N. McKENZIE.

LIFTING MACHINE.

APPLICATION FILED OCT. 6, 1916.

1,250,478.

Patented Dec. 18, 1917.

2 SHEETS—SHEET 1.

FIG. 1.

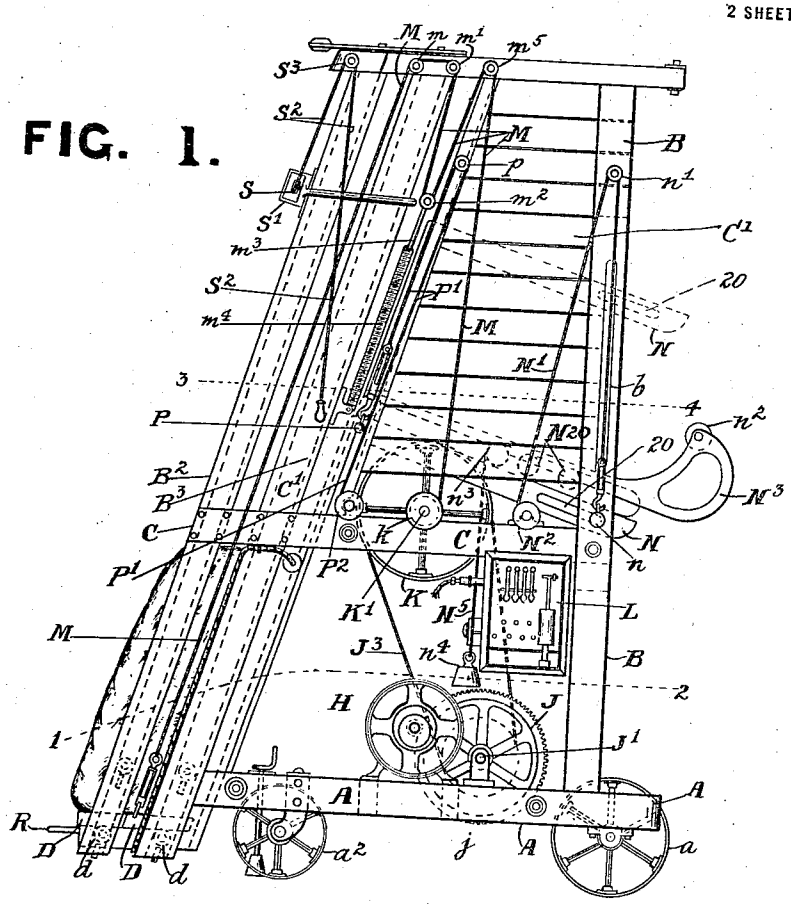
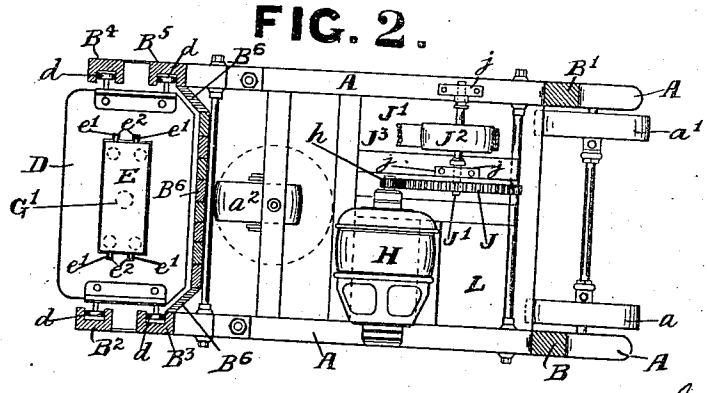


FIG. 2.



Inventor
Norman McKenzie,
by Herbert W. Jenner
Attorney.

N. McKENZIE.

LIFTING MACHINE.

APPLICATION FILED OCT. 6, 1916.

1,250,478.

Patented Dec. 18, 1917.

2 SHEETS—SHEET 2.

FIG. 3.

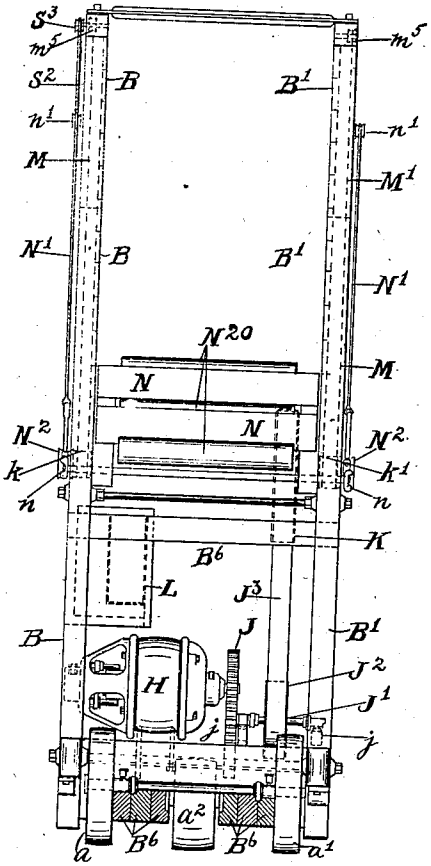


FIG. 4.

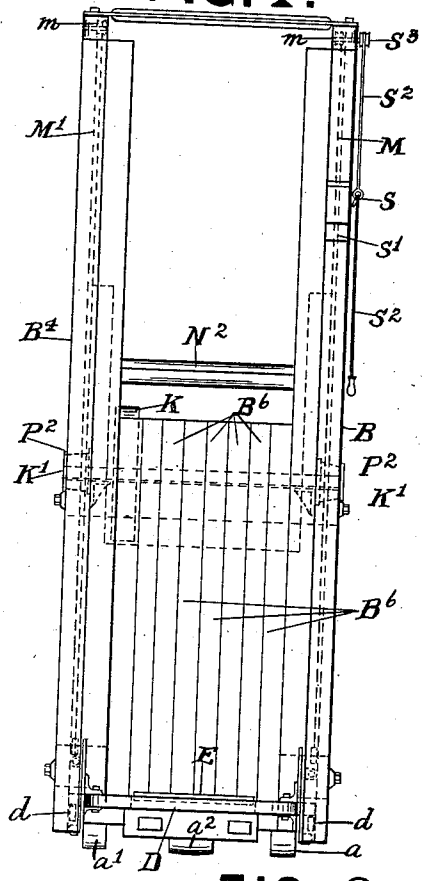


FIG. 5.

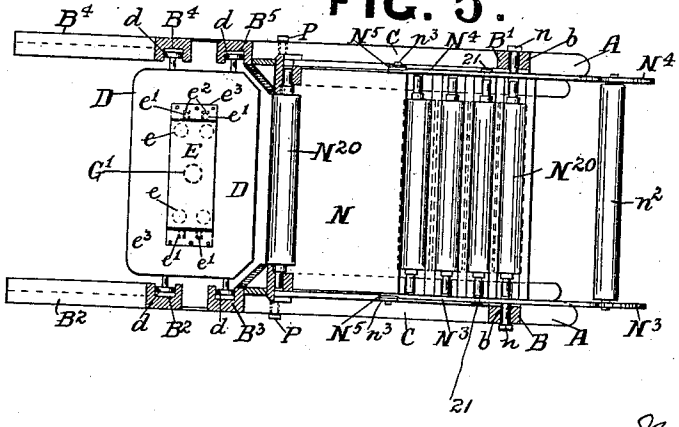


FIG. 6.

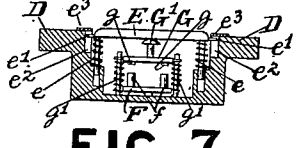
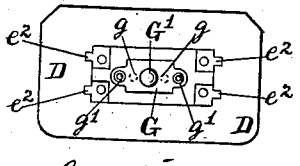


FIG. 7.



Inventor
Norman McKenzie,
by Herbert W. Jenner.
Attorney

UNITED STATES PATENT OFFICE.

NORMAN McKENZIE, OF KINGSTON-UPON-HULL, ENGLAND.

LIFTING-MACHINE.

1,250,478. Specification of Letters Patent. Patented Dec. 18, 1917.

Application filed October 6, 1916. Serial No. 124,084.

To all whom it may concern:

Be it known that I, NORMAN McKENZIE, a citizen of Great Britain, residing at Kingston-upon-Hull, in the county of York, England, have invented certain new and useful Improvements in Lifting-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improved sack, cask and the like lifting and delivering apparatus, and it has for its object to provide or produce a machine or apparatus which will automatically lift sacks, casks and the like delivered from a sack-barrow or the like on to a platform or receiver with which the apparatus is provided, to the required height, and will then deliver them to the person waiting to receive them, or on to or into a lorry, wagon, cart or the like provided to receive them, thereby dispensing with much of the labor which has hitherto been necessary in the lifting of sacks and the like from one level to a higher level.

In order that my invention may be readily understood and carried into effect, I have appended hereunto two sheets of drawings on which Figure 1 represents a side view of my improved sack and the like lifting and delivering apparatus, Fig. 2 a section on the line 1—2 of Fig. 1, Fig. 3 a back or rear end view of Fig. 1 but with the tilting device with which the rear platform is provided, removed, Fig. 4 a front view, and Fig. 5 a section on the line 3—4 of Fig. 1, but with the motor and other mechanism omitted. Fig. 6 is a detail showing the platform on which the sack or the like to be raised is first placed, in section, the depressible plate working therein and the contact device which completes the electric circuit between the platform and the automatic starter which sets the motor in motion, and Fig. 7 is a plan view of the platform with the depressible plate removed.

Referring to the drawings, A represents the base of the apparatus constructed in the form of a frame provided with wheels a, a^1 and a^2 to enable the apparatus to be wheeled from place to place, the wheel a^2 being shown as a caster wheel adapted to swivel to allow of the apparatus being steered in the required direction.

This wheeled frame or "truck", as I will call it, carries a pair of strong uprights B, B^1 and two or more strong oblique members, four of such members being a convenient number and being the number shown in the drawings, B^2, B^3, B^4 and B^5 indicating such members, the inclination of such members being such that they project rearwardly over the truck to a suitable extent. The upright B is mounted on one end of the truck and at one side thereof, the upright B^1 being mounted in a corresponding position on the opposite side of the truck, and the oblique members B^2 and B^3 are mounted on the other end of the truck at one side thereof, the oblique members B^4 and B^5 being mounted in a corresponding position on the opposite side of the truck. B^6 indicates an arrangement of boards or the like suitably fitted behind the oblique members and which form the backing for the sacks or the like to be raised, to rest against, said boards or the like extending to a suitable height. The top edges of these boards are arranged or adjusted at a predetermined level according to the height to which the load is to be lifted.

C indicates strong ties or braces for binding or securing the uprights B, B^1 and the oblique members B^2, B^3, B^4 and B^5 together, whereby the whole constitutes a strong frame, C^1 indicating match-boarding or the like which fills in the upper part of the sides of the said frame and prevents the sacks or the like from falling off the sides of the platform hereinafter referred to, on to which they are delivered when they are raised to the required height.

D is a platform situated at the front of the frame between the oblique members B^2, B^3 and B^4, B^5 and which is adapted to travel up and down between the said oblique members, said platform being caused to keep a true course as it moves up and down, by means of small wheels or rollers d mounted on its ends, which work in oblique guide slots formed in the inside faces of the oblique members, or by any other suitable means.

E is a depressible plate adapted to work up and down in an opening provided for it in the platform D and normally supported slightly above the level of the platform by springs e or equivalent means, said plate being caused to work true by any suitable means, one and a convenient means for the purpose consisting in providing its ends with projections e^1 which work in slot-holes e^2

formed in the end walls of the opening in the platform D, plates e^3 being secured on the platform over the slot-holes e^2 to limit the upward movement of the plate E.

F indicates a plate fixedly mounted in the opening in the platform D, said plate being provided with contact points f, and G is a second plate provided with contact points g mounted above the plate F in the said opening, said second plate working on fixed guides g^1, g^1 and being normally supported above the plate F by springs mounted on the guide rods g^1, g^1 and which bear on the underside of the said plate G, the plate G being provided with a stud or projection G^1, which bears on the underside of the depressible plate E whereby on the said plate E being depressed, the plate G is forced down and its contact points come into contact with the contact points on the plate F and complete an electric circuit as and for the purpose hereinafter described. Any other approved form of electrical contact device may be used in carrying out this invention.

H is an electric motor mounted on the truck of the apparatus, J is a spur or like toothed wheel mounted on the shaft J^1 rotatable in bearings j, j on the said truck A, the spur or like wheel J gearing with a pinion wheel h on the motor shaft, J^2 being a belt pulley mounted on the shaft J^1. K is a belt pulley keyed or otherwise fixedly mounted on a cross-shaft K^1 rotatable in bearings mounted on ties or braces C of the frame of the apparatus at a suitable height above the pulley J^2 on the shaft J^1, k, k^1 being two small drums, the one fixedly mounted on one end of the pulley shaft K^1 and the other fixedly mounted on the other end of the said shaft, said two drums being preferably situated at the outside of the frame of the apparatus, the shaft K^1 with the drums k, k^1 being driven by the pulley J^2 through the medium of the belt J^3 which runs around the pulley J^2 and the pulley K on the shaft K^1 on which the drums k, k^1 are mounted. Any other approved driving mechanism can be used in place of the belts and pulleys in carrying out this invention.

L indicates an electric starter of any well-known type mounted in or on the frame of the apparatus, for setting the electric motor in motion on the plate E mounted in the opening in the platform D of the apparatus being depressed when a sack or the like is placed on the platform D, said starter being connected by a cable comprising positive and negative electric wires the one connected to the plate F and the other to the plate G situated in the opening in the platform D, and such starter is further connected by electric wires with a cable or other source of electricity, and with the motor H. These wires are arranged in any approved way.

M indicates a wire-rope, chain or the like one end of which is connected to one end of the platform D of the apparatus, said rope or the like being carried up and led over sheaves m, m^1, then carried down and led under a sheave m^2 mounted in a link or the like m^3 connected to a helical spring m^4 connected to the side of the frame of the apparatus, from which it is carried upward and led over a sheave m^5, then carried down and its other end connected to the small drum k on one end of the pulley shaft K^1, M^1 being a second wire-rope, chain or the like one end of which is connected to the opposite or far end of the platform D, said rope or the like being led over and under a corresponding arrangement of sheaves at the opposite or far side of the frame, and its other end connected to the small drum k^1 on the pulley shaft K^1.

N is an adjustable platform on to which the sacks or the like are delivered when raised by the platform D to the required height, said platform N being situated behind the boards or the like B^6 which form the backing for the sacks or the like being raised, and works between the uprights B and B^1. This platform is raised to the required height and lowered to suit the height at which the sack or the like is to be delivered, by any suitable means, the means illustrated in the accompanying drawings consisting in providing it at or near its back end with pins or projections n, one at each side, said projections n, passing the one through a vertical slot-hole b in the upright B and the other through a corresponding slot-hole in the upright B^1. These pins n also slide in slots 20 in the sides of the platform N, and which extend crosswise of the slots b. A chain or other flexible connection N^1 is provided and is suitably connected at one of its ends to the projection at one side of the platform, carried upward and led over a sheave n^1 mounted on the frame of the apparatus, then carried down and its other end connected to the drum N^2 of a small hand winch mounted on the said frame, a second rope, chain or the like being employed at the other or far side of the frame and having one of its ends connected to the projection at the other or far side of the platform, said rope or the like being led over a sheave and its other end connected to the drum of a second small hand winch mounted on the frame at the opposite or far side of the apparatus.

The front of the platform N is raised in a similar manner, P indicating the projection on the near side of the said platform, P^1 a wire-rope, chain or the like which has one of its ends connected thereto, p a sheave mounted on the side of the frame of the apparatus and over which the rope, chain or the like is led, and P^2 the drum of a small hand winch mounted on the frame of the

apparatus and to which the other end of the rope, chain or the like is connected, a second rope, chain or the like being employed at the other or far side of the frame, said rope or the like having one of its ends connected to the projection on the other or far side of the platform, said rope or the like being led over a sheave in like manner and its other end connected to the drum of a second small hand winch mounted on the other or far side of the frame of the apparatus.

Rollers N^{20} are preferably mounted in the platform N to insure the sacks or the like the more readily sliding down the said platform.

It will be seen on reference to Fig. 1 of the drawings, that when a sack with its contents is raised by the platform D and delivered by it on to the platform N, such sack during delivery is overturned and slides down the platform N mouth or top first.

To cause the sack to be delivered in its proper or upright position to the person, wagon or the like waiting to receive it, I employ a tipping device consisting of a pair of curved or like members N^3, N^4, the one pivoted to one side of the platform N and the other pivoted to the other side of the said platform, the outer ends of which members project beyond the outer end of the platform, a roller n^2 being preferably mounted in such members. The middle parts of the tipping members are pivoted to the sides of the platform N by pins 21 as shown in Fig. 5. The inner end of each member has a rope, chain or the like connected to it, each rope or the like being led over a sheave mounted on the sides of the platform, a weight being suspended from the free end of each rope or the like, N^5 indicating the near side rope or the like, n^3 a sheave over which it passes, and n^4 the weight suspended from its free end. When the sack tipped on to the platform N by the platform D comes into contact with the curved ends of the members N^3, N^4, the said members tilt on their pivots, which action turns the sack over to its original or upright position, such members when relieved of the weight of the sack, automatically returning to their original and normal position ready to receive the next sack.

R indicates a projection on the front of the platform D, and S is a trip lever pivoted in a frame S^1 fitted at a suitable height on the front of the frame of the apparatus, said lever having a wire-rope, chain or the like S^2 connected to one end, which rope or the like is led over a sheave S^3 mounted on the side of the top of the frame of the apparatus, the trip lever being adapted to operate a switch when tilted. This switch is an electrical cut-out switch of any approved construction. It is arranged in circuit with the motor, and the operating device or lever S is also of any approved construction and arrangement. When the projection R strikes the operating device S the electric current is cut off from the motor H. If the sack, when raised, fails to fall over the top edge of the backing by gravity onto the platform N, the motor is therefore stopped automatically, and the platform D with the sack then descends by gravity to its original position. This prevents any accidental overwinding of the load.

The operation of the apparatus is as follows:—The sack or the like and its contents to be raised and delivered is tipped by a hand-barrow or otherwise delivered on to the platform D at the front of the apparatus and by its weight depresses the plate E mounted in the opening in the platform as a result of which the plate G in the opening in the platform is pressed down and the contact pieces g thereon come into contact with the contact pieces f of the plate F also mounted in the opening in the platform D, which completes an electric circuit with the motor starting device L, so allowing electric current to pass from the electric supply through the starter L to the motor H which is thereby set in motion. The motor H when running drives the shaft K^1 through the toothed wheel J, the pulley J^2 and the pulley K, the rotation of the shaft K^1 causing the wire-ropes, chains or the like connected to the platform D and to the winding drums on the said shaft K^1 to be wound on such drums, the winding of the ropes, chains or the like on the said drums effecting the hoisting or drawing up of the platform D with the sack or the like thereon. When the platform D reaches the height at which a greater portion of the sack would project above the backing B^6, the sack topples over the said backing on to the platform N down which it slides and is caught by the person, or falls on to or into the lorry, wagon or the like to whom, or to which it is to be delivered. Immediately the sack leaves the platform D the plate E mounted in such platform springs back to its normal position under the action of the springs which causes the breaking of the electric circuit with the starter L, with the result that the motor H stops and is free to rotate in the opposite direction, the platform D then descends automatically by gravity to its normal position ready to receive another sack or the like, the operation being repeated each time a sack or the like is placed on the platform.

I claim:—

1. In a lifting machine, a frame provided with guides, a platform for the load slidable in the said guides, a depressible plate for receiving the load carried by the said platform, an electric motor, electrical contact

devices carried by the said platform and plate and operating to start the motor when the plate is depressed by the load, and hoisting mechanism operatively connecting the motor with the said platform.

2. In a lifting machine, a frame provided with guides, a platform for the load slidable in the said guides and provided with a chamber, a spring-supported plate for receiving the load slidable in the said chamber, an electric motor, electrical contact devices arranged in the said chamber and secured to the said platform and plate and operating to start the motor when the plate is depressed by the load, and hoisting mechanism operatively connecting the motor with the said platform.

3. In a lifting machine, a frame provided with guides, a platform for the load slidable in the said guides, a depressible plate for receiving the load carried by the said platform, an electric motor, electrical contact devices carried by the said platform and plate and operating to run the motor in a direction to raise the load when the said plate is depressed by the load, and hoisting mechanism operatively connecting the motor with the said platform, the said platform operating by gravity to run the deënergized motor in the reverse direction when the load is removed from the said plate.

In testimony whereof I affix my signature, in presence of two witnesses.

NORMAN McKENZIE.

Witnesses:
LOUIS EDGAR KIPPAX,
FRED HAROLD RHODES.