

C. WOLFERMANN.
FOLDING TOP FOR VEHICLES.
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1,065,092.

Patented June 17, 1913.

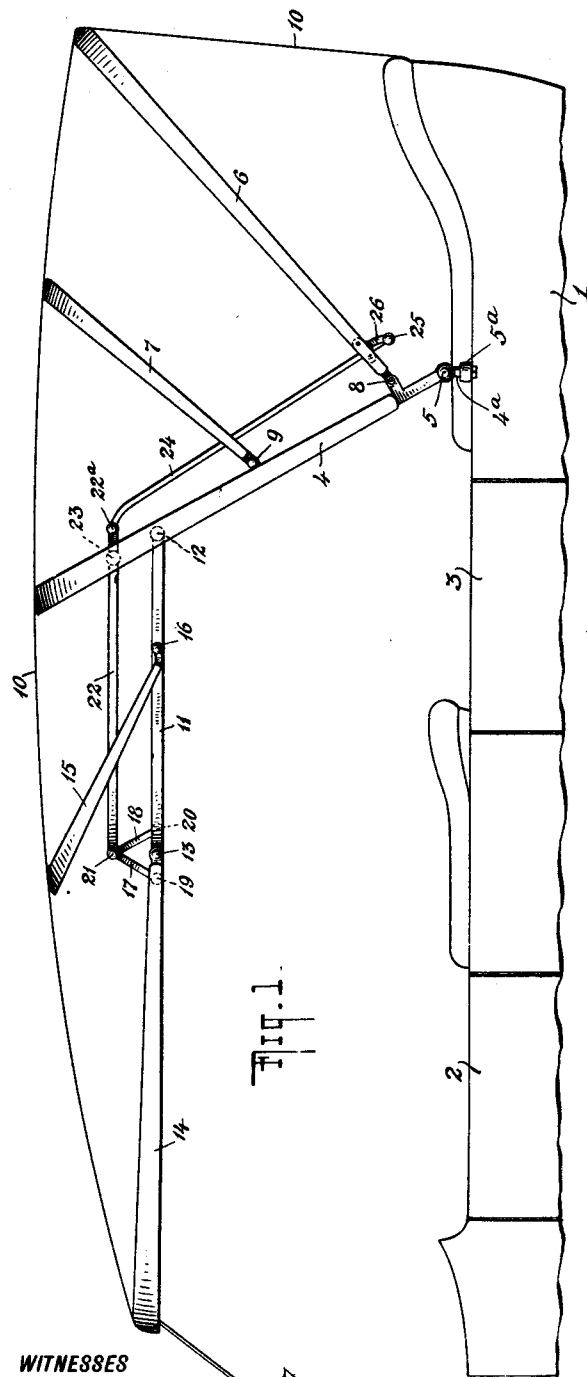


FIG. 1.

WITNESSES

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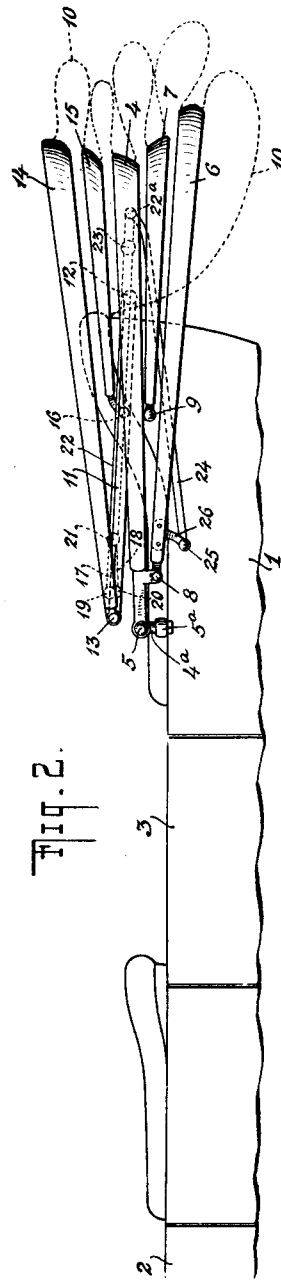


FIG. 2.

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PAPER-LIFTING DEVICE.

1,065,085.

Specification of Letters Patent.

Patented June 17, 1913.

Application filed February 15, 1909. Serial No. 477,999.

To all whom it may concern:

Be it known that I, CLARENCE E. STEERE, a citizen of the United States of America, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Paper-Lifting Devices, of which the following is a specification.

My invention relates to automatic paper lifting devices and has for its object improvements in such devices.

One of the special objects is to make the device so that it will automatically maintain the top of a pile of paper at a given height, and to make the operations associated with such work as convenient and economical as possible.

Another object of my invention is to provide a paper lifting device which will be independent of other devices with which it is associated so that it may be moved about from place to place and at different times may be used with different printing presses to which it is desired to feed paper. To this end the frame used is self-contained and supports thereon, not only the lifting mechanism itself, but the motor, its connections for raising and lowering the lifting mechanism, and the means by which the action of the motor is controlled. When so made this device is not dependent for its operation upon physical connection with the press to which it lifts the paper, and may be started and stopped without regard to the operation or idleness of any other mechanism.

Still another object of my invention is to provide, in the connections between the high speed motor and the slowly moving paper platform, a reducing gear which will not of itself run backward under a load, and to connect the platform to this by a friction connection which may be released to permit the platform to descend at any desired speed without the necessity of using the movement of the motor to accomplish such lowering. In doing this I have a planetary gearing for reducing the speed, in which planetary gearing the two central gears differ but little in diameter and has the smaller of the two for the fixed gear.

Other objects will be self-evident from the description hereinafter given.

In the accompanying drawings, Figure 1 is a side elevation, partly in section; Fig. 2 is an end elevation; Fig. 3 is a partial

section on line 3-3 of Fig. 1; Fig. 4 is an enlarged elevation of the contact device which controls the height of the top of the pile of papers; Fig. 5 is a side elevation, and Fig. 6 is a plan of Fig. 4; Fig. 7 is a diagram of the electric circuits, Fig. 8 is a plan of a detail.

In the said drawings, A is a frame work, on the upper part of which is a shaft B. On one end of the shaft B is a nest of planetary gears in a case C, the larger one of the central gears D of which is secured to the shaft, while the other the smaller central gear E is normally held in a fixed position by a band brake F controlled by means of a hand wheel H and a screw G. The case C has gear teeth on its periphery which are in mesh with a pinion on the shaft of the motor M, said motor being supported on the frame A by a suitable bracket A¹. The planetary gearing is arranged so that the high speed of the motor will be transformed into a very slow speed of the shaft B.

On the shaft B are sprocket wheels J which carry chains K, and on these chains is hung a platform L for carrying the pile of paper P. The platform is guided by rollers L¹ which run in suitable guides in the frame A.

On a bridgetree A² of the frame A is a bracket N in which slides a vertical rod N¹ having a roller N² at its lower end. Secured to one side of the rod N¹ is a contact strip O partly cut away as shown at O¹. Insulating pieces Q and Q¹ which normally engage the contact strip O. The rod N¹ normally rests by gravity at the position shown in Fig. 4, and in this position the strip O closes electrical connection between the pieces Q and Q¹. When, however, the rod N¹ is raised so that the point O¹ is above the piece Q¹, the electrical connection between Q and Q¹ is broken.

At a suitable place on the frame A is a solenoid S which controls a contact lever R adapted to sweep over contact points R¹. The motor M, and a suitable source of electricity W, are connected to the lever R and contacts R¹, as shown in Fig. 7. The solenoid S is connected up through a switch T and battery V with the contact pieces Q and Q¹, as shown in the same figure. Also secured on bridgetrees A² are crossbars A³ provided with slots A⁴. Supported under

these crossbars, and adjustable by means of bolts passing through the slots, are bearings 20 carrying a shaft 21 on which are wheels 22 in the form of pulleys. Mounted on studs 5 at each end of one of the crossbars A^3 are pulleys 23 and 24. Secured to the pulley 23, and turning therewith, is a gear 25 in mesh with the gear on the periphery of the case C. In line with these pulleys are two other 10 pulleys 26 and 27, one of which is secured to the shaft 21 and the other of which is an idler serving as a tightener for the belt 28 from pulley 23 to pulley 24. This belt serves to drive the shaft 21. Instead of the 15 belt here shown, a chain and sprocket wheels may be used, the belt being shown for simplicity of illustration.

The operation is as follows:—Assuming the switch T to be open, the platform L at its 20 lowest position and the brake band F tightened so as to hold the gear E in a fixed position, paper is piled upon the platform to a desired height. The switch T is then closed. This completes a circuit from the 25 battery V through the solenoid S and actuates the same to cause it to throw the arm R from the position shown in Fig. 2 to that shown in Fig. 7. This closes the circuit from the source W through the motor M and 30 causes said motor to drive the gear C, to which are secured the planetary pinions C^1 . These revolving about the stationary gear E drive the gear D, and consequently the shaft B. The movement of the shaft B acts to 35 lift the platform L very slowly. When the top of the pile of paper engages the roller N^2 it lifts the rod N^1 and contact strip O. As soon as the point O^1 rises above Q^1 , the circuit through the solenoid is broken, and 40 this in turn breaks the circuit through the motor M. Thereupon the motor stops, leaving the pile of paper at the desired height. If now a portion of the paper be removed, the rod N^1 will fall, again closing the circuit 45 for the solenoid; which, as before described, starts the motor. When the top of the remaining pile of paper engages the roller N^2 and again raises the point O^1 above the piece Q^1 the motor will again stop. This 50 is continued until the paper is all removed and the platform L engages the roller N^2 to stop the device. The roller N^2 is used on the lower end of the rod N^1 so that upon removing a bunch of sheets of paper, such 55 removal will not put a lateral strain on the rod N^1 . The lower edges of the wheels or rollers 22 are lower than the roller N^2 . When it is desired to have the top of the pile of paper pushed over to one side, as 60 shown in Fig. 2, the shaft 21 is adjusted on the bars A^3 so that the wheels 22 will touch the edge of the pile before the roller N^2 does, or at least before O^1 rises above Q^1 so as to break the circuit for the motor. 65 These rollers 22 turn in the direction of the

arrow of Fig. 2, and push the paper over as shown. The amount of such pushing over is determined by the adjustment of the shaft 21. The platform is lowered by turning the hand wheel H to release the brake 70 band F and permit the gear E to freely rotate on its bearing. In this condition, the weight of the platform turns the gear D, which is secured thereto, to drive the small 75 gears C^1 . As the gear E is no longer held in a fixed position these small gears freely turn on their pins C^2 , and the platform is rapidly lowered by gravity. A too rapid lowering of the platform may be prevented 80 by retaining a slight frictional contact between the brake band F and the gear E. A new pile of paper may then be placed on the platform, the brake tightened and the device started as before. To prevent the 85 motor from running during the process of lowering the platform, the switch T should be opened before the brake is released.

Planetary gearing of the kind mentioned in this connection is desirable, not only because it enables me to get a great reduction 90 of speed in a small compass, but it will not drive the motor backward under the load on the platform when the power is shut off from the motor. This last is accomplished by having the smaller of the two central 95 gears the stationary one, and the larger for the driven one. Thus, the gear E held by the brake is smaller in diameter than the gear D secured to the driven shaft B. The planetary pinions travel around the shaft B 100 whenever the gears D and E move with respect to each other. If an attempt be made to produce such movement by turning shaft B when gear E is held stationary, the long 105 gear arm will act to drive the short pinion arm, and the long pinion arm will bear against the stationary short gear arm. That this is a condition of self-lock is evident from the fact that an analysis will show that if the gearing can be moved by 110 force applied to shaft B, then the load would lift itself. Thus, if a strain be applied through the shaft B to move the gear D clockwise so as to rotate the pinions 115 contrainclockwise on their spindles, then because the large pinion engages the small gear that pinion will, for a given rotation, move through a larger arc on gear E than does the small pinion on gear D. This would 120 cause the spindles C^2 to travel contrainclockwise about the shaft B and carry the gear D against its own strain.

What I claim is:—

1. The combination with a platform, and a source of power for raising it, of a con- 125 nection between the power and the platform consisting of a planetary gearing consisting of gears revolving about two central gears on a common axis, a brake by which one of the central gears is held in a fixed position 130

pivots 12 so that their outer ends will move toward said bow 4, the links 18 meanwhile swinging relatively to the braces 22 and rods 11 about the pivots 21 to the position shown in Fig. 2. A further effect of the operation so far described will be to cause a swinging movement and a pull to be exerted on the links 17 and the bow 14 consequently swung back on its pivots 13 toward the rods 11 and bow 15 which latter is also swung on its pivots 16, the entire top in its folded condition having the appearance illustrated in Fig. 2. As the links 17 and 18, braces 22 and links 24 are located on the inside of the various elements with which they are connected the said links 17 and 18, braces 22 and links 24 will not prevent a compact folding of the top as can be plainly seen by referring to Fig. 2. It is, of course, to be understood that the cover 10 will easily and readily accommodate itself to these various operations and will be brought to a folded condition in more or less the usual manner. When in its completely folded condition my improved top occupies a minimum amount of space and is entirely out of the way and does not interfere with the vision of the occupants of the vehicle or the ready operation thereof. In its folded condition the said top also does not materially project beyond the confines of the vehicle and is thus not likely to become damaged or smashed through contact with extraneous elements. Another important advantage of my improved top resides in the fact that it may be brought to an operative or to an inoperative position by simply manipulating the main bow 4 thus doing away with the necessity for actuating a number of separate elements when a change in position is desired.

While I prefer to have the links 17 and 18, braces 22 and links 24 duplicated on opposite sides of the vehicle top, it is to be understood that these elements may only be located on one side of said vehicle top, if this is found desirable.

The connection between the main bow 4 and the body of the vehicle may be a detachable one so that the top may be completely and entirely removed from the vehicle, if desired. As an example of such structure the main bow 4 may be provided with pins 4^a removably secured in any manner in eyes 5^a rigidly attached to the vehicle body 1.

Various changes in the form shown and described may be made within the scope of the claims without departing from the spirit of my invention.

I claim:

1. A folding top for vehicles comprising a main section movably connected with said vehicle, an articulated auxiliary section movably connected with said main section

and adapted to extend horizontally over said vehicle, means carried by said main section having a portion extending lengthwise of and parallel to said auxiliary section in its extended position and connected with said auxiliary section on opposite sides of and in close proximity to a joint thereof for suspending the auxiliary section in operative position and a flexible cover connected with said sections.

2. A folding top for vehicles comprising a main bow, a peak bow, rods pivotally connected at one end with said main bow and at the other end with said peak bow, a brace movably carried by said main bow and extending parallel to said peak bow in its extended condition, connections from the one end of said brace to a rod and to said peak bow respectively and means for maintaining said brace in operative position whereby said peak bow is suspended in its extended condition over said vehicle.

3. A folding top for vehicles comprising a main bow pivotally secured to said vehicle a rearwardly extending bow pivotally connected with said main bow, forwardly extending rods pivotally connected with said main bow, a front bow pivotally connected with the free ends of said rods, braces pivotally mounted on said main bow, links pivotally connected with the one end of said braces and themselves pivotally connected with said rods and said forward bow respectively at opposite sides of the pivotal connection between said forward bow and said rods, links pivotally connected at one end with the opposite ends of said braces and having their other ends pivotally connected with said rearwardly extending bow whereby said forward bow and said rods are rigidly supported in operative position and a cover connected with all of said bows and with said vehicle.

4. A folding top for vehicles comprising a main bow, a peak bow, rods pivotally connected with said main bow and with said peak bow, means pivotally mounted on said main bow and connections diverging from said means to a rod and said peak bow respectively whereby said peak bow is suspended over said vehicle.

5. A folding top for vehicles comprising a main bow pivotally mounted thereon, an auxiliary bow pivotally connected with said main bow, a peak bow, rods having one end pivotally secured to said peak bow and the other end pivotally connected to said main bow, a brace pivotally mounted on said main bow and extending parallel to said peak bow in its extended condition, connections from one end of said brace to a rod and said peak bow respectively, and a link connected with the opposite end of said brace and with said auxiliary bow.

6. A folding top for vehicles comprising

a main bow pivotally mounted thereon, an auxiliary bow pivotally connected with said main bow, a peak bow, rods having one end pivotally secured to said peak bow and the other end pivotally connected to said main bow, a brace pivotally mounted on said main bow and extending parallel to said peak bow in its extended condition, connections from one end of said brace to a rod and said peak bow respectively, a link connected with the

opposite end of said brace and with said auxiliary bow, and an auxiliary peak bow pivotally mounted on said rods.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CARL WOLFERMANN.

Witnesses:

JOHN A. KEHLENBECK,
G. V. RASMUSSEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."