

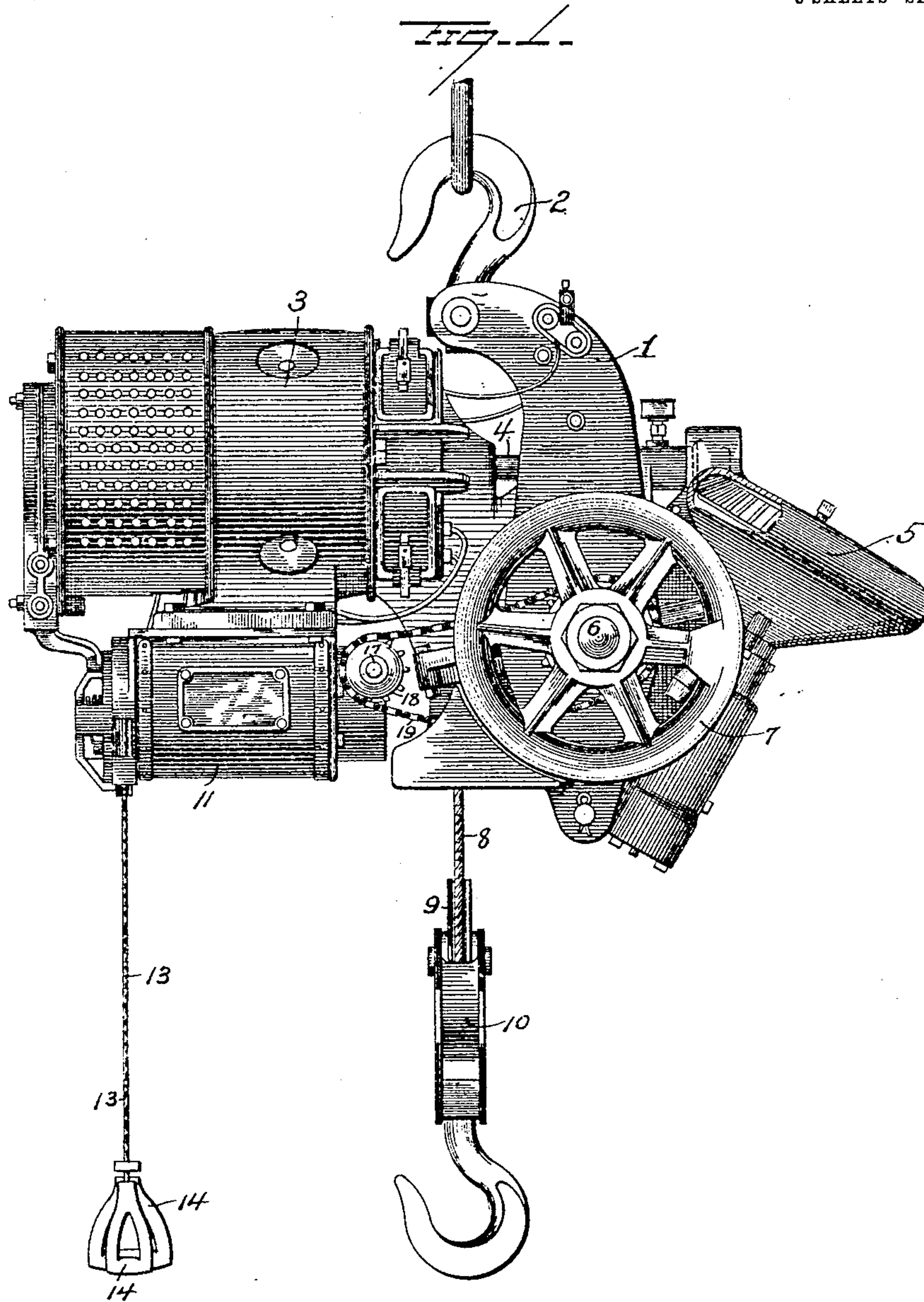
No. 850,694.

PATENTED APR. 16, 1907

H. S. VALENTINE.  
AUTOMATIC STOP FOR ELECTRIC HOISTING APPARATUS.

APPLICATION FILED JAN. 10, 1907.

3 SHEETS—SHEET 1.



WITNESSES  
E. J. Nottingham  
G. J. Downing

INVENTOR  
H. S. Valentine  
By H. A. Seymour  
Attorney



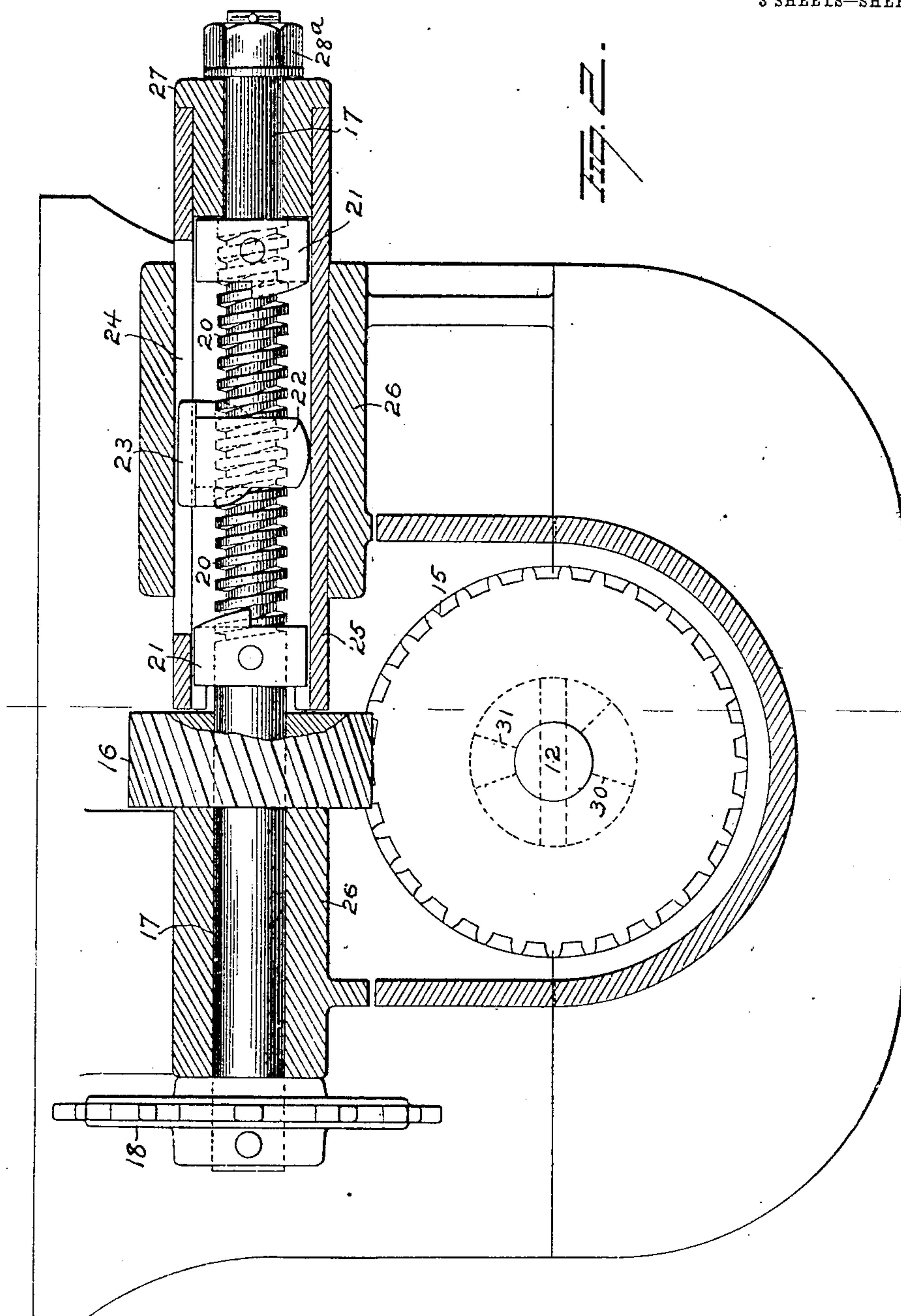
No. 850,694.

PATENTED APR. 16, 1907.

H. S. VALENTINE.  
AUTOMATIC STOP FOR ELECTRIC HOISTING APPARATUS.

APPLICATION FILED JAN. 10, 1907.

3 SHEETS—SHEET 2.



WITNESSES  
E. Nottingham  
G. F. Downing

INVENTOR  
H. S. Valentine  
By H. A. Seymour  
Attorney

No. 850,694.

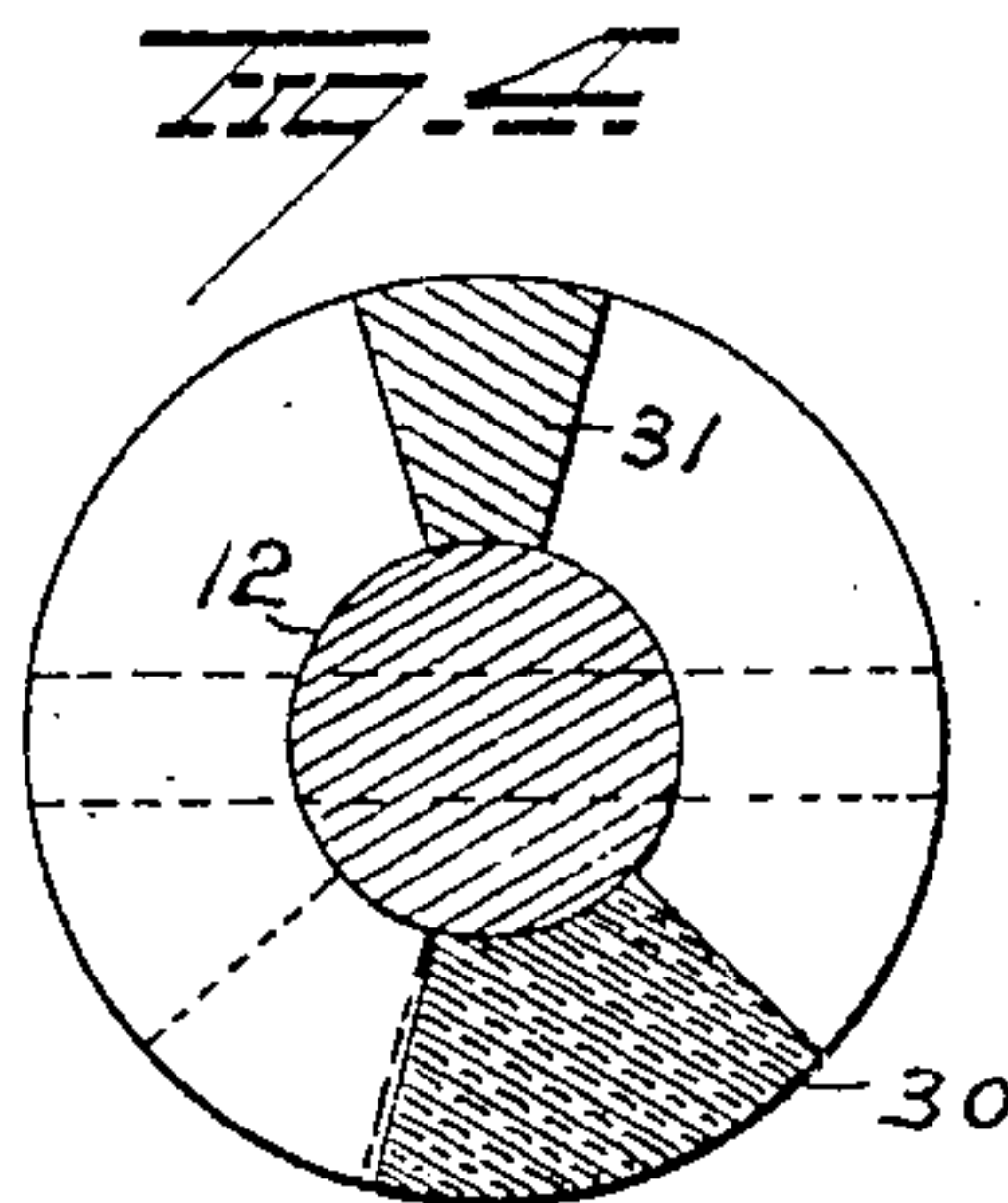
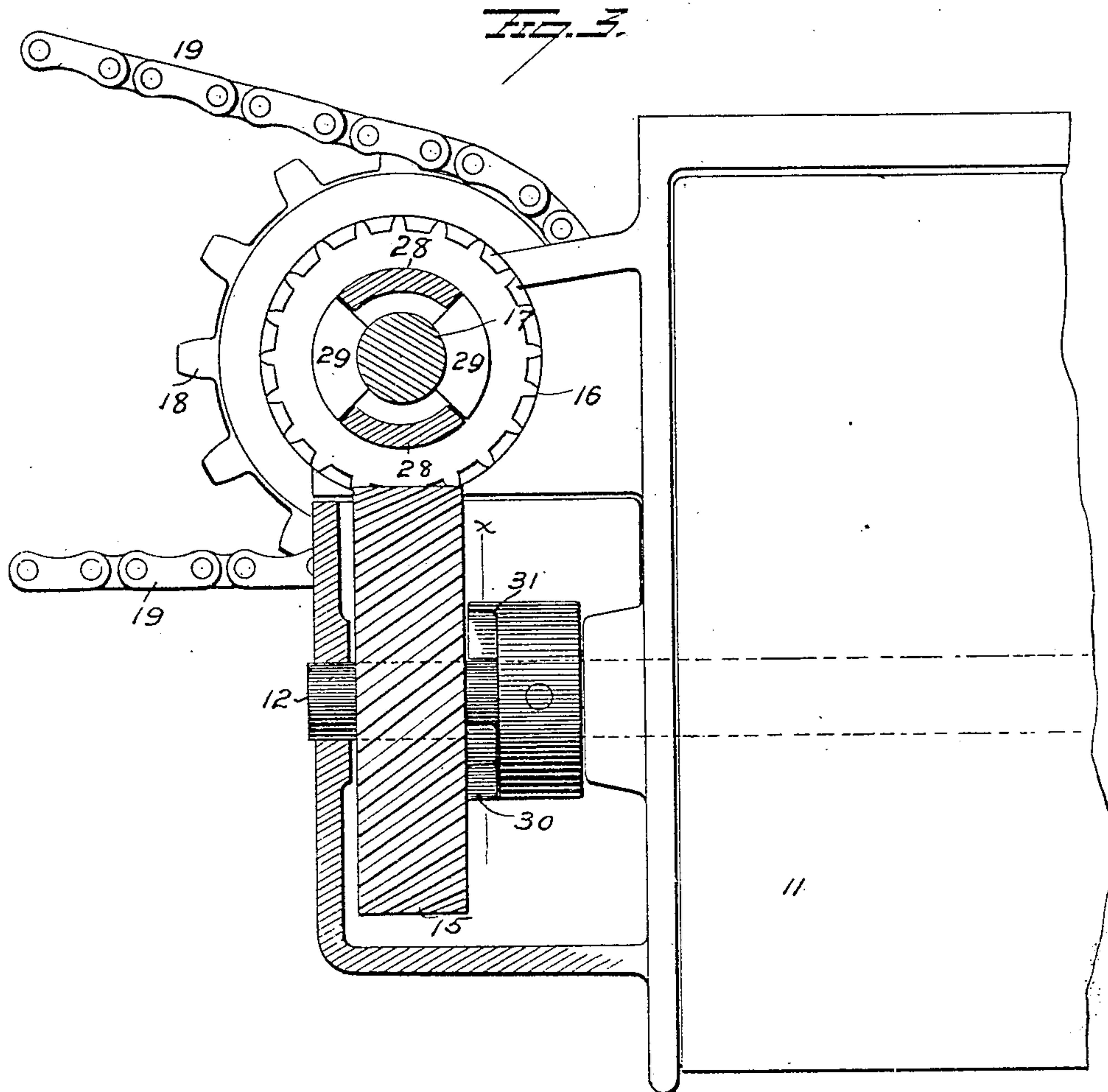
PATENTED APR. 16, 1907.

H. S. VALENTINE.

AUTOMATIC STOP FOR ELECTRIC HOISTING APPARATUS.

APPLICATION FILED JAN. 10, 1907.

3 SHEETS—SHEET 3



WITNESSES

*E. Nottingham*  
*G. J. Downing*

INVENTOR

*H. S. Valentine*  
*G. H. Seymour*  
Attorney



# UNITED STATES PATENT OFFICE.

HERBERT S. VALENTINE, OF STAMFORD, CONNECTICUT, ASSIGNOR TO  
THE YALE & TOWNE MANUFACTURING COMPANY, OF STAMFORD, CON-  
NECTICUT.

## AUTOMATIC STOP FOR ELECTRIC HOISTING APPARATUS.

No. 850,694.

Specification of Letters Patent.

Patented April 16, 1907.

Application filed January 10, 1907. Serial No. 351,662.

*To all whom it may concern:*

Be it known that I, HERBERT S. VALENTINE, of Stamford, in the county of Fairfield and State of Connecticut, have invented  
5 certain new and useful Improvements in Automatic Stops for Electric Hoisting Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable  
10 others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in automatic stops for electric hoisting apparatus; and it consists in the parts and combinations of parts, as will be more fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in elevation of a portable electric hoist embodying my invention. Fig. 2 is an  
20 end view of the controller, showing the screw and means actuated thereby for automatically operating the controller. Fig. 3 is a view, partly in section and partly in elevation, of one end of the controller; and Fig. 4  
25 is a view in section on line *xx* of Fig. 3.

1 represents the supporting or carrying frame provided at its upper end with the hook 2, by which the apparatus is suspended from an elevated support. Carried by frame  
30 1 is the motor 3, having a shaft 4, carrying at its end a pinion which engages a gear-wheel within the casing 5. This wheel is arranged in an inclined position, as shown, and its shaft is provided with a worm which meshes  
35 with a worm-wheel on shaft 6, whereby said shaft is driven by the rotation of the shaft 4 of the motor 3. Hoist-drum 7 is secured to shaft 6 and carries hoist rope or chain 8, which passes under sheave 9 in block 10.

40 Secured to the under side of the motor is the controller 11, provided with a shaft 12, carrying the controller-cylinder and having at one end a sheave around which the two actuating-ropes 13 are wound in opposite  
45 directions, the said ropes being each provided with a handle 14, by which the controller-shaft may be actuated or turned manually. With the ropes in the position shown, by pulling down on one rope 13 the motor  
50 will be started to wind or unwind the hoist-rope, and by then pulling on the other

rope the motor will be brought to a stop, and then by continuing the downward pull the direction of rotation of the hoist motor and drum will be reversed.

Loosely mounted on the end of the controller-shaft adjacent to the frame 1 is a spiral or worm wheel 15, which latter is engaged by the spiral or worm wheel 16, loose on shaft 17. This shaft is suitably mounted  
55 in bearings 26 on the controller-frame and carries at one end a fixed sprocket-wheel 18, which is engaged by an endless sprocket-chain 19, passing around a sprocket-wheel on the drum-shaft 6. From this it will be seen  
60 that when the drum 7 is rotating in either direction motion is imparted to shaft 17, thus causing them to rotate in unison. Shaft 17 is screw-threaded, as at 20, throughout a portion of its length and is provided with the  
65 shouldered stops 21, secured thereto so as to rotate therewith.

Mounted on the screw 20 intermediate the stops 21 is the shouldered nut 22, having threads conforming to the threads on the  
70 screw 20. This nut 22 is provided with a spline 23, which rests and moves in groove 24 in the sleeve 25, the latter being mounted in the bearing 26, formed on the frame of the controller.

The outer end of sleeve 25 is closed by the box 27, in which the outer end of shaft 17 rests and is supported, and the sleeve 25 and box 27 are held in place by the nut 28<sup>a</sup>, secured onto the end of shaft 17. The end of  
75 sleeve 25 adjacent to worm-wheel 16 is provided with clutch-teeth 28, which rest between clutch members 29 on worm-wheel 16. Hence it will be seen that when sleeve 25 is rotated worm-wheel 16 will be rotated and  
80 impart movement to the worm-wheel 15 on controller-shaft 12. Worm-wheel 15 is provided at its hub with a clutch member 30, adapted to engage a corresponding clutch member 31 on the controller-shaft 12.

In Fig. 4 I have shown the clutch member 31 on the controller-shaft in its position when the motor is at rest and in dotted lines when the controller-cylinder or shaft 12 has been turned to hoisting position.

In the operation of the apparatus the sprocket-chain 19 causes shaft 17 to rotate



in unison with the hoist-drum 7, and as the shaft rotates the loose nut 22, which is held against rotation by its spline 23 in groove 24 of sleeve 25, is caused to travel lengthwise the screw 22, the sprocket-chain and wheels being designed to allow a predetermined number of feet hoisting or lowering on the hoisting-drum. If through carelessness or otherwise the controller be not manually operated to stop the motor when the limit of travel for which the hoist has been set is reached, a shoulder on the traveling nut engaging one of the fixed stops 21 on shaft 17 causes nut 22 to turn and in turn rotates the sleeve 25, and the latter in turn rotates the spiral gear 16 through the clutch members 28 and 29, before referred to. The rotation of spiral gear 16 imparts rotation to the spiral gear 15, and the clutch member 30 thereof, then resting in contact with the clutch member 31 on the controller shaft or cylinder, turns the latter back to its off position or position of rest and, if the momentum be great enough, back to the first lowering step. The same is also true in lowering.

To adjust the height of lift, the hoist-rope should be wound until the lifting-hook is at the desired height and the nut 28<sup>a</sup> on shaft 17 turned in a direction to allow the sleeve 25 to be withdrawn sufficiently to disconnect its clutch members from the clutch members on spiral gear 16. The sleeve is then rotated by hand, thereby causing the traveling nut 22 to move into contact with the stop 21, which controls the hoisting motion, after which the sleeve 25 is restored to its normal position and secured by tightening up nut 28<sup>a</sup>.

With this construction the controller can be operated by hand by the ropes 13, and it is only when not stopped, either in hoisting or lowering, at the proper point that the automatic stop mechanism comes into operation and shifts the controller-cylinder back to its off position.

It is evident that many slight changes might be resorted to in the relative arrangement of parts shown and described without departing from the spirit and scope of my invention. Hence I would have it understood that I do not wish to confine myself to the exact construction and arrangement of parts shown and described, but consider myself at liberty to make such slight changes as fairly fall within the spirit and scope of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a motor-controller and a screw rotating with the motor, of means for manually operating the controller, a sleeve, means actuated by the screw for rotating the sleeve under certain conditions, and gearing connecting the sleeve and controller-shaft, one member of said gearing

being coupled to the controller-shaft by a connection which permits of a partial rotation of said shaft independent of said gearing member.

2. The combination with a motor, a controller having a rotating shaft, and a screw rotating with the motor, of a sleeve, means actuated by the screw for rotating the sleeve when the limit of the hoisting or lowering movement of the hoist-rope has been reached, gearing actuated by said sleeve, and alined stops on one member of said gearing and the controller-shaft whereby the latter is actuated by the rotation of said gearing.

3. In a stop mechanism for hoisting devices the combination with a hoist-drum, a motor, a hoist-rope, a controller and devices for manually actuating said controller, of a gear-wheel loose on the controller-shaft and having a clutch member or shoulder adapted to engage a similar member on the controller-shaft, the clutch members being so located as to permit full operating motion of the controller-shaft manually, and means for rotating said gear-wheel when the hoist-block reaches a predetermined point in either hoisting or lowering.

4. The combination with a carrying-frame, a motor, a controller, hoist-drum, and gearing connecting the motor and drum, of a screw-shaft geared to the drum so as to rotate therewith and provided with shouldered stops, a nut mounted to travel on said screw and provided with shoulders, a sleeve embracing the screw and having a groove to receive a spline on the nut, a gear-wheel loose on the screw-shaft, clutch members connecting the sleeve and gear-wheel, a gear-wheel loose on the controller-shaft and meshing with the gear-wheel clutched to the sleeve, and coupling means on the controller-shaft and the gear thereon whereby the controller-shaft is actuated by the gear-wheel when the hoist-block reaches a predetermined point either in hoisting or lowering.

5. The combination with a motor, a hoist-drum, a controller and means for manually operating the controller-shaft, of a gear-wheel loose on the controller-shaft and having a shoulder adapted to engage a shoulder on the controller-shaft and turn the latter to its off position, the said shoulders being so located as to allow free manual operation of the controller-shaft without interference from said gear, and means for rotating said gear at the limits of the hoisting or lowering movements of the hoist-chain.

6. The combination with a frame, and a motor-controller and drum carried thereby, and means for manually operating the controller, of a screw-shaft, gearing connecting the latter and drum, a gear-wheel loose on the screw-shaft, a gear-wheel meshing said first-mentioned gear and loosely mounted on the controller-shaft, means on the controller-



shaft adapted to be engaged by means on the  
gear-wheel on said shaft whereby a turning  
movement may be imparted to said shaft,  
and means actuated by said screw-shaft for  
5 rotating the gear-wheels when the hoist-rope  
reaches the limits of hoisting and lowering  
movements.

In testimony whereof I have signed this  
specification in the presence of two subscrib-  
ing witnesses.

HERBERT S. VALENTINE.

Witnesses:

SCHUYLER MERRITT,  
S. B. AVERY.