

APPLICATION FILED MAY 22, 1920.

Patented Dec. 5, 1922.
3 SHEETS—SHEET 1.



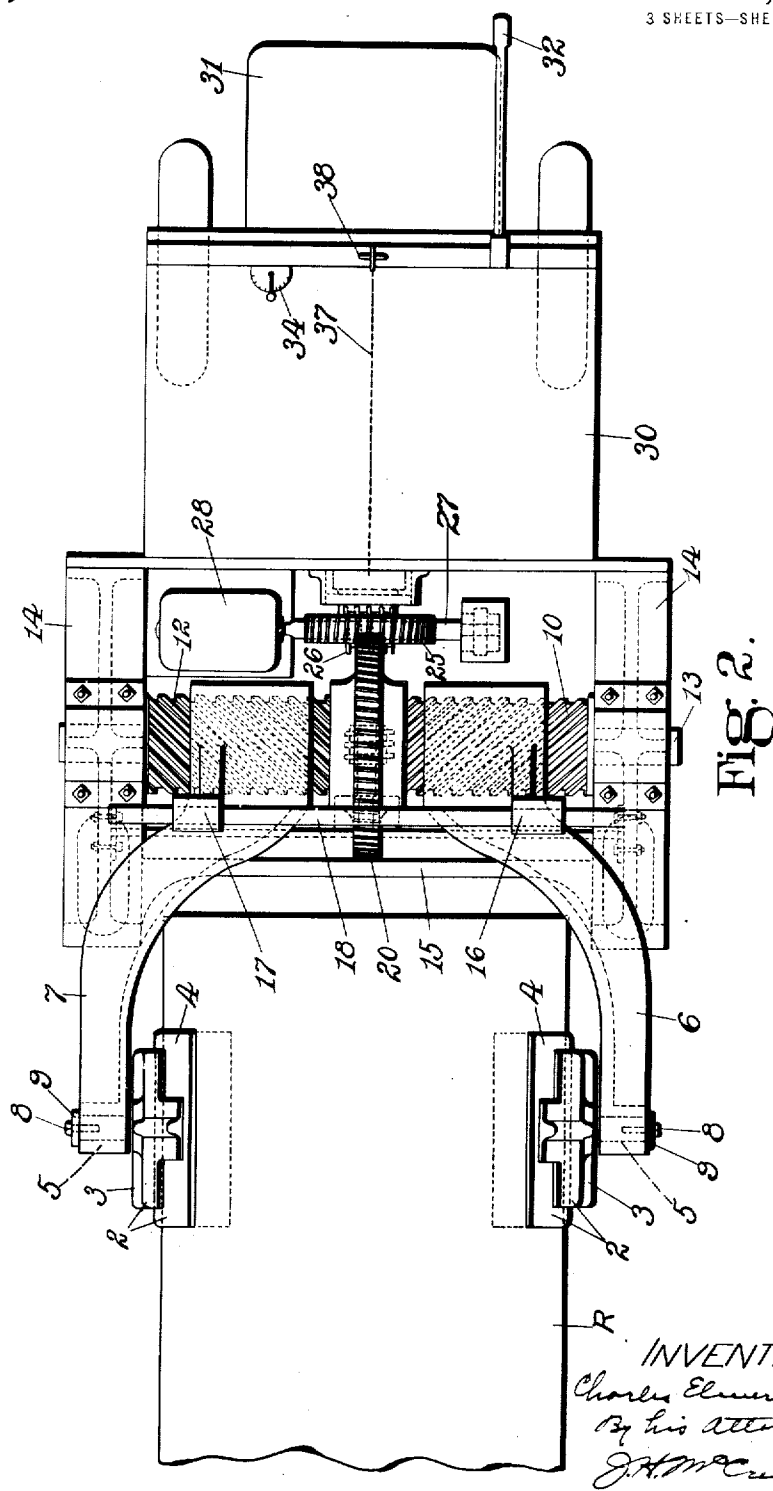
INVENTOR.
Charles Elmer Pope,
By his Attorney,
J. W. Crook.

UPENDER.

1,437,547.

Patented Dec. 5, 1922.

3 SHEETS—SHEET 2.

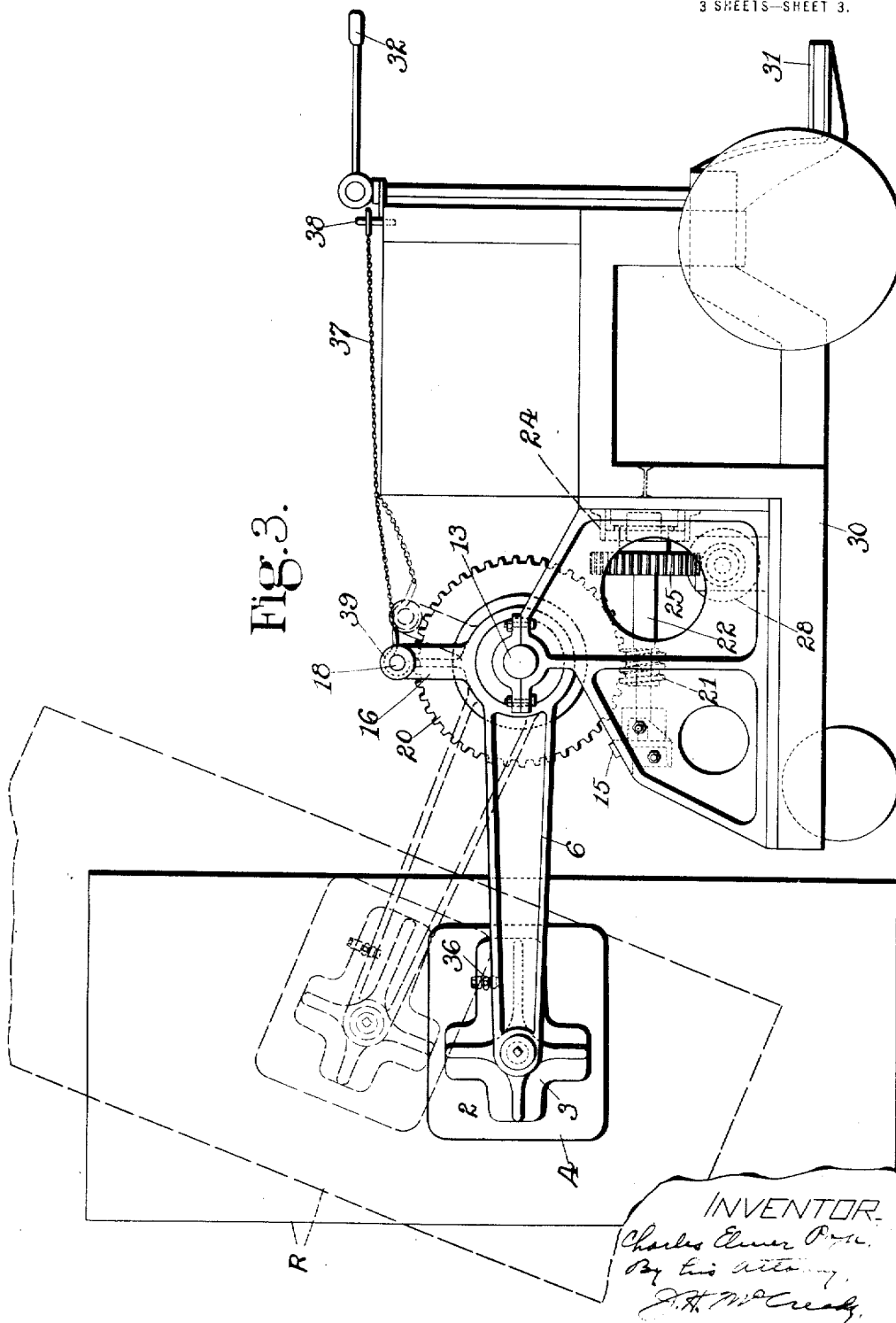


INVENTOR.
Charles Elmer Cox,
By his Attorney,
J. H. McCurdy.

1,437,547.

C. E. POPE.
UPENDER,
APPLICATION FILED MAY 22, 1920.

Patented Dec. 5, 1922.
3 SHEETS—SHEET 3.



UNITED STATES PATENT OFFICE.

CHARLES ELMER POPE, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNOR TO GREAT NORTHERN PAPER COMPANY, OF MILLINOCKET, MAINE, A CORPORATION OF MAINE.

UPENDER.

Application filed May 22, 1920. Serial No. 383,526.

To all whom it may concern:

Be it known that I, CHARLES ELMER POPE, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented certain Improvements in an Upender, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to machines for handling heavy bulky articles, and it is especially concerned with the problem of handling large rolls of paper. The web of paper delivered by a paper making machine is wound up into a large roll which is wrapped and sealed preparatory to being shipped. Frequently these rolls are five or six feet in height, three feet or more in diameter, and weigh in the neighborhood of a thousand pounds. Consequently, it is not an easy matter to handle them. The rolls are delivered from the paper making machine in a horizontal position and it is necessary to set them up on end in order to economize floor space. They must also be transported from one part of the plant to another and to the cars in which they are to be shipped. It is the chief object of the present invention to devise an apparatus with which this handling and transporting of bulky rolls of paper can be conveniently accomplished.

The nature of the invention will be readily understood from the following description when read in connection with the accompanying drawings, in which

Figure 1 is a side elevation of a machine embodying the invention in the form at present preferred;

Fig. 2 is a plan view of the machine shown in Fig. 1; and

Fig. 3 is a view similar to Fig. 1 but showing the machine in a different position.

The construction shown comprises two grippers 2—2 mounted to engage opposite sides of the roll R of paper to be handled. Each gripper preferably consists of a casting or body portion 3 with a heavy sheet metal part 4 secured thereto, and each gripper is curved to fit approximately the curvature of the roll of paper. Each of the members 3 is provided with a short shaft 5 and

these shafts are rotatably mounted in the forward ends of arms 6 and 7, respectively. For the purpose of holding these grippers on the arms a bolt 8 is threaded into the end of each shaft and bears against a large washer 9 that overlies the face of the arm opposite the gripper. This construction enables the grippers to swing freely on their respective arms 6 and 7.

These arms are of very heavy, sturdy construction, as shown in the drawings, and the end portions of these arms opposite the grippers are internally threaded to receive oppositely threaded members 10 and 12 fixed securely on a shaft 13 that is mounted in suitable bearings in the frame members 14. This construction enables the arms 6 and 7 to move toward and from each other when the shaft 13 is rotated, the direction of this movement depending, of course, upon the direction of rotation of the shaft, and it also enables the arms to swing upward and downward relatively to the shaft 13. Normally, due to the manner in which the arms are mounted, they rest on a bar 15 that connects the opposite frame members 14. In order to make the arms swing in unison, they are provided with upwardly extending projections 16 and 17, respectively, Fig. 2, which are drilled horizontally to receive a long bar 18.

For the purpose of rotating the shaft 13, a worm wheel 20 is mounted fast thereon and meshes with a worm 21 keyed to a shaft 22 supported in bearings 23 and 24, respectively, in the frame 14. This shaft lies below and at right angles to the shaft 13 and it has secured fast thereto a worm wheel 25 meshing with a worm 26 fast on a shaft 27 which is driven by an electric motor 28.

This entire apparatus is mounted on an auto truck 30 which may be of any suitable type. That shown is of the electrically driven type much used in railway stations, warehouses and the like. It is provided with a platform 31 on which the operative stands and with a lever 32 by which he controls and steers the truck. The details of the operating and driving mechanism of the truck are not shown since these details of construction form no part of the present invention and any suitable form of truck can be used. The electrically driven type, however, has the advantage that it is easy to

control, simple to operate, and provides a convenient source of power for the motor 28. The operation of this motor may be governed by a controller 34.

5 Assuming now that it is desired to upend a roll of paper lying in a horizontal position, the truck is advanced toward the end of the roll with the arms 6 and 7 in their lower positions, as shown in Fig. 1, the axes on which the grippers 2—2 turn being, in this position of the arms, approximately level with the axis of the roll R. The grippers at this time are separated by a distance greater than the diameter of the roll so that they pass freely over the opposite sides of the roll into the position shown in Fig. 2. The motion of the truck is stopped when the parts are in substantially the position shown in the latter figure and the motor 28 is then set into operation by a movement of the controller handle 34. This motor is driven in the proper direction to force the arms 6 and 7 toward each other and thus cause the grippers 2—2 to move into engagement with the opposite sides of the roll. It will readily be appreciated that the operating mechanism for these arms is such that it will exert a very powerful action to force the arms toward each other and thus cause the grippers to exert a heavy compressing or gripping action on the roll. It will also be observed that these arms are both free to swing upwardly, that is, in a clockwise direction about the axis of the shaft 13, as the parts appear in Figs. 1 and 3, and that the direction of rotation of the shaft 13 is such that when the movement of the arms toward each other is stopped by the compression of the roll between the grippers, the further rotation of the shaft 13 produces such an upward movement, thus lifting the end of the roll held between the grippers. The continued upward movement of the arms draws the truck and the roll R toward each other, or the truck may be started up slowly at this time and advanced toward the roll, the result of these operations being to raise the roll from a horizontal position, as it appears in full lines in Fig. 1, into an upright position, as shown in dotted lines in said figure. In other words, it "upends" the roll.

If, after having upended the roll as just described, it is desired to transfer it to some other point, it is merely necessary to maintain the motor 28 in operation, thus raising the arms 6 and 7 still further and causing them to lift the roll R off the floor. The rotation of the motor 28 may then be stopped by a proper movement of the controller handle and, while the roll is thus held in its elevated position, the truck 30 may be moved in the usual way to carry the load to the desired point. Due to the worm gearing through which the arms 6 and 7 are oper-

ated, the weight of the roll R will be ineffective to reverse the motor. In other words, this driving mechanism being irreversible under the weight of the load will maintain the load in its elevated position. Whenever it is desired to deposit the load, however, it is merely necessary to stop the motion of the truck 30 and move the handle of the controller 34 in the proper direction to reverse the motor 28, when the arms 6 and 7 will be lowered until the roll R rests on the floor. A further lowering movement of the arms at this time is prevented due to the grip of the members 2—2 on the roll, and consequently the next movement of the arms 6 and 7 will be a releasing movement; that is, a movement away from each other to release the hold of the grippers on the roll. Thereafter the arms will drop until further downward movement is arrested by the engagement of the arms 6 and 7 with the bar 15. The truck may then be backed away from the load and driven to any desired location.

It should be noted that the grippers 2—2 are not centrally pivoted. That is, the axis of the pivot on which each gripper is supported is above the center of gravity of the gripper as it appears in Fig. 1. Consequently, the gripper normally assumes the directional position in which it is shown in full lines in this figure due to the influence of gravity. This holds the gripper with the axis of the curvature of its gripping face in a horizontal position where it is ready to pick up a horizontal roll. In some cases, however, it is desirable to use this mechanism for transferring upright rolls from one position to another. For this purpose each gripper is provided with a latch or swinging stop 36 which normally rests against the face of the gripper in an inoperative position. Whenever desired, however, it may be swung into a position at right angles to the gripper, as shown in Fig. 3, where it will rest on the upper surface of one of the arms. This latch is mounted on the heavier side of the gripper so that when the gripper has once been placed in the position shown in this figure it will be held there by gravity. For this work also it is desirable to support the grippers at a different elevation, and this object is conveniently accomplished by providing a chain 37 connected at one end to an eye bolt 38 on the truck frame and carrying a hook 39 at its opposite end to engage the bar 18 previously referred to. Fig. 3 shows the chain supporting the arms 6 and 7 at the proper elevation to engage an upright roll R which is to be lifted into the dotted line position shown in this figure and then transported to some other location. The operations necessary to raise, transport and release the roll will be obvious from the foregoing description.

Due to the nature of the forces exerted on the shaft 22, the bearing 24 is designed to support this shaft both against endwise thrust as well as against radial movement.

5 When the upender is to be used on rolls that vary substantially in diameter, it will be desirable to adjust the lower limit of the swinging movement of the arms 6 and 7 and this may conveniently be done by providing 10 each arm with a stop screw, not shown, arranged to engage the bar 15.

While I have herein shown and described the best embodiment of the invention of which I am at present aware, it will be understood that this embodiment may be modified in many particulars without departing 15 from the spirit or scope of this invention. It will be obvious to anyone skilled in the art that the threads may be varied to suit the requirements of the work.

What is claimed as new is:

1. A machine for handling large rolls of paper comprising, in combination, an auto truck, and means mounted on said truck for 25 raising one of said rolls into an upright elevated position and supporting the roll in said position while it is transported.

2. A machine for handling large rolls of paper comprising, in combination, a truck, 30 means mounted on said truck for grasping a horizontal roll of paper by opposite sides thereof, raising said roll, and automatically tipping the roll into an upright position during the raising thereof.

3. A machine for handling large rolls of paper comprising, in combination, concave grippers to engage opposite sides of one of 35 said rolls, and supporting and operating means for said grippers for moving them toward each other to grip a roll and to raise them when said movement is arrested by the compression of the roll.

4. A machine of the character described comprising, in combination, grippers to 45 engage opposite sides of an article, arms pivotally supporting said grippers, and means operating through said arms to move said grippers toward and from each other and to raise and lower said grippers.

5. A machine of the character described comprising, in combination, a pair of grippers mounted to engage opposite sides of an 50 article, a pair of arms on the ends of which the respective grippers are pivotally mounted, a shaft having oppositely threaded portions on which said arms are mounted, said 55 arms having internally threaded parts to engage respectively with the threaded portions of said shaft, and means for rotating said shaft.

6. A machine of the character described comprising, in combination, a pair of grippers mounted to engage opposite sides of an 60 article, a pair of arms on the ends of which the respective grippers are mounted, a shaft

having oppositely threaded portions on which said arms are mounted, said arms having internally threaded parts to engage respectively with the threaded portions of said shaft, a motor, and worm gearing connections 70 between said motor and said shaft for rotating the shaft.

7. A machine of the character described comprising, in combination, a pair of grippers mounted to engage opposite sides of an 75 article, a pair of arms on the ends of which the respective grippers are pivotally mounted, a shaft having oppositely threaded portions on which said arms are mounted, said 80 arms having internally threaded parts to engage respectively with the threaded portions of said shaft, means for rotating said shaft whereby said rotative movement is operative to force said arms toward and from each other, and means for limiting the swinging 85 movement of said arms on said shaft.

8. A machine of the character described comprising, in combination, grippers to engage opposite sides of an article, and a single operating mechanism for moving said grippers 90 into and out of gripping engagement with the opposite sides of said article and for raising and lowering said grippers to raise and lower the article.

9. A machine of the character described 95 comprising, in combination, grippers to engage opposite sides of an article, a single operating mechanism for moving said grippers into gripping engagement with the opposite sides of said article and for lifting said grippers 100 to raise the article, and an auto truck on which said operating mechanism and grippers are mounted.

10. A machine of the character described comprising, in combination, two grippers 105 for grasping an article between them, two arms on which said grippers respectively are pivoted, mechanism for operating said arms to move said grippers toward and from each other and to raise and lower said 110 arms, and positively acting means to support said arms in a predetermined elevation.

11. A machine of the character described comprising, in combination, a pair of arms for gripping an article between them, and 115 mechanism irreversible under the weight of said article for moving said arms to grip or release the article and for raising or lowering it.

12. A machine of the character described 120 comprising, in combination, grippers to engage opposite sides of an article, arms supporting said grippers, means operating through said arms to move said grippers toward and from each other and to raise and 125 lower said grippers, and additional means operating positively to support said arms in different elevations.

13. A machine of the character described comprising, in combination, grippers to en- 130

gage opposite sides of an article, arms supporting said grippers, means operating through said arms to move said grippers toward and from each other and to raise and lower said grippers, said grippers being mounted to be held normally by gravity in a given directional position, and means for utilizing gravity to hold said grippers in a different position.

14. A machine of the character described comprising, in combination, grippers to engage opposite sides of an article, arms supporting said grippers, means operating through said arms to move said grippers toward and from each other and to raise and lower said grippers, a pivotal connection between each gripper and its cooperating arm supporting the gripper at one side of its center of gravity, and means cooperating with said arm to hold the gripper in a fixed relationship to said arm.

15. A machine of the character described comprising, in combination, a pair of grippers mounted to engage opposite sides of an article, a pair of arms on the ends of which the respective grippers are pivotally mounted, a shaft having oppositely threaded portions on which said arms are mounted, said arms having internally threaded parts to engage respectively with the threaded portions of said shaft, a worm wheel fast on said shaft, a worm meshing with said worm wheel, a shaft on which said worm is mounted, bearings supporting said worm shaft against radial and endwise movement, a motor, and a worm gearing connection between

said motor and said worm shaft for driving the worm shaft.

16. A machine of the character described comprising, in combination, a pair of arms between which an article to be handled is gripped, a gripper pivoted to each of said arms, said grippers being shaped to engage the opposite sides of said article, power driven mechanism for moving said arms toward and from each other and for raising and lowering said arms, said mechanism being irreversible under the weight of said article, and an auto truck on which said arms and mechanism are mounted.

17. A machine of the character described comprising, in combination, a pair of grippers mounted to engage opposite sides of an article, a pair of arms on the ends of which the respective grippers are pivotally mounted, a shaft having oppositely threaded portions on which said arms are mounted, said arms having internally threaded parts to engage respectively with the threaded portions of said shaft, a worm wheel fast on said shaft, a worm meshing with said worm wheel, a shaft on which said worm is mounted, bearings supporting said worm shaft against radial and endwise movement, power driven mechanism for rotating said worm shaft in either direction, and an auto truck on which said bearings and mechanism are mounted.

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

CHARLES ELMER POPE.

DISCLAIMER.

1,437,547.—*Charles Elmer Pope*, Springfield, Mass. UPENDER. Patent dated December 5, 1922. Disclaimer filed December 30, 1924, by the assignee, *Great Northern Paper Company*.

Hereby enters this disclaimer—

"To that part of the claim in said specification which is in the following words, to wit:

"1. A machine for handling large rolls of paper comprising, in combination, an auto truck, and means mounted on said truck for raising one of said rolls into an upright elevated position and supporting the roll in said position while it is transported."

[*Official Gazette January 20, 1925.*]