

No. 816,233.

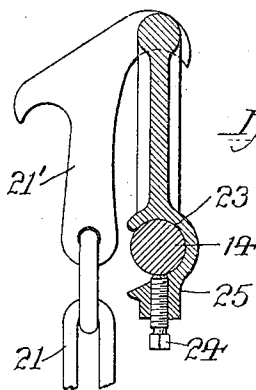
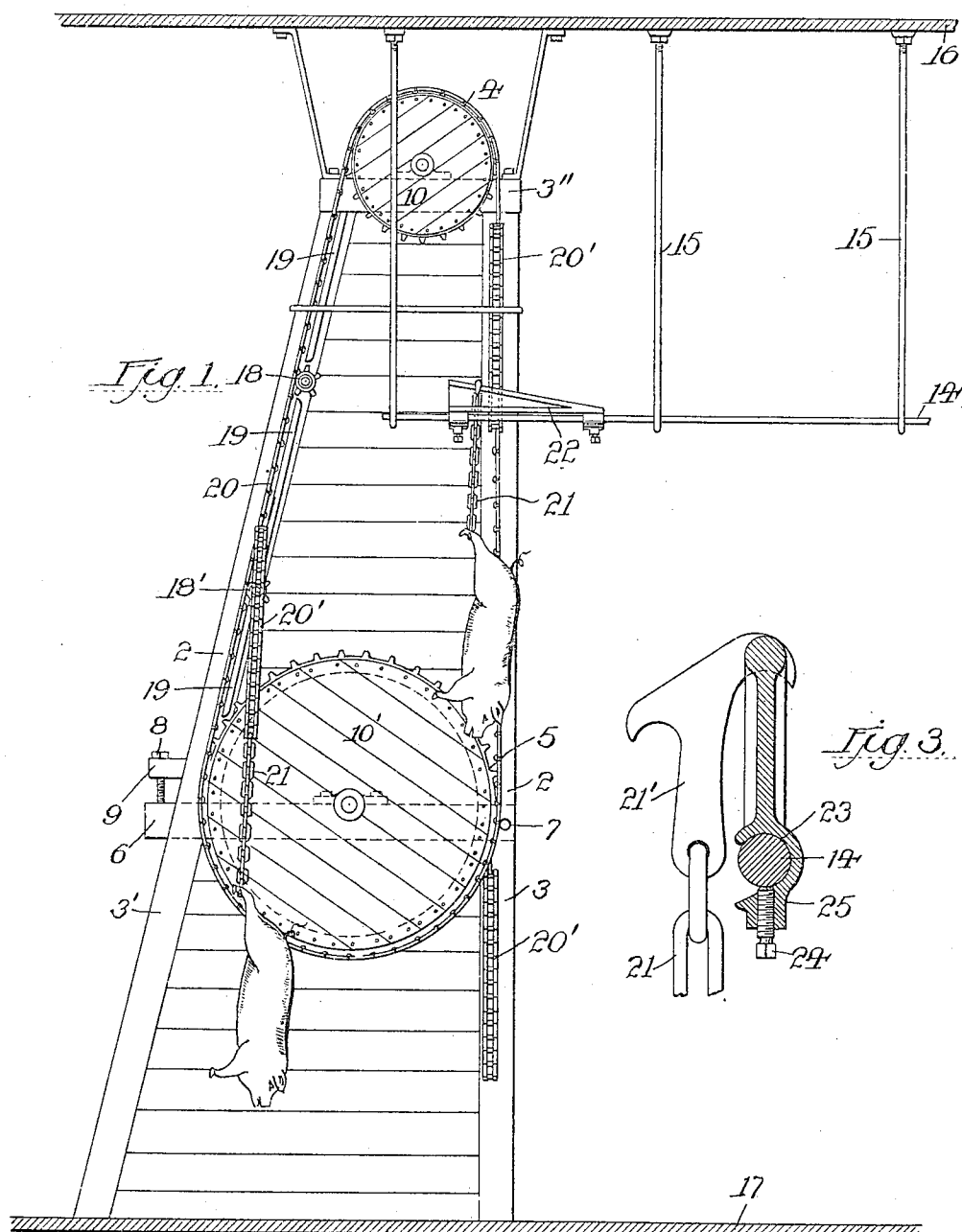
PATENTED MAR. 27, 1906.

O. P. HURFORD.

HOG HOIST.

APPLICATION FILED MAY 25, 1903.

2 SHEETS—SHEET 1.



Witnesses:

Edw. Barrett

John S. Allen

Inventor:

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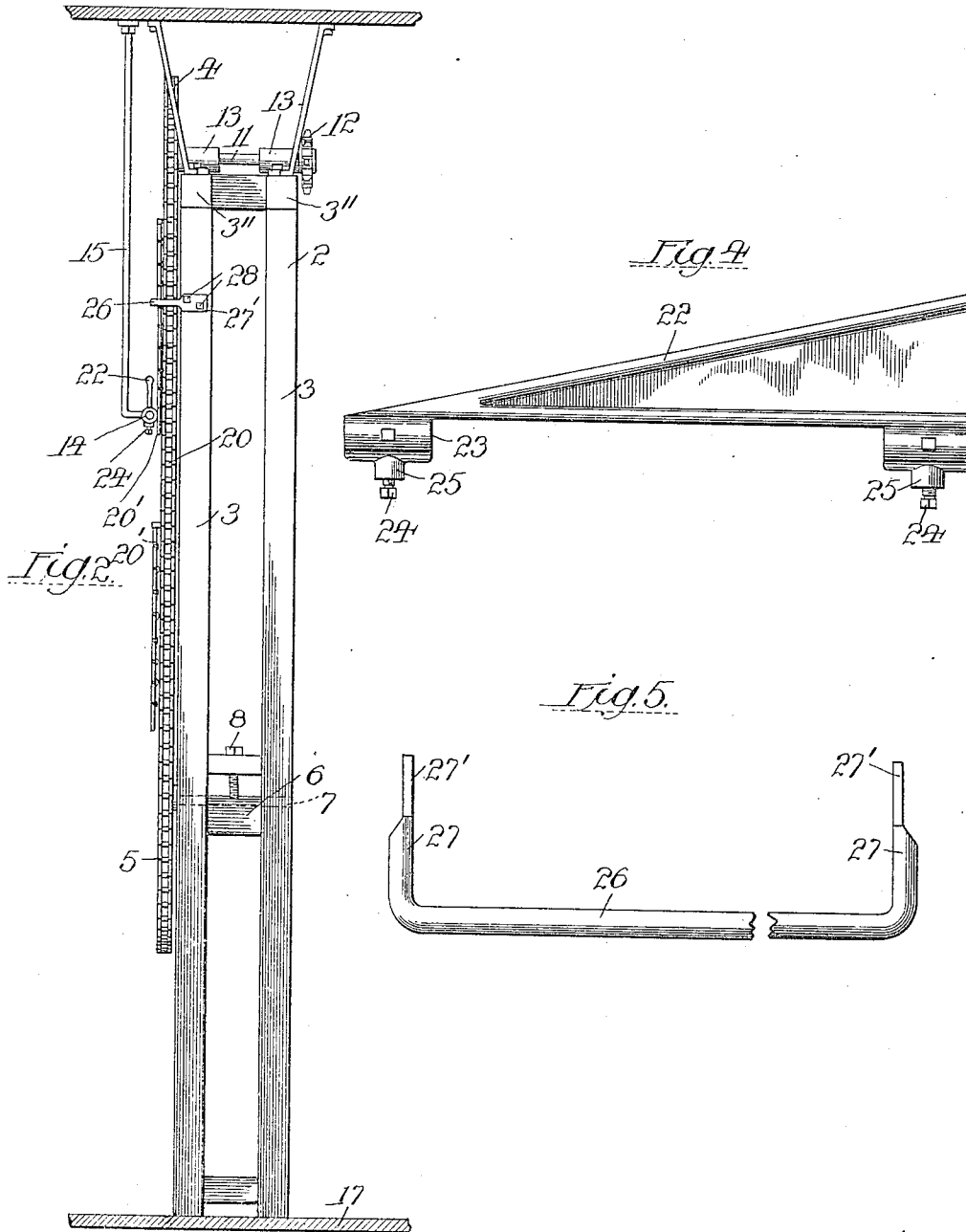
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2 SHEETS—SHEET 2.



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# UNITED STATES PATENT OFFICE.

OLIVER P. HURFORD, OF CHICAGO, ILLINOIS.

## HOG-HOIST.

No. 816,233.

Specification of Letters Patent.

Patented March 27, 1906.

Application filed May 25, 1903. Serial No. 158,654.

*To all whom it may concern:*

Be it known that I, OLIVER P. HURFORD, a citizen of the United States, residing at Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Animal-Hoists, of which the following is a specification.

This invention relates to machines employed in slaughtering and packing establishments for hoisting and delivering stock to an elevated track or sticking-rail, and has particular reference to the endless-chain type of carriers.

The particular object of this invention is to provide an animal-hoist which in its preferred form is especially adapted for comparatively small slaughtering plants or establishments, and in general to improve present forms of so-called "hog-hoisting" machines and cure defects therein disclosed by actual use.

To that end the invention contemplates the production of a strong rapidly-operable machine adapted for plants having limited floor-space and power, a machine involving a minimum of change of direction of motion of the suspended animal and in which is imparted simultaneously with the operation of elevating the desired forward momentum an individual compact hoist which does not include as a part thereof any portion of the room in which it is erected, a hoist which overcomes the necessity for steep inclines for the receiving-rail and heavy jars to machinery and animals during deliveries from hoist to receiving or sticking rail by combining initial forward momentum with a moderate adjustable incline, thereby also avoiding serious lateral strains upon the hoisting chain or conveyer and violent vibrations therein, a conveyer employing but one loop, wherein the conveyer-chain is fully supported against funicular action during its travel through the sticking-pen and when a hog is attached to said chain, a conveyer which also prevents similar action upon the hoisting or elevating leg of the conveyer-chain, and a hoist in which is obviated the possibility of serious accident due to disarrangement, dislodgment, or displacement of the conveyer or pendant chain by the struggles of the suspended animal.

The invention further contemplates adjustable means for accelerating the forward movement of a hog along the receiving-rail at the moment it leaves the conveyer, said

means providing for gradually-gathered momentum through length rather than pitch of the starting incline and the provision of improved means for making the tension of conveyer-chain self-adjustable without interfering with hoisting operations.

The invention comprises the improvements suggested in the foregoing; and it consists in the novel features of construction and arrangement of parts adapted to attain the above advantages, as hereinafter described in detail, illustrated in the drawings, and particularly pointed out in the claims.

My invention will be more readily understood by reference to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a side elevation of a hoist embodying my invention. Fig. 2 is an end elevation. Fig. 3 is an enlarged detail view representing a transverse section of the delivery-block. Fig. 4 is an enlarged detail representing a side elevation of the delivery-block adjustable upon the sticking-rail. Fig. 5 is a plan view of the combination frame-brace and chain-guard.

Referring to the drawings, 2 represents the frame of the machine, consisting of preferably six-inch by twelve-inch upright timbers 3 and 3' and the cross-piece 3'', supporting the shaft-bearing for the upper sprocket-wheel 4. The lower sprocket-wheel 5 has its shaft bearing on a bridge or support 6, pivoted at 7 to the upright 3'. The free end of said support projects beyond the upright 3' and is free to drop as the conveyer-chain stretches under the weights of its loads, whereby the wheel 10' automatically takes up slack in said conveyer-chain while normally held against upward movement by a screw 8, having threaded engagement with the projection 9, fixed upon the upright 3'. The wheels 4 and 5 are preferably made in the form of spoke-wheels, having their face sides boarded up, as shown. These boards 10 10' are secured to the wheels in any suitable manner, the details of the wheel structure forming no part of my invention, it being old to board up the face of a wheel for the purpose of preventing injury to the finished hog product. The upper wheel 4 is rotated in any suitable manner, but preferably by means of a shaft 11, carrying sprocket-wheel 12. Said shaft is shown supported upon the cross-piece 3'' in bearings 13 13.

14 is a usual form of sticking-rail or delivery-bar supported on ceiling-hangers 15, the details of which are well known in the art.

16 17 represent, respectively, the ceiling and floor of a slaughtering-room, to either or both of which the end or ends of the hoist may be rigidly secured in any suitable manner.

18 18' are small sprocket-wheels rotatively fixed to the inner face of the upright 3'.

19 19 19 are wear-strips preferably faced with metal suitably secured to the inner side of the upright 3' and having their face portions arranged in a plane touching the pitch-circles of the wheels 18 18'.

The frame 2 is boarded up between the uprights, preferably so that said boarding is flush with the faces of the wheels.

20 represents the endless conveyer-chain which may be of the ordinary detachable link-belt type, and 20' represents short pendent chains pivoted upon the conveyer-chain 20.

21 21' represent the usual form of shackle-chains and a double hook for engaging, respectively, a link in the pendent chain 20' and the sticking-bar 14. The details of the chains and hook referred to being very old and well known to those skilled in the art, no extended description of their structure or operation need be entered into.

22 is a substantially wedge-shaped delivery-block formed with a channel or groove 23 for the sticking-bar 14 and is secured to the latter by means of set-screws 24, operating through threaded apertures in projections 25 in the lower portion of said block, as clearly illustrated in Fig. 3.

26 is a chain-guard and frame-brace secured to the upright timbers above the horizontal plane of the sticking-bar. Said guard is bent at its ends into portions 27, having straps 27', suitably apertured for lag-screws 28, by means of which said guard is fastened to the upright timbers 3 3'.

My invention operates as follows: Referring to Fig. 1, which illustrates the relative positions of a hog at the beginning and end of its elevation, assuming that the diameter of the upper wheel is two feet and that the diameter of the lower wheel is four feet, it will be found that the elevation of the hog has advanced it toward the sticking-rail a distance of three feet. While the time consumed in the elevating movement is comparatively short, yet the distance from the lower to the upper wheel is sufficient to give headway to the forward movement of three feet and is approximately twelve times the radius of the upper wheel, and that is length of throw forward which the upper wheel imparts. The momentum thus gained will carry the animal steadily forward when its supporting-hook engages the delivery-block, and but a very moderate pitch of the latter is re-

quired to sustain the movement started during elevation. The incline tends to gradually increase this movement, and the longer the incline the greater will be the speed of forward movement by the time the hook 21' reaches the sticking-bar. If it is found that the forward impetus given by the incline is too great, it can be reduced by moving the delivery-block back or toward the upright 3'. As the parts become worn such changes are often necessary. If, on the other hand, the inclined leg of the conveyer-chain occupied a vertical position, the only means for imparting a forward impetus to the hog by the carrier would be the movement of the pendent chain 20 from one side of the wheel 4 to a point just beyond the vertical plane of the center thereof, a distance of slightly more than one foot, or about one-twelfth of the elevating movement. The time consumed for the sweep over the wheel would be less than a second, with the result that while the pivoted end of the chain moved forward promptly the lower and free end carrying the heavy weight would remain practically stationary and at the moment the hook engaged the sticking-rail the chain and hog depending therefrom would lie in an inclined plane substantially perpendicular to the plane of the upper surface of the delivery-block. The result would be a momentary suspension of movement of the hook 21' until the weight had time to gather momentum or swing forward and then not until the weight had passed the vertical plane occupied by the hook. If the throw of the upper wheel were considerable, the inclination of the flexible support might, relatively, with regard to a moderate incline, such as illustrated in these drawings, be rearward, causing the hook to slip in that direction instead of toward the sticking-rail. Hence the receiving ends of sticking-rails for chain conveyers have heretofore necessarily been very much inclined and not adjustable to a moderate pitch. Unless the upper wheel were of sufficient diameter to allow time for forward momentum of the hog during progress of the pivoted end of the pendent chains from one side to a point little past the center of wheel a larger wheel would be detrimental, as it would increase the inclination of hog and its flexible support or chain away from the sticking-rail. This would produce a decided pendulum movement very undesirable and inconvenient to the sticker or operator at the sticking-bar who would be compelled to first stop the swinging movement before sticking. On account of the foregoing facts hoists of the chain-conveyer type have been provided with inclines of more than forty-five degrees, which have operated to pull the chain laterally toward the sticking-rail, stretching it to its limit by the lateral pull of the hook and preventing free release of conveyer-chain

from hook. This lateral frictional engagement between hook and conveyer-chain has prevented the latter from dropping away from the former and hook and chain have  
 5 been forced apart with a snap at the limit of the lateral movement. With the forward momentum of the hog started before the upper wheel is reached, the hook will be delivered upon the incline with a forward sweep supported by the suspended weight following in the same direction. Hence but little inclination of the delivery-block is required, and violent starts and jars are avoided. Another advantage gained by my invention  
 15 over devices having inclines steep enough to overcome the inertia of the hog and its angle of inclination away from the bar is that severe jars, and consequent injury to the finished product, are avoided. By adjusting the incline in the path of the hook I accomplish the desired speed of forward movement uninterrupted by an abrupt change from a steeply-inclined plane to one substantially horizontal. The hog, therefore, glides from  
 25 delivery-block to sticking-bar with a practically unvarying movement and suspended vertically instead of swinging to and fro. Should there be any slight discrepancy between the relative vertical and lateral movements of hook and conveyer chain, the guard  
 30 27 will prevent the chain from yielding outwardly and causing the binding between hook and chain previously referred to. It is also a safeguard against such serious accidents as the pendent chain being kicked over to the outer instead of the inner side of the sticking-rail at the moment of its transit past the end thereof.

The two wheels arranged one above the  
 40 other upon a base occupying a very small area particularly adapts the machine for mounting upon a floor-space so small that this item needs scarcely be taken into consideration, and the hoist may be made to face  
 45 any direction of rail without encountering the problem of floor-space. Another very decided advantage resides in its capability of an adjustment against any sticking-rail already in use, because the means for delivering hogs upon and impelling them along  
 50 the sticking-rail are not dependent upon any special form of rail. The small amount of power required to operate the hoist, the strain of hoisting not requiring powerful  
 55 bracing, the altitude of the lower wheel of degree of forward throw and of speed of operation all contribute to make my machine invaluable in small and light plants having but limited power and floor-space and in which  
 60 the output varies considerably. The large lower wheel supports all of that portion or leg of the conveyer-chain traveling through the shackling-pen. For convenience said portion of the chain may be termed the "receiving-

leg," the portion traveling over the upper  
 65 wheel the "delivery-leg," and the forwardly-inclined portion between the wheels the "hoisting-leg." By supporting the receiving-leg of the chain against lateral movement the danger of the chain being pulled off the  
 70 sprocket-wheel at the moment of greatest lateral strain upon it before the attached hog has been lifted off the floor is obviated. The large lower and small upper wheel, in combination with the chain, also provides in a simple  
 75 manner for a comparatively long receiving and short delivery leg, as well as the inclined hoisting-leg, without special wheels or parts to accomplish such functions. The use of only two wheels also economizes power  
 80 which would otherwise be wasted in friction. Considerable economy of floor-space is effected. The strain of hoisting is imposed in a direct line upon the base of the frame of the machine, and by supporting the hoisting-leg  
 85 upon the frame of the machine and having only one loop of chain side strains and chain slack tending to throw the chain off the sprocket-wheels are overcome.

Having thus described my invention, I  
 90 claim as new and desire to secure by Letters Patent—

1. In a hog-hoisting device, in combination with an endless chain and an upper and lower sprocket-wheel on which said chain is  
 95 alone mounted, depending hog-shackles carried by said endless chain, said lower sprocket-wheel having a diameter greater than that of the upper sprocket-wheel and of sufficient length to form a comparatively long receiving  
 100 stretch of chain whereby the hogs may be readily shackled thereon, and said lower wheel also providing a lateral support for the receiving stretch of chain throughout the shackling-pen, said wheels providing a substantially  
 105 triangular arrangement of the chain conveyer and both being inside a vertical line tangent to the upper wheel whereby an upwardly-inclined ascending leg is formed and also a descending leg from which the hog  
 110 upon release therefrom will be carried directly away from the chain and space inclosed thereby and a sticking-rail extending at an angle to said conveyer and adapted to receive the shackle from the descending leg, substantially  
 115 as described.

2. In a hog-hoisting device, in combination with an endless carrier-chain, depending shackles carried thereby, two sprocket-wheels one above the other, on which said  
 120 chain is supported, the lower wheel being of greater diameter than the upper wheel, said wheels arranged to bring the ascending leg of said chain in a path inclined upwardly toward an adjacent slaughtering-room, and  
 125 the descending leg of said chain in a vertical path adjacent the slaughtering-room and a sticking-rail having a member intersecting

the plane of the vertical leg of said chain and inclined therefrom toward the slaughtering-room, substantially as described.

3. In a hog-hoisting device, in combination with an endless chain an upper and a lower sprocket-wheel therefor whereby only two stretches of chain between the sprocket-wheels are formed, the lower wheel of greater diameter than the upper wheel but each having one of its vertical tangents in the same plane, whereby an ascending inclined leg of said chain and a vertical descending and delivering leg of said chain are formed, and a lateral support for the chain in the shackling-pen is provided, substantially as described.

4. In a hog-hoisting device in combination with an endless-chain conveyer, depending flexible hog-shackles secured to said conveyer, a sprocket-wheel at the upper part of said chain on which said conveyer is supported, and a larger sprocket-wheel at the lower part of said chain and forming a positive lateral support for the entire length of the receiving-leg of the chain which extends through the shackling-pen, said wheels having their centers out of alinement, with the center of the lower wheel farther away from the delivery side of the pen, whereby a substantially triangular hoist is formed having only two stretches of chain between the sprocket-wheels and with an ascending leg of the conveyer inclined toward the delivery side of the pen is provided, and a continuous straight descending leg of said chain from the top sprocket-wheel to the lower sprocket-wheel is provided, and a sticking-rail intersecting the plane of said descending leg and having a shackle-receiving member which extends away from said chain on a downward incline, substantially as described.

5. In a device of the class described, the combination, with a conveyer, means for actuating the same, means for shackling animals thereto, and a suitable receiving-rail, of an inclined delivery-block adjustable along and upon said rail, and means for securing said block upon said rail.

6. In a device of the class described, the

combination, with an endless conveyer adapted to travel in a vertical plane and having a forwardly-inclined ascending leg, and means for shackling animals thereto, of a receiving-rail arranged adjacent to the path of travel of said conveyer, and an inclined delivery-block adjustable upon and along said rail.

7. In a device of the class described, the combination, with an endless conveyer having a forwardly-inclined ascending leg, an auxiliary guide and support for said ascending leg, and means for shackling animals to said conveyer, of a receiving-rail arranged adjacent to the path of travel of said conveyer, and an inclined delivery-block adjustable upon and along said rail.

8. In a device of the class described, the combination, with a pair of conveyer-wheels arranged one above the other in the same vertical plane and the lower thereof being of greater diameter than the upper, of an endless conveyer mounted thereupon, said wheels being relatively disposed to provide a forwardly-inclined ascending leg of said conveyer, means for preventing lateral movement of said ascending leg, an animal-shackle detachably suspended from said conveyer, a suitable receiving-rail, and a guard insuring engagement between said shackle and said rail.

9. In a device of the class described, the combination with an endless-chain conveyer, of a large chain-supporting sprocket-wheel, and a small chain-supporting sprocket-wheel above the large wheel, the centers of the wheels being out of alinement and forming a forwardly-inclined ascending leg, and a series of small loose guide sprocket-wheels with which said ascending leg of the chain engages, substantially as described.

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

OLIVER P. HURFORD.

Witnesses:

J. W. BEEKSTROM,  
GEORGE W. BURTON.