J. C. MORGAN AND C. S. SCHROEDER.

FREIGHT HANDLING TRUCK.

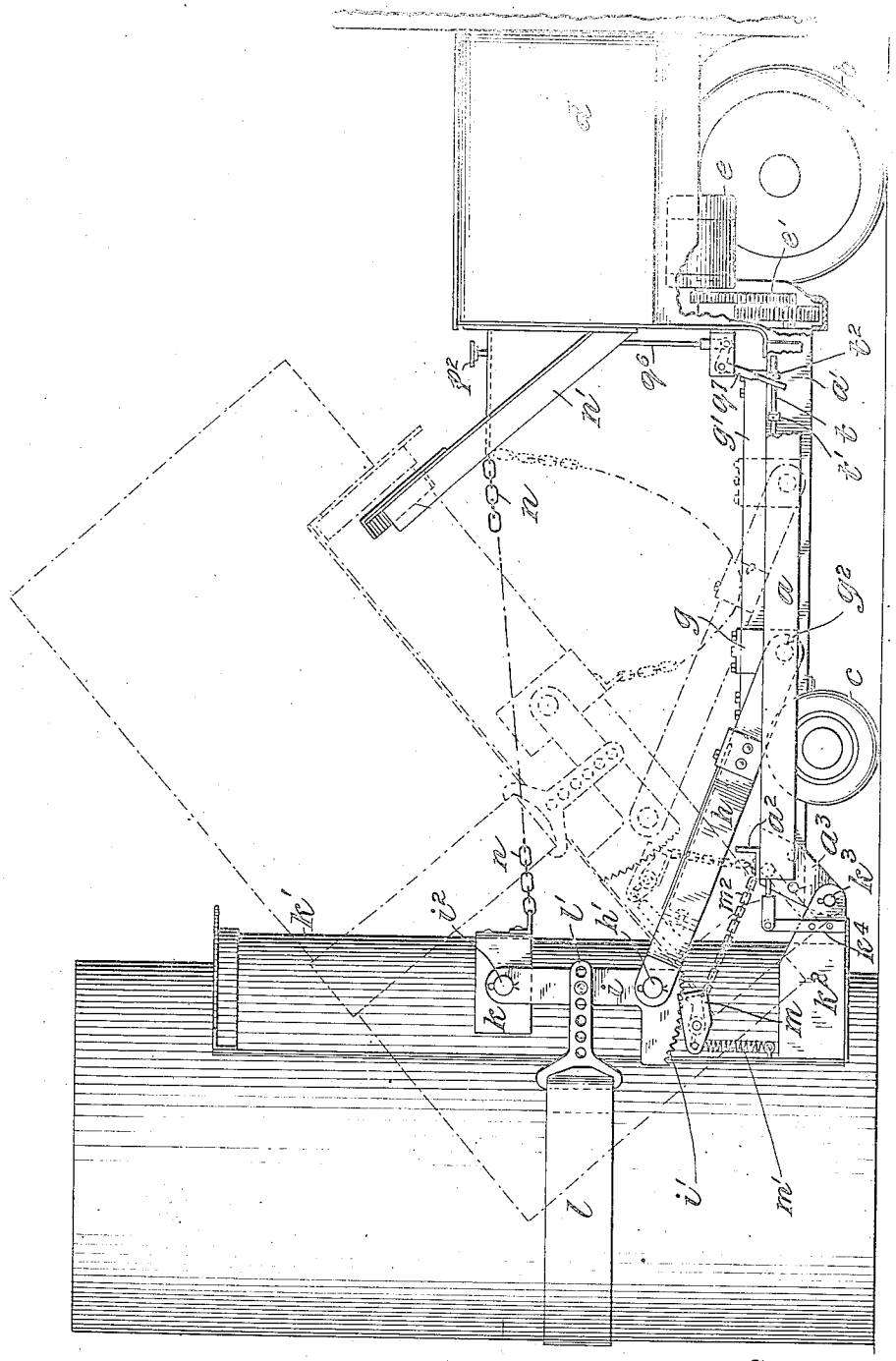
APPLICATION FILED MAY 6, 1920.

1,379,472.

Patented May 24, 1921.

5 SHEETS—SHEET 1.

Fig. 1.



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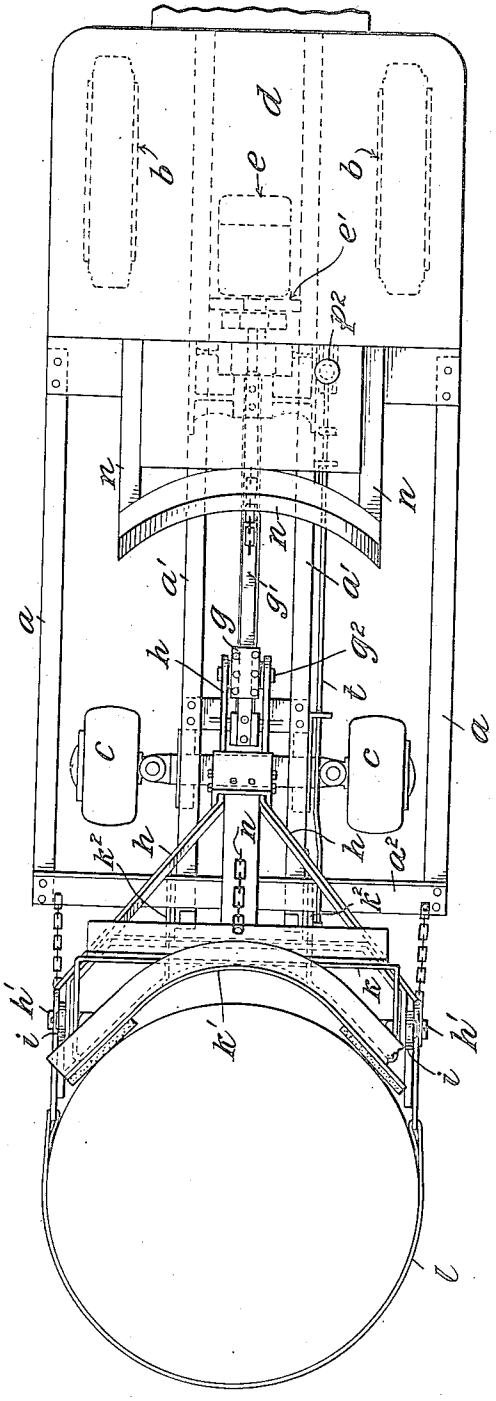
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3 SHEETS—SHEET 2.

Fig. 2.



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5 SHEETS—SHEET 3.

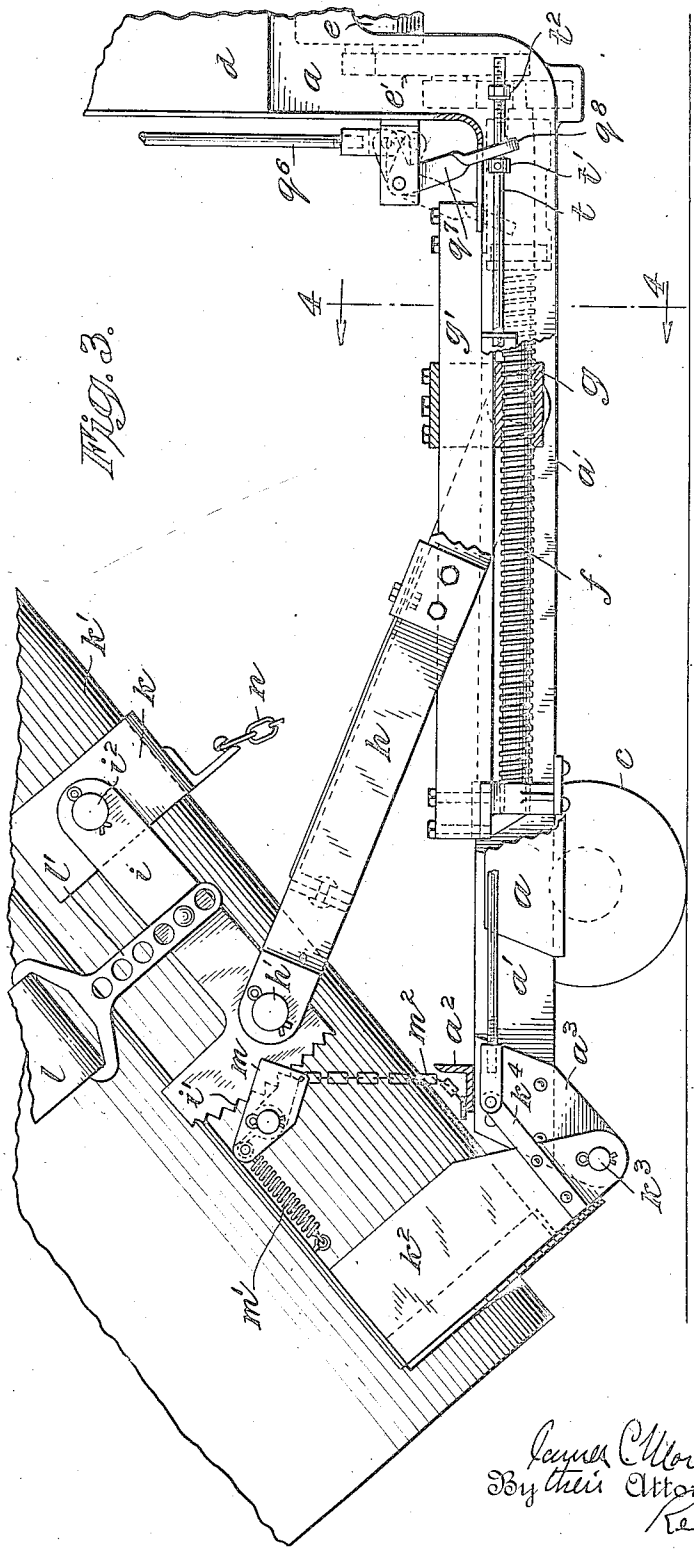


Fig. 3.

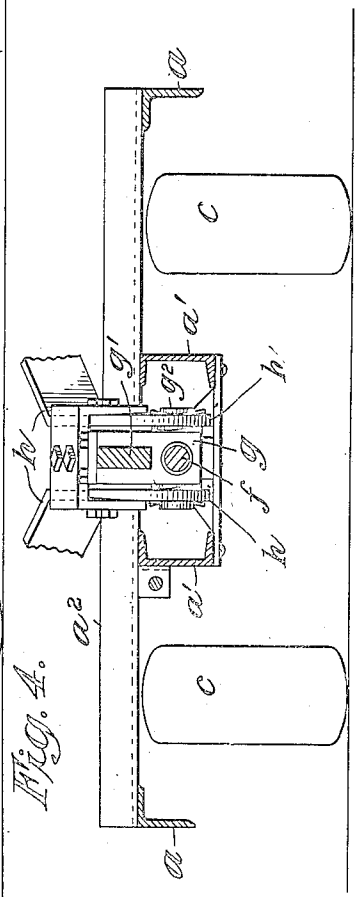


Fig. 4.

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5 SHEETS—SHEET 4

Fig. 5.

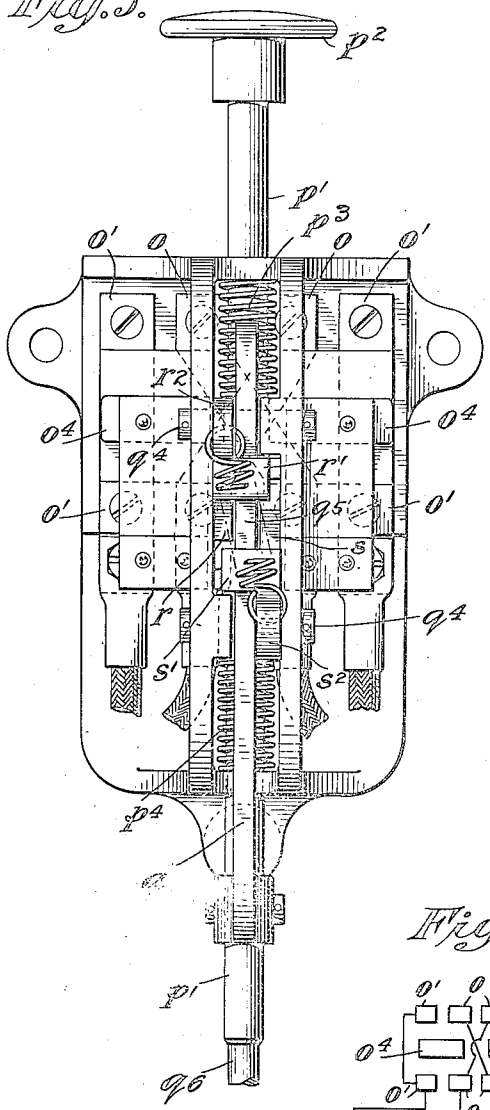


Fig. 6.

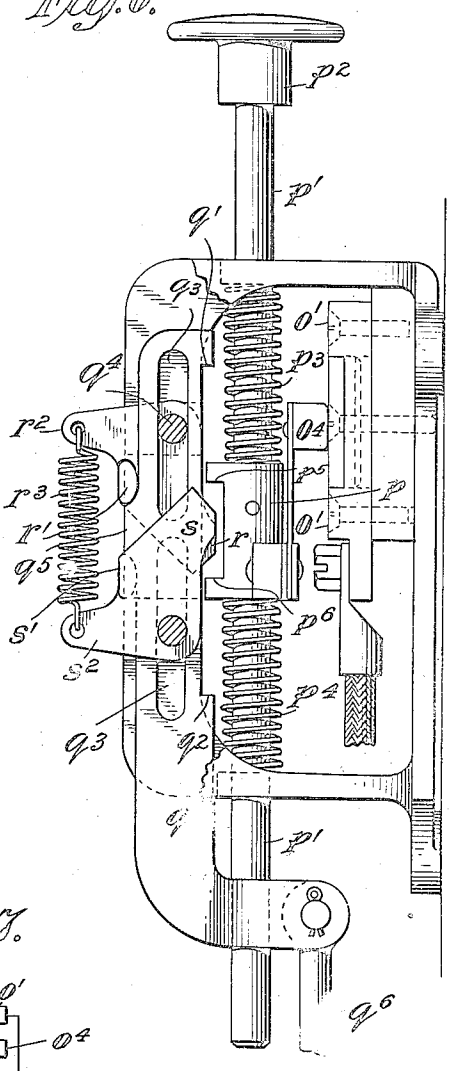
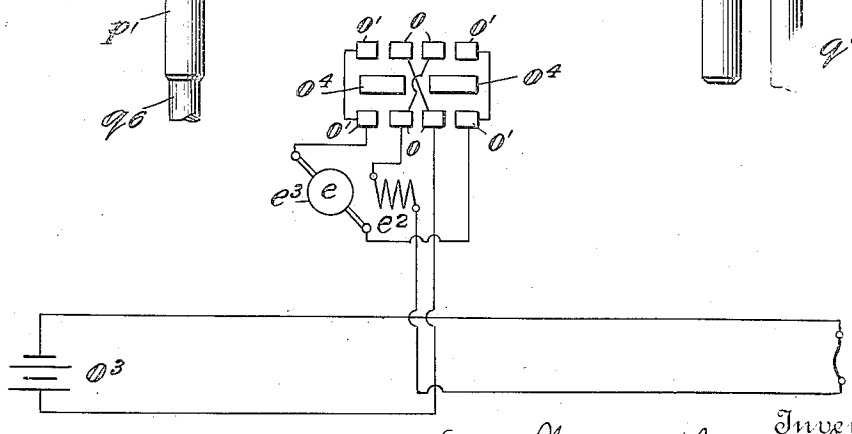


Fig. 7.



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5 SHEETS—SHEET 5

Fig. 8.

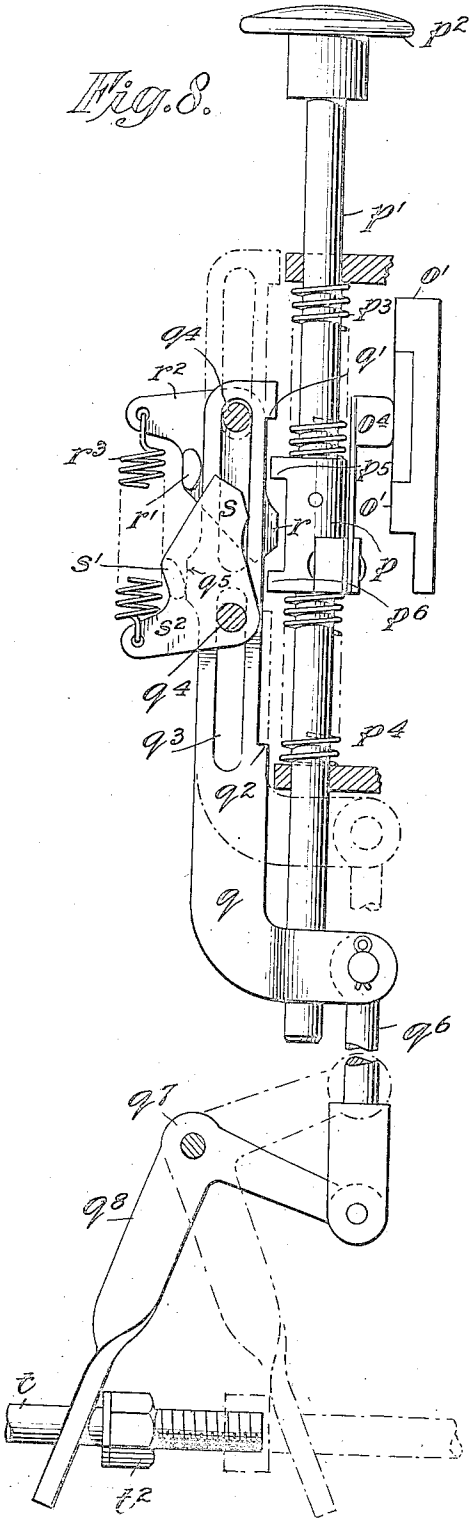
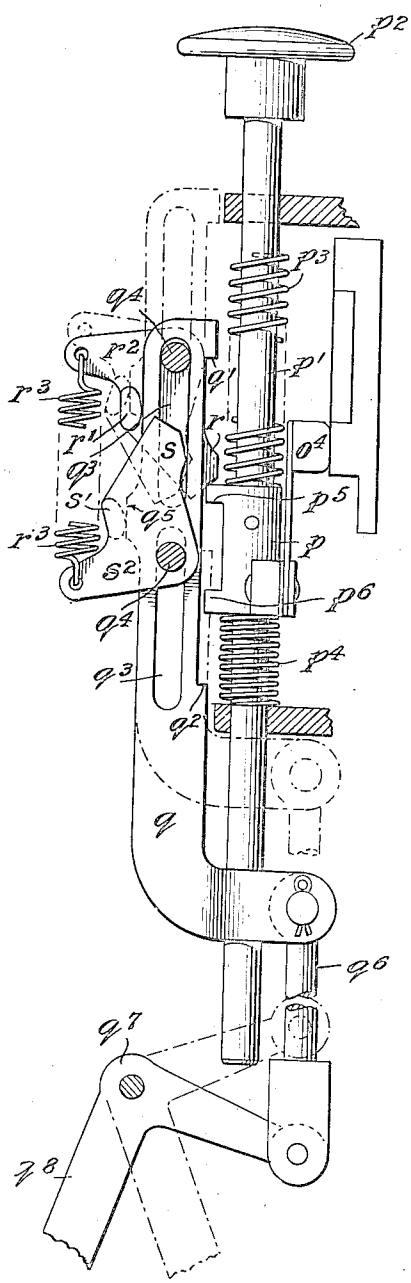


Fig. 9.



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UNITED STATES PATENT OFFICE.

JAMES C. MORGAN AND CHARLES S. SCHROEDER, OF NEW BRIGHTON, NEW YORK, ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE YALE & TOWNE MANUFACTURING COMPANY, OF STAMFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

FREIGHT-HANDLING TRUCK.

1,379,472. Specification of Letters Patent. Patented May 24, 1921.

Application filed May 3, 1920. Serial No. 379,776.

To all whom it may concern:

Be it known that we, JAMES C. MORGAN and CHARLES S. SCHROEDER, citizens of the United States, residing at New Brighton, in the borough of Richmond of the city of New York, in the State of New York, have invented certain new and useful Improvements in Freight-Handling Trucks, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

This invention relates to trucks such as are use for the handling of freight in freight sheds and on piers and for the transportation of heavy articles in industrial establishments. It has been developed with particular reference to its use in connection with motor driven trucks of this character and the embodiment herein illustrated has been designed for the handling of heavy rolls of print paper, although it is capable of use in the same or in slightly modified form for the handling of various other articles and packages of goods. The invention has particularly in view the provision of means for picking up from the floor a heavy article such as a roll of print paper, shifting it to a position suitable for transportation, and setting it back on the floor at the point desired. The invention will be more fully explained hereafter with reference to the accompanying drawings in which it is illustrated and in which—

Figure 1 is a view in side elevation of so much of a truck as is necessary to enable the invention to be understood, a portion of the casing being broken out.

Fig. 2 is a top view of the same.

Fig. 3 is a detailed fragmentry view, partly broken out, showing in different positions some of the parts shown in Fig. 1 but on a larger scale.

Fig. 4 is a view in section on the plane indicated on the broken line 4—4 of Fig. 3.

Fig. 5 is a detailed view in elevation of the limit switch for controlling the motor employed as the source of power for picking up the article to be transported.

Fig. 6 is a view of the same in side elevation, some parts being broken away.

Fig. 7 is a diagrammatic view of the wiring connections of the limit switch and the motor.

Figs. 8 and 9 are fragmentary views showing parts of the limit switch in different positions.

The truck to which the invention is applied has a frame a, suited to the requirements of the work, motor and steering wheels b, carrying wheels c which may be cross-connected to the motor wheels b, and a storage battery box d.

A motor, e, receiving current from the storage battery through the limit switch, as hereinafter described, drives, through suitable gearing e', shown in Fig. 1, a screw shaft f, mounted in suitable bearings carried by the frame a and the supplemental frame a'. A traveling nut g, engaged by the screw f, is mounted to slide on a guide bar g' and has pivoted thereto, as at g^2, a forked connecting rod h.

The arms of the forked connecting rod h are pivotally connected, one at each side, as at h', to clamping arms i provided each with a toothed sector as at i', and pivoted as at i^2, on a plate k fixed to an apron or carrier k' which is suited to the form of the articles to be handled, such as rolls of paper or drums or barrels or other articles. The apron k' has secured at its lower end plates or arms k^2 which are pivoted, as at k^3, to brackets a^3, carried by the supplemental frame a'. The arms k^2 are preferably raised somewhat above the floor and are extended somewhat beyond the apron k' so that when the article to be transported is grasped and tilted, as hereafter described, its edge shall be lifted at once clear of the floor.

A strap l, provided at one or at each end with a takeup l', is engaged at each end with the corresponding arm i and is adapted to encircle the article to be transported, when the truck has been placed in proper relation thereto, and to hold it to the apron k'.

A dog m pivoted to the apron k', one at each side, is normally held by a spring m' in engagement with the sector i' of the corresponding arm i and is held out of engagement therewith, when the parts are in the position shown in Fig. 1, by a chain m^2 connected to the cross bar a^2 of the supplemental frame a'. A chain n may be connected at one end to the apron k' and at the other end to a fixed arm n', to limit the

movement of the apron k' in one direction, while the arm n' secured to the frame, may form a support for the apron and the load when they are tilted, as shown by broken lines in Fig. 1.

It will be obvious that the screw shaft f might be turned by hand or any suitable means and the operation of parts already referred to will therefore be described before an explanation of the devices for controlling the motor e is entered into. It being assumed that the roll of paper or other article to be transported stands upon the floor, as shown in Fig. 1, the truck is moved into such relation therewith that the strap l can be placed about the roll and fastened to the arms i. The apron k' being vertical at this time, the dogs m are held by the chains m^2 out of engagement with the sectors i', so that the arms are free to be moved by the shaft in either direction as may be required by convenience in securing the strap l. If power be now applied to the shaft f to draw the nut g away from the apron k' the first effect is, through the connector h and the arms i, to draw the strap tightly about the paper roll and the latter snugly into the apron k'. Continued rotation of the shaft in the same direction then causes the apron k' to be tilted on the fulcrum of the pivots k^3, raising the paper roll from the floor and eventually bringing it into the position shown by broken lines in Fig. 1 at rest against the support n', in a position suitable for transportation. It will be seen that as soon as the tilting of the apron k' begins, the chains m^2 will be slacked and the dogs m will be drawn by the springs m' into operative relation with the sectors i' so that the arms i can not thereafter move to relax the grip of the band or strap l on the paper roll. When the truck has been moved with its load to the place where the load is to be deposited the screw shaft f is rotated in the opposite direction to move the apron and the load from the tilted position to the vertical position. As soon as the apron and load reach the vertical position the dogs m are drawn by the chains m^2 out of engagement with the toothed sectors i' and the band or strap l is then relaxed by the movement of the arms i so that the band can be cast off from the arms and the paper roll released.

When the means for tightening the band l and for tilting the apron or carrier k' with its load are motor operated, and when the article to be transported is of great weight, as a roll of print paper, it is desirable that the motor be controlled automatically through the movement of the carrier so that it shall with certainty be stopped preferably before the carrier and its load reach the position of rest on the support n', for the purpose of avoiding the breakage of parts likely to occur if the motor continues to run after the load has reached a position of rest. This purpose is accomplished conveniently by the provision of a limit switch, operated by the movement of the carrier to stop the motor without requiring the attention of the operator, and operated by hand to start the motor. The position of the switch is indicated and some of the co-acting parts are shown in Figs. 1, 2 and 3 of the drawings, while the construction of a switch suitable for the purpose is shown in detail in Figs. 5, 6, 8 and 9, the wiring of the switch, motor and battery being shown diagrammatically in Fig. 7. The switch shown has a series of fixed contacts o and a series of fixed contacts o', suitably connected to the field coils e^2 and the armature coils e^3 of the motor e, and to the battery o^3, in a manner common to controllers for electric motors and as clearly indicated in Fig. 7. The switch also has a pair of movable contacts o^4, adapted to bridge the contacts o and o' and carried by the sleeve p which is secured to a rod p' mounted to slide vertically in the frame and provided with a suitable handle p^2. The coiled springs p^3 and p^4 act in opposition to each other upon the sleeve p to restore the sleeve and the contacts o^4 to the middle or normal position, indicated in Figs. 5, 6 and 8, when the rod is released after movement in one direction by the hand or in the other direction by the carrier. The sleeve p has upper and lower lugs p^5 and p^6 for coöperation with a slide q and with beveled stops r and s. The slide q is formed with upper and lower shoulders q' and q^2 for coöperation with the lugs p^5 and p^6 respectively and is slotted, as at q^3, for cooperation with pins q^4. The slide is also provided with a cam q^5 for coöperation with lugs r' and s' formed on the bell crank levers r^2 and s^2 which carry respectively the beveled stops r and s and are pivoted on pins q^4. The horizontal arms of the two bell cranks are connected by a spring r^3.

At its lower end the slide q is connected by a rod q^6 with a bell crank q^7, one arm q^8 of which is slotted or apertured to engage loosely a rod t which is supported for endwise movement in suitable guides on the frame and is connected to a bar k^4 secured to one of the arms k^2 of the carrier k'. The rod has two collars t' and t^2, one of which may be adjustable as shown and the arm q^8 of the bell crank q^7 stands between these two collars, so that when the carrier k' is tilted to extreme position, as shown in Figs. 1 and 3, and the rod t is moved to the right, as shown by full lines in Fig. 3, the collar t' strikes the arm q^8 and moves it from the position shown by broken lines in Fig. 3 to the position shown by full lines, at the same time, through the rod q^6, moving the slide q up from the position shown by full lines in

Figs. 5, 6, and 8. The effective movement of the slide q takes place shortly before the carrier k' leaves its position of rest and effects, as will be explained, a movement of the sleeve p sufficient to place the contacts o^4 in neutral position, thereby breaking the current to the motor and stopping the motor. As will be explained, the rod p' is now locked against downward movement and can only be moved upward by the operator for the purpose of starting the motor in the opposite direction.

The action of the beveled stops r and s, in coöperation with the lugs p^5 and p^6, is sufficient to prevent movement of the sleeve p and rod p' under the influence of either spring p^3 or p^4, but is not sufficient to prevent the movement of the sleeve p and the rod p' when forced, the spring r^3 then permitting either stop r or s to be thrust back by the lug p^5 or the lug p^6, as the case may be. Furthermore, the stop s is held in its retracted position, shown in Figs. 8 and 9, by the coöperation of the cam q^5 of the slide q with the lug s' of the bell crank s^2, when the slide q is in its lowest position, and similarly the beveled stop r is held in its retracted position by the coöperation of the cam q^7 with the lug r' when the slide is in its highest position.

In describing the operation of the limit switch it will be assumed that the parts are first in the position shown in Fig. 8, with the contacts o^4 in the neutral position. The truck being then backed up to the roll of paper and the band l having been placed about the same and connected to the levers i, the operator, by the pressure of his hand on the handle p^2, depresses the rod p' from the position shown in Fig. 8 to the position shown in Fig. 9 and thereby moves the lug p^5 past the beveled stop r, compressing the spring p^4 and moving the contacts o^4 to the position indicated in Fig. 9, in which the circuit through the motor e is completed.

The rotation of the screw shaft f is thus commenced and, as already described, the first effect of the movement of the traveling nut g is to move the levers i so as to tighten the band l about the roll, the levers i being held in their new position by the dogs m as soon as the tilting of the carrier k' begins and the chains m^2 are slacked. The tilting movement of the carrier k' continues until the carrier approaches the rest n'. The longitudinal movement of the rod t to the right, in Fig. 3, continues during the tilting movement of the carrier and at the last of such tilting movement the collar t' on the rod t strikes the arm q^8 of the bell crank q^7 and throws the slide q from the position shown in full lines in Figs. 6, 7, 8 and 9, to the position indicated by broken lines in Figs. 8 and 9. This movement of the slide causes the beveled stop r to be withdrawn from the path of the lug p^5 and permits the rod p' to be raised by the expansion of the spring p^4, this movement of the rod p' shifting the contacts o^4 again to normal position and thereby opening the circuit of the motor. The downward movement of the rod p', either by inadvertence on the part of the operator or by accident, is then prevented by the fact that the shoulder q' then stands closely under the lug p^6 and prevents any effective downward movement. Also by the upward movement of the slide q the beveled stop r' is withdrawn from operative position and the beveled stop s is permitted to move into operative position, accidental or unpremeditated upward movement of the rod p' being thus prevented. When the truck has been moved to the place where the load is to be deposited the operator, by application of his hand to the handle p^2, pulls the rod p' upward, the lug p^6 sliding past the beveled stop s. By this movement of the rod p' the contacts o^4 are shifted so as to throw current on the motor but in reverse, thereby restoring the carrier k' gradually to its vertical position, placing the load on the floor, and, by the tightening of the chains m^2, withdrawing the dogs m from the toothed sector i' so that the band l is relaxed and can be cast off. Furthermore, when the carrier k' moves back toward the vertical position the collar t^2 on the rod t strikes the arm q^8, and as the carrier k' reaches the vertical position, or shortly before, causes the slide q to be pulled down and, through co-action of the shoulder q' with the lug p^5, to restore the contacts o^4 to neutral position, the downward movement of the rod being assisted by the expansion of the spring p^3, previously compressed by the upward movement of the rod p'. The downward movement of the slide causes the beveled stop r to move into operative position. When the contacts o^4 are in neutral position the rod p' is balanced between the two springs p^3 and p^4 and is held yieldingly against accidental or unpremeditated movement by the beveled stop r.

It will be understood that various changes in details of construction and arrangement, not only of the limit switch but of the mechanism for grasping and tilting the load, may be made to suit the convenience of the manufacturer or the requirements of use and that the invention is not limited to the particular construction shown and described herein, except as pointed out in the claims.

We claim as our invention:

1. The combination of a supporting frame, a carrier pivoted on the frame, devices to secure the article to be handled to the carrier and means to tilt the carrier, and also clamp and secure the article to the carrier.

2. The combination of a supporting frame, a carrier pivoted on the frame, devices to secure to the carrier the article to be handled and means acting upon and through said devices to cause said devices to bind the article to the carrier and to tilt the carrier on the frame.

3. The combination of a supporting frame, an apron mounted on the supporting frame, an arm pivoted on the apron, a band connected to said arm and adapted to draw into the apron the article to be handled, and means to swing the arm on the apron to tighten the band.

4. The combination of a supporting frame, an apron pivotally mounted on the frame, an arm pivoted on the apron, a band connected to said arm and adapted to draw into the apron the article to be handled, and means to swing the arm on the apron to tighten the band and to tilt the apron on the frame.

5. The combination of a supporting frame, an apron mounted on the frame, an arm pivoted on the apron, a band connected to said arm and adapted to draw into the apron the article to be handled, means to swing the arm on the apron to tighten the band, and a dog to engage the arm and prevent its movement to relax the band.

6. The combination of a supporting frame, an apron pivotally mounted on the frame, an arm pivoted on the apron, a band connected to said arm and adapted to draw into the apron the article to be handled, means to swing the arm on the apron to tighten the band and to tilt the apron on the frame, and a dog to engage the arm and to prevent its movement to relax the band.

7. The combination of a supporting frame, an apron pivotally mounted on the frame, an arm pivoted on the apron, a band connected to said arm and adapted to draw into the apron the article to be handled, means to swing the arm on the apron to tighten the band and to tilt the apron on the frame, a dog to engage the arm, means to hold the dog normally in engagement with the arm, and means acting in a definite position of the apron to hold the dog in inoperative position.

8. The combination of a supporting frame, an apron pivotally mounted on the frame, an arm pivoted on the apron, a band connected to said arm and adapted to draw into the apron the article to be handled, means to swing the arm on the apron to tighten the band and to tilt the apron on the frame, a dog to engage the arm, means to hold the dog normally in engagement with the arm, and a chain connected to the dog and to the frame and acting when it is drawn taut by the movement of the apron to hold the dog in inoperative position.

9. The combination of a supporting frame, a carrier pivoted on the frame, the said carrier having an open lower or rear end, means carried by the carrier for clamping and holding the article to be handled, a screw shaft, a traveling nut connected to the carrier and also to the clamping means whereby the latter will be actuated to clamp the article to the cradle and the latter then tilted to lift the article from the floor.

10. The combination of a supporting frame, a carrier pivoted on the frame, devices to secure to the carrier the article to be handled, a screw shaft, a traveling nut and a connection from the nut to said devices to bind the article to the carrier and to tilt the carrier on the frame.

11. The combination of a supporting frame, an apron mounted on the frame, an arm pivoted on the apron, a band connected to said arm and adapted to draw into the apron the article to be handled, a screw shaft, a traveling nut, and a connection from the nut to said arm.

12. The combination of a supporting frame, an apron pivotally mounted on the frame, an arm pivoted on the apron, a band connected to said arm and adapted to draw into the apron the article to be handled, a screw shaft, a traveling nut, and a connection from the nut to said arm.

13. The combination of a supporting frame, forwardly projecting carrier arms secured to the carrier adjacent the lower end of the latter and pivoted at their front ends to the supporting frame, means including a motor to tilt the carrier on the frame, a switch to control the motor, and devices connected at one end to one of said arms and connected at its other end to switch actuating means whereby the latter will be actuated by the upward movement of said connecting arm to stop the motor when the carrier has reached its normal carrying position.

14. The combination of a supporting frame, forwardly projecting arms secured to the carrier and pivoted at their front ends to the supporting frame, means including a motor to tilt the carrier on the frame, a switch to control the motor, a device connected at one end to one of said arms and connected at its other end to switch actuating means whereby the latter will be actuated by the upward movement of said connecting arm to stop the motor when the carrier has reached its normal carrying position and hand actuated devices to operate the switch to start the motor.

15. The combination of a supporting frame, a carrier pivotally mounted on the frame, an arm pivoted on the carrier, a band connected to said arm and adapted to draw into the carrier the article to be handled, means including a motor to swing the arm on the apron to tighten the band and to tilt

the carrier on the frame, a switch to control the motor, and devices actuated by the movement of the carrier to operate the switch to stop the motor.

16. The combination of a supporting frame, a carrier having forwardly projecting arms, brackets depending from the carrier and to which said arms are pivoted in a plane below the supporting frame, a screw shaft, a traveling nut, a connection from the nut to the carrier, a motor to drive the screw shaft, a switch to control the motor, and devices connected with one of said forwardly projecting arms on the carrier to operate the switch to stop the motor.

This specification signed this 7th day of May A. D. 1920.

JAMES C. MORGAN.
CHARLES S. SCHROEDER.