted to accumulate a plurality of articles in stacked relation thereon, means for lowering said table at a rate whereby the top of an article received thereon will be below the plane of discharge of a succeeding article to be stacked thereon, means for increasing the speed of descent of said table after a predetermined number of articles have been accumulated thereon, and means for tilting said table to discharge the accumulated articles in stacked relation.

3. An apparatus of the character described comprising a framework, a substantially rectangular and horizontally disposed table movable vertically on rotatable screw shafts with respect to said framework, said table having a multiplicity of anti-friction elements forming the upper receiving surface thereof and adapted to receive a plurality of articles in stacked relation thereon, means for rotating said screw shafts to lower said table at a rate whereby the top of an article received thereon will be below the plane of discharge of a succeeding article to be stacked thereon, means for accelerating the descent of the table after a predetermined number of articles have been accumulated on the said table, and means for tilting said table with respect to said screw shafts to discharge the accumulated articles in stacked relation from said anti-friction elements, said table tilting means being adjustable to vary the point of discharge at which said table is tilted.

4. An apparatus of the character described comprising a framework, a substantially horizontally disposed table movable vertically on rotatable screw shafts with respect to said framework, said table being adapted to accumulate a plurality of articles in stacked relation thereon, means for rotating said screw shafts to lower said table at a rate whereby the top of an article received thereon will be below the plane of discharge of a succeeding article to be stacked thereon, means for accelerating the descent of the table after a predetermined number of articles have accumulated on said table, means for tilting said table to discharge the accumulated articles in stacked relation, means for returning said table to elevated receiving position at a rate of speed greater than the rate of speed of descent, and means actuated by the articles discharged from said table to prevent return of said table until all the articles have been discharged therefrom.

5. An apparatus of the character described comprising a pair of spaced vertical frameworks, a vertically disposed screw spindle journalled in each framework, a support arranged intermediate said frames and having the end portions thereof operatively connected to said screw spindles, a table carried by and movable with respect to said support, means for rotating said spindles to raise and lower said support and table, means engageable with the table for supporting the same independently of said support, and interengaging guides between said table and support for accurately positioning said table on said support during ascent of the support.

6. An apparatus of the character described comprising a pair of spaced vertical frames, a vertically disposed screw spindle journalled in each frame, a substantially horizontally disposed support, arranged intermediate said frames and having the end portions thereof operatively connected to said screw spindles, a table carried by and tiltable vertically with respect to said support, means for rotating said spindles to raise and lower said support and table, means for arresting a side edge of said table at a predetermined position during the descent thereof, while permitting the opposite side edge to continue its descent, thereby to tilt said table and discharge the articles thereon by gravity, additional means for arresting descent of said opposite side edge, and interengaging guides between said table and support for accurately positioning said table on said support during ascent of the support.

7. An apparatus of the character described comprising a pair of spaced vertical frames, a vertically disposed screw spindle journalled in each frame, a substantially horizontally disposed table arranged intermediate said supports

and having the end portions thereof operatively connected to said screw spindles, mechanism including a drive shaft for rotating said spindles to raise and lower said table, a prime mover for rotating said drive shaft to cause said table to descend at a predetermined rate of speed, means for arresting a side edge of said table at a predetermined position during the descent thereof, while permitting the opposite side edge to continue its descent, thereby to tilt said table and discharge the articles thereon by gravity, means for accelerating the descent of the table during the tilting thereof, and means for rotating said drive shaft at a higher speed during the ascent of the table than during descent thereof.

8. An apparatus of the character described comprising a framework, a substantially horizontally disposed table movable vertically with respect to said framework, mechanism for raising and lowering said table including a drive shaft and an electrically operated prime mover operatively connected thereto, means for controlling said prime mover to cause said table to descend at a predetermined rate of speed, a stop for arresting one side of the table during its descent thereby to tilt said table and permit discharge of the articles thereon by gravity from the opposite side, electrical contacts adapted to be automatically actuated when tilting of said table occurs to control an electric circuit whereby rotation of said drive shaft is accelerated to increase the rate of descent of said table, and additional contacts and electrical control means adapted to be automatically actuated upon discharge of the articles from said table, to return said table to an elevated position at a rate of speed greater than the speed of descent.

9. An apparatus of the character described comprising a framework, a substantially horizontally disposed table movable vertically with respect to said framework, mechanism for raising and lowering said table including a drive shaft and two electrically driven prime movers operatively connected thereto, means for controlling one of said prime movers to cause said table to descend at a predetermined rate of speed, a stop for arresting one side of said table during its descent thereby to tilt said table and permit discharge of the articles thereon by gravity from the opposite side, electrical contacts adapted to be automatically actuated when tilting of said table occurs to energize the second prime mover and rotate said drive shaft at an increased rate of speed, and means for driving said shaft at an increased rate of speed to cause said table to ascend at a faster rate of speed than the speed of descent.

10. An apparatus of the character described comprising a framework, a substantially horizontally disposed table movable vertically with respect to said framework, said table having a multiplicity of anti-friction wheels arranged in closely staggered relation and forming a support for articles to be received on said table, mechanism for raising and lowering said table including a drive shaft and two electrically driven prime movers operatively connected thereto, means for controlling one of said prime movers to cause said table to descend at a predetermined rate of speed, a stop for arresting one side of said table during its descent thereby to tilt said table and permit discharge of the articles resting on said anti-friction wheels by gravity from the opposite side, electrical contacts adapted to be automatically actuated when tilting of said table occurs to energize the second prime mover and rotate said drive shaft at an increased rate of speed, and means for driving said shaft at an increased rate of speed to cause said table to ascend at a faster rate of speed than the speed of descent.

11. An apparatus of the character described comprising a framework, a support movable vertically in said framework, a table resting on said support, a plurality of screw shafts connected to said support for raising and lowering the same, a prime mover operatively connected to said shafts and adapted to rotate the same at a speed whereby said support and table will be lowered at a rate to position the top of an article received thereon below the plane of discharge of a succeeding article to be stacked thereon, means carried by said framework and interposed at predetermined points in the path of descent of said table for supporting the same at an inclined angle independently of said support thereby to discharge the article in stacked relation from the table, and interengaging guides on said support and table for accurately positioning said table on said support during ascent of said support.

12. An apparatus of the character described comprising a framework, a support movable vertically in said framework, a table resting on said support, a plurality of screw shafts connected to said support for raising and lowering the same, a prime mover operatively connected to said shafts and adapted to rotate the same at a speed whereby said support and table will be lowered at a rate to position the top of an article received thereon below the plane of discharge of a succeeding article to be stacked thereon, means carried by said framework and interposed at predetermined points in the path of descent of said table for supporting the same at an inclined angle independently of said support thereby to discharge the articles in stacked relation from the table, means for accelerating the descent of the support during the tilting of the table with respect thereto, and interengaging guides on said support and table for accurately positioning said table on said support during ascent of said support.

13. An apparatus of the character described comprising a framework, a support movable vertically in said framework, a table resting on said support, a plurality of screw shafts connected to said support for raising and lowering the same, a prime mover operatively connected to said shafts and adapted to rotate the same at a speed whereby said support and table will be lowered at a rate to position the top of an article received thereon below the plane of discharge of a succeeding article to be stacked thereon, means carried by said framework and interposed at predetermined points in the path of descent of said table for supporting the same at an inclined angle independently of said support thereby to discharge the article in stacked relation from the table, a second prime mover adapted to be operatively connected to said screw shafts to rotate the same at a higher speed, and means for connecting said second prime mover to said screw shafts during the tilting of the table with respect to said support to accelerate the tilting operation.

14. An apparatus of the character described comprising a framework, a substantially horizontally disposed support, a table carried by and

tiltable vertically with respect to said support, said table being adapted to accumulate a plurality of articles in stacked relation thereon, mechanism operatively connected to said support for raising and lowering the support and table, a prime mover for actuating said mechanism to lower said support and table, means for varying the speed of said prime mover whereby said support and table may be lowered at a rate to position the top of an article received thereon below the plane of discharge of a succeeding article to be stacked thereon, means carried by the framework and interposed at a predetermined point in the path of descent of said table to tilt the same with respect to said support and thereby discharge the articles from the table, a second prime mover adapted to be connected to said mechanism to raise said support and table at a rate of speed greater than the rate of descent, and means actuated by the articles discharged from said table to prevent operation of said second prime mover to return the support and table until all the articles have been discharged therefrom.

15. An apparatus of the character described comprising a framework, a support movable vertically in said framework, a table resting on said support, means connected to said suport for raising and lowering the same and having means adapted to actuate the first-named means to lower said support and table at a rate to position the top of an article received thereon below the plane of discharge of a succeeding article to be stacked thereon, means carried by said framework and interposed at predetermined points in the path of descent of said table for supporting the same at an inclined angle independently of said support thereby to discharge the article in stacked relation from the table, and interengaging guides on said support and table for accurately positioning said table on said support during ascent of said support.

16. An apparatus of the character described comprising a pair of spaced vertical frameworks, a support intermediate said frames, a table carried by and movable with respect to said support, means in said vertical frameworks for raising and lowering said support and table, means engageable with the table for supporting the same independently of said support, and means between said table and support for accurately positioning said table on said support during ascent of said support.

17. An apparatus of the character described comprising a substantially horizontally disposed table, said table being adapted to accumulate a plurality of articles in stacked relation thereon, means for moving said table vertically to lower said table at a rate whereby the top of an article received thereon will be below the plane of discharge of a succeeding article to be stacked thereon, means for accumulating a predetermined number of articles on said table, means for increasing the speed of descent of said table after a predetermined number of articles have been accumulated thereon, and means for tilting said table at a predetermined point of descent to discharge the accumulated articles in stacked relation.

18. An apparatus of the character described comprising a pair of spaced vertical frames, a vertically disposed screw spindle journalled in each frame, a substantially horizontally disposed table arranged intermediate said supports and having the end portions thereof operatively connected to said screw spindles, means for rotating said spindles to raise and lower said table and to cause said table to descend at a predetermined rate of speed, means for arresting a side edge of said table at a predetermined position during the descent thereof while permitting the opposite side edge to continue its descent to thereby tilt said table and discharge the articles thereon, means for accelerating the descent of the table during the tilting thereof, and means for rotating said spindles at a higher speed during the ascent of the table than during descent thereof.

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