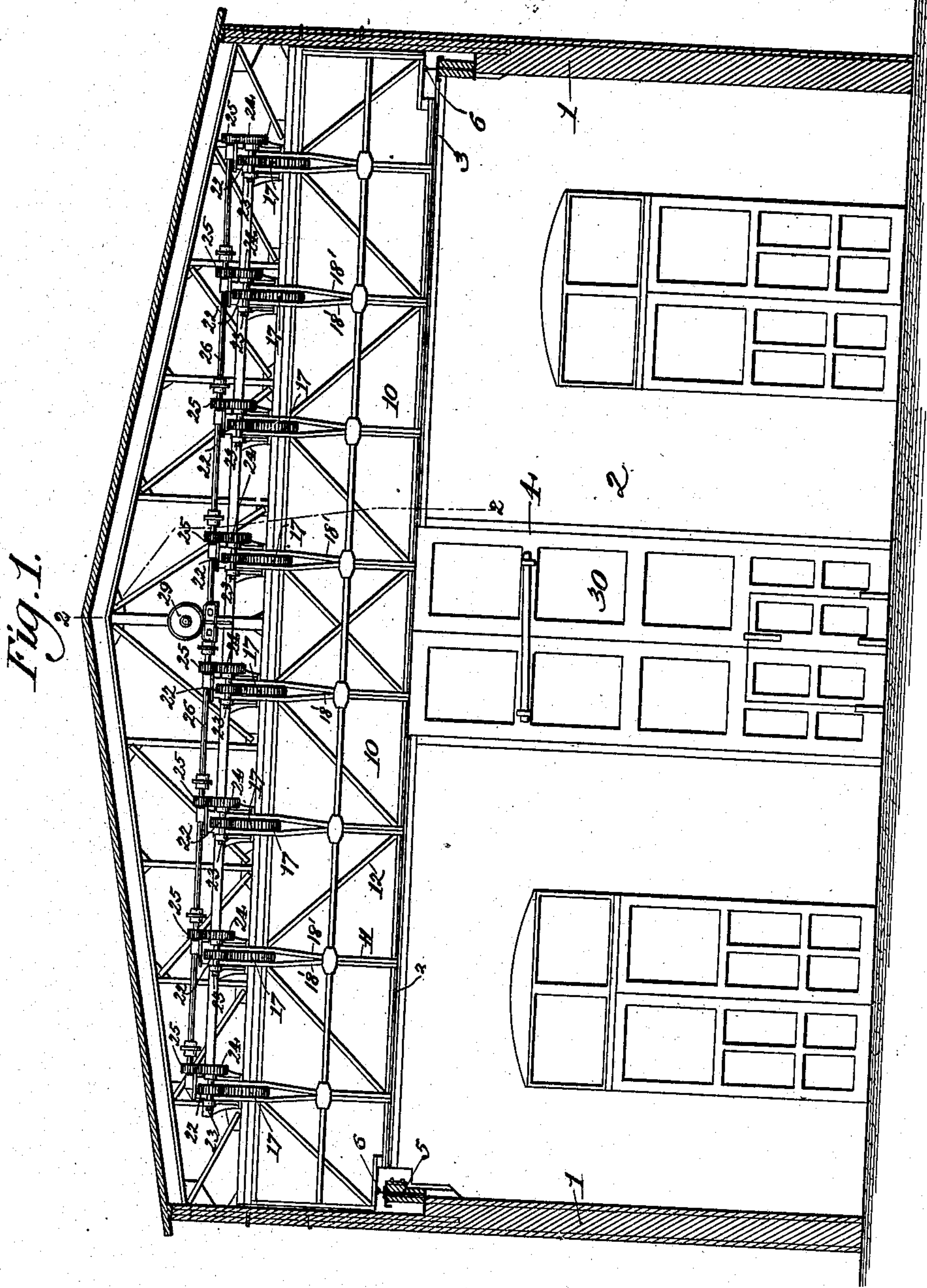


899,930.

J. T. WALLIS.  
CRANE DOOR.  
APPLICATION FILED FEB. 13, 1907.

Patented Sept. 29, 1908.  
4 SHEETS—SHEET 1.



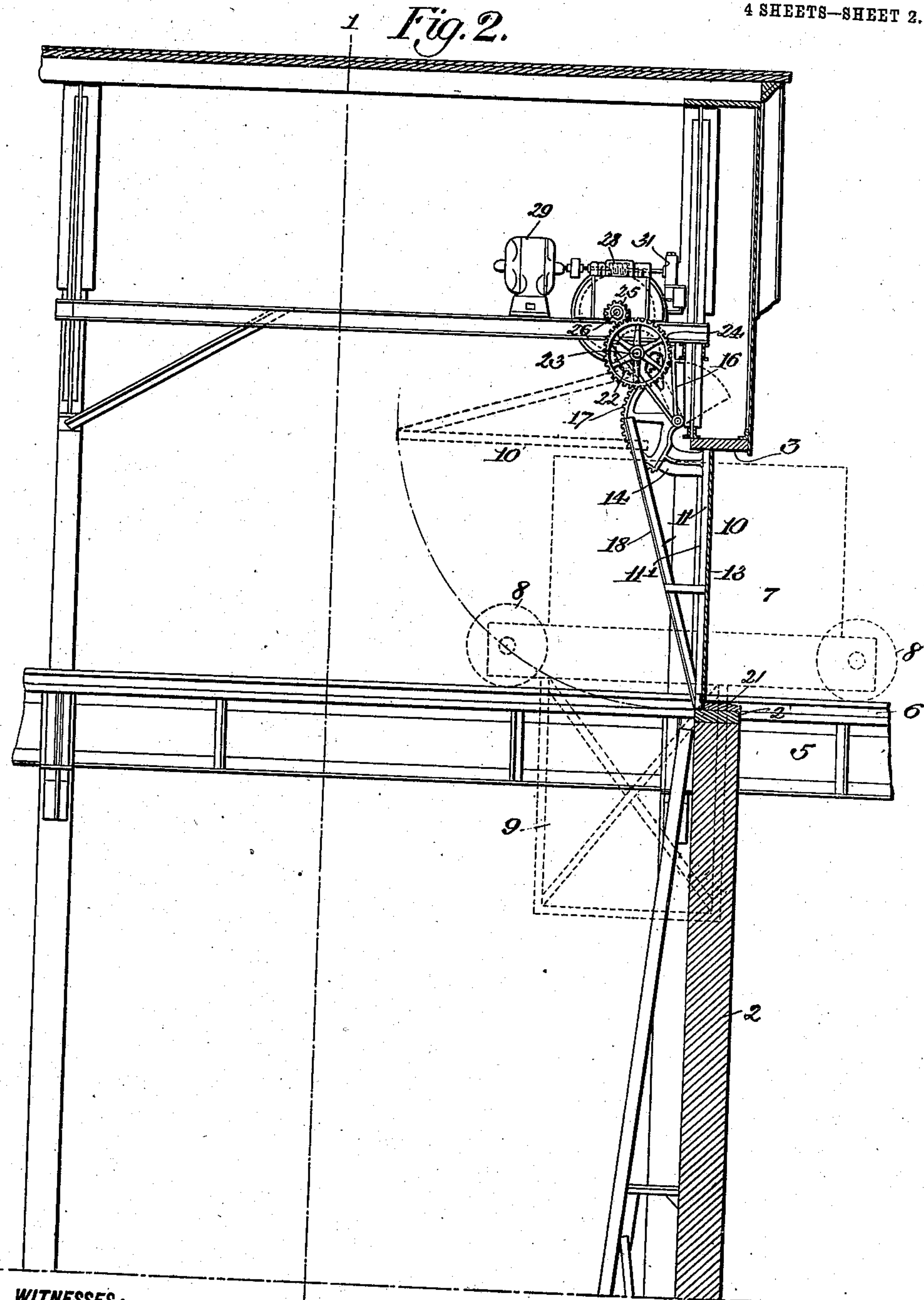
WITNESSES:  
*D. Williams*  
*E. C. Lippincott*

INVENTOR  
*James T. Wallis*  
BY  
*Francis J. Chamberlain*  
ATTORNEY.

899,930.

J. T. WALLIS.  
CRANE DOOR.  
APPLICATION FILED FEB. 13, 1907.

Patented Sept. 29, 1908.  
4 SHEETS—SHEET 2.



WITNESSES:  
*D. Williams*  
*C. E. Liffincott*

INVENTOR  
*James T. Wallis*  
BY  
*Francis J. Chambers*  
his ATTORNEY.



J. T. WALLIS.  
CRANE DOOR.  
APPLICATION FILED FEB. 13, 1907.

899,930.

Patented Sept. 29, 1908.  
4 SHEETS—SHEET 3.

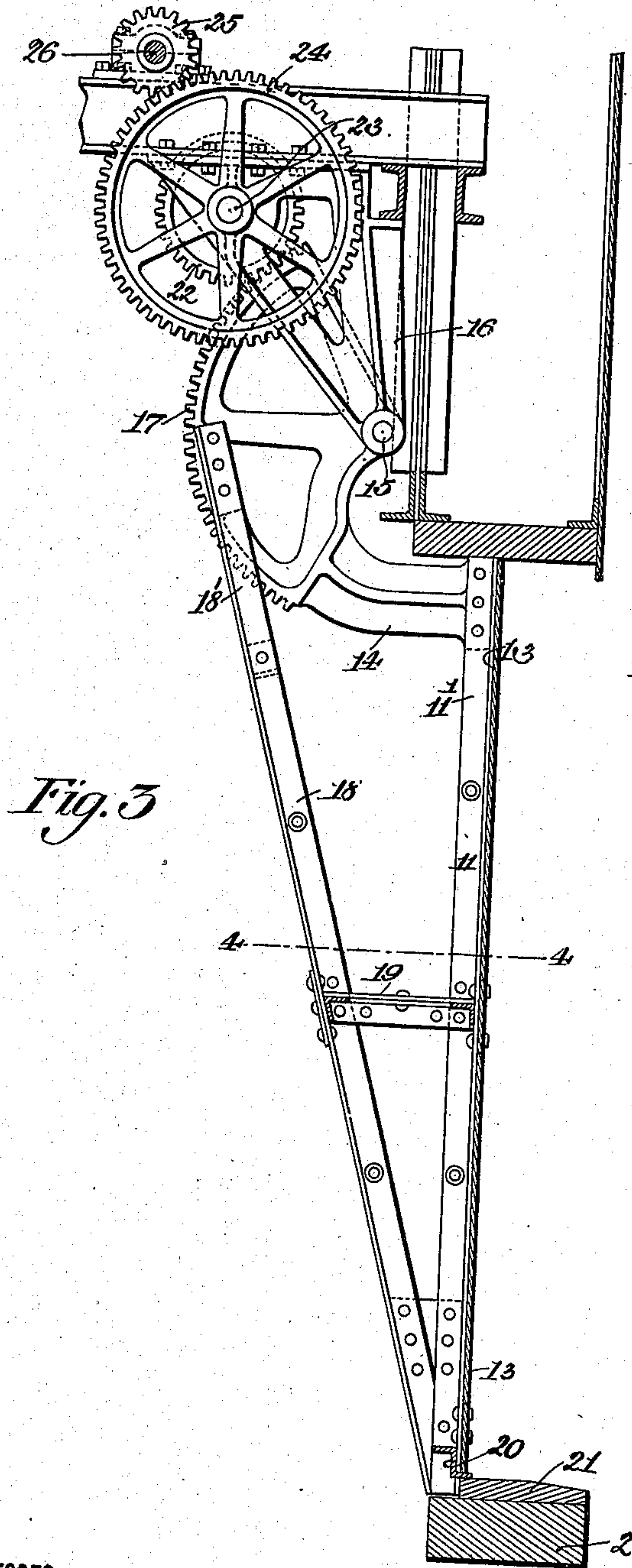


Fig. 3

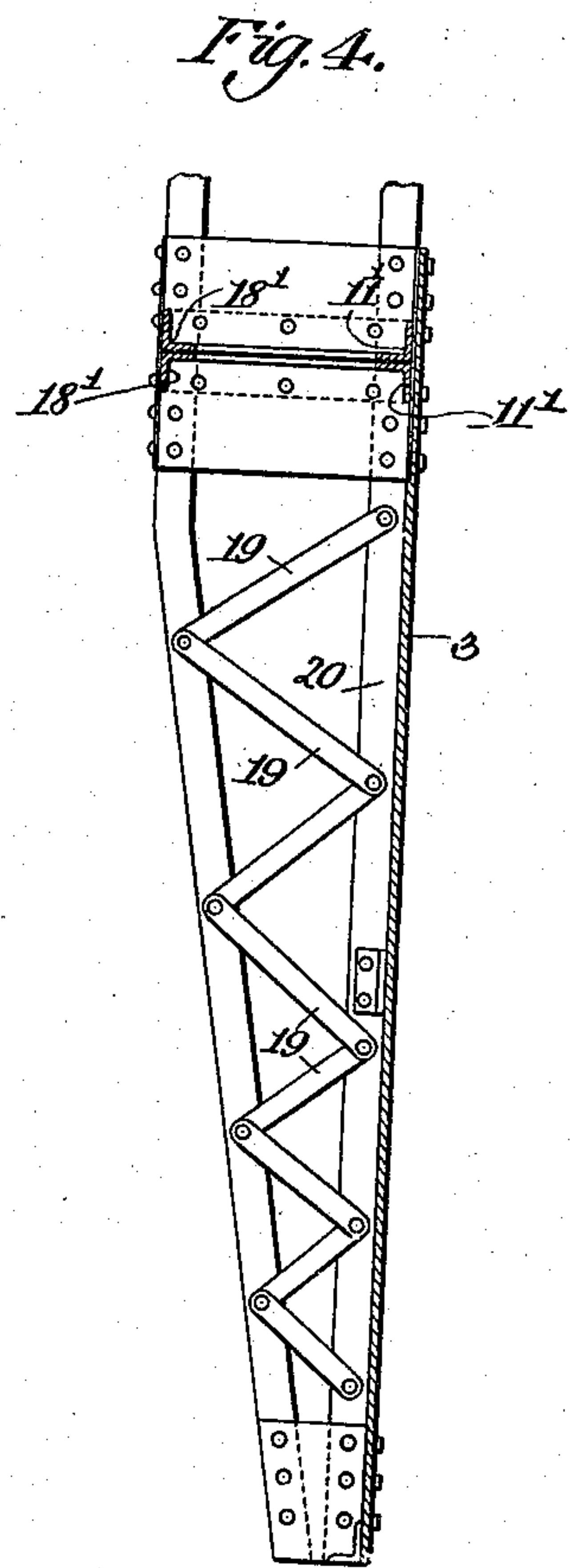


Fig. 4.

WITNESSES:

*D. S. Williams*  
*C. C. Liffincott*

INVENTOR

*James J. Wallis*

BY

*Francis J. Chambers*  
his ATTORNEY.

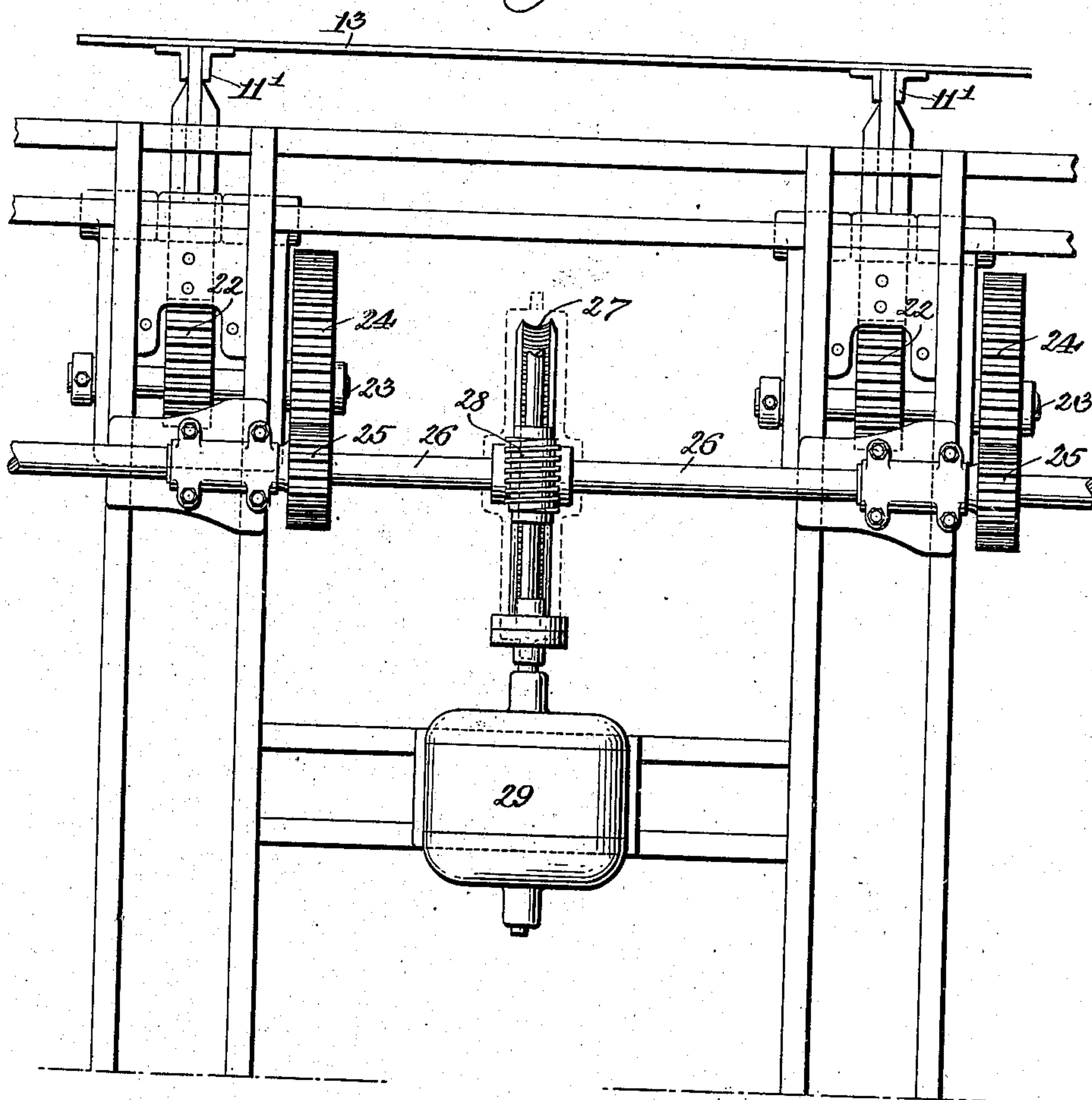
899,930.

J. T. WALLIS.  
CRANE DOOR.  
APPLICATION FILED FEB. 13, 1907.

Patented Sept. 29, 1908.

4 SHEETS—SHEET 4.

*Fig. 5.*



WITNESSES:

*D. Williams*  
*O. E. Lippincott*

INVENTOR

*James T. Wallis*  
BY  
*Francis J. Chambers*  
his ATTORNEY.



# UNITED STATES PATENT OFFICE.

JAMES T. WALLIS, OF PHILADELPHIA, PENNSYLVANIA.

## CRANE-DOOR.

No. 899,930.

Specification of Letters Patent.

Patented Sept. 29, 1908.

Application filed February 13, 1907. Serial No. 357,185.

*To all whom it may concern:*

Be it known that I, JAMES T. WALLIS, a citizen of the United States of America, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Crane-Doors, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My present invention relates to buildings equipped with overhead traveling cranes and has for its object to make suitable provision whereby such a crane may be moved through a side or end wall of the building in which it is normally located and the openings in the side wall necessary to permit said passage may be normally closed. The dimensions of the openings in the wall through which the overhead traveling crane may pass are necessarily so large that the doors for closing them must not only be large but must be made strong and heavy to withstand the high wind pressures occasionally acting on them. In consequence of this the proper arrangement and operation of such doors is a matter of importance.

The construction hereinafter described and illustrated in detail has been found in practice to fulfil all the necessary requirements and to possess many advantages of use and reliability of operation.

Of the drawings, Figure 1 is a sectional elevation taken on the line 1—1 of Fig. 2 showing a building having the crane door arrangements of my invention. Fig. 2 is a section on the line 2—2 of Fig. 1. Fig. 3 is a sectional elevation taken similarly to, but on a larger scale than Fig. 2 showing the main crane door and a portion of the operating mechanism. Fig. 4 is a section on the line 4—4 of Fig. 3 and Fig. 5 is a plan view illustrating the door operating motor and gearing which may be employed to connect it to the door.

In the drawings, 1 are vertical side walls and 2 a vertical end wall of a building. These walls may be made of brick or other masonry, or otherwise, as desired. The end wall 2 has a main crane doorway 3 and an auxiliary crane doorway 4 formed in it. The side walls 1 support sleepers or beam members 5 which in turn support the crane rails 6. As shown in Fig. 2, the beams 5 and rails 6 extend through the end wall 2. The

overhead traveling crane 7, shown in dotted lines in Fig. 2, is provided with wheels 8 which run on the rails 6 and has a cage 9 carried by the trolley of the crane (not illustrated in detail) which may be moved into line with and then through the auxiliary doorway 4. A door 10 comprising frame members 11 and 12 and any suitable sheathing 13 normally closes the doorway 3. As shown the frame members 11 may each be formed of a pair of angle bars 11' riveted together and to the sheathing which may be of metal. The upper end of each pair of members 11' forming a single frame member have secured between them one end of a hinge arm 14. Each member 14 is pivoted on a horizontal shaft 15 supported by a bracket 16 which in turn is supported from the framework of the building. The arm 14 is provided with gear teeth which unite to form a gear segment 17 concentric with the shaft 15. To strengthen the construction members 18 inclined to the plane of the door extend from the periphery of each segment 17 to the lower edge of the door. Each member 18 may be formed of two angle bars 18' riveted together, the upper ends of each pair of bars 18' being spread apart to receive the periphery of the gear segment 17 which is secured between them. The door is further strengthened by horizontal frame members 19 and 19'. The lower edge of the door is provided with a flanged bar 20, the under surface of a horizontal flange of which is adapted to rest upon the upper surface of a strap or plate 21 which may be notched to receive the ends of the frame members 11 projecting below the strap 20.

The various segments 17 mesh with small spur gears 22 carried by short shafts 23. Each shaft 23 also carries a large spur gear 24 which meshes with the proper one of a set of small spur gears 25 mounted on a shaft 26. The shaft 26 has mounted upon it midway between its ends a gear 27. The gear 27 meshes with and is driven by a worm 28 carried by the armature shaft or an extension thereof of an electric motor 29. The doorway 4 is closed by one or more door members 30 turning about a vertical axis or axes. As the doorway 4 is comparatively narrow the door or doors for it may be of the usual form and manually actuated.

In operation, when it is desired to move the crane through the wall 2 in the manner



shown in Fig. 2, the motor 29 is actuated to move the door 10 from the position shown in full lines in Fig. 2 to the position shown in dotted lines, and the door members 30 are moved into the open position. The motor 29 may be operated by any suitable controller supported on the floor of the building or at some other fixed point, or located on the crane. As the long door 10 is hinged at numerous points along its length and as the power for opening and closing the door is directly applied to each hinge, no difficulty is experienced in maintaining the door in proper parallelism as it is turned and in properly forcing the door into the closed position. The gearing described possesses the advantage that the gear 27 cannot rotate the worm 28 and hence this gearing may serve to lock the door in any desired position. To increase the positiveness of the lock any suitable brake mechanism 31 may be applied to the shaft carrying the worm 28. Advantageously this may be a brake setting automatically when the motor circuit is opened in a manner well known to those skilled in the art.

As the shafts 15 are laterally displaced from the plane of the door, the space above the door casing receives the gears 17 when they are turned to the open position as seen in Fig. 2. All the door operating parts are therefore located within the building, and the door when open and consequently unsupported at its lower edge is entirely within the building and is protected against the action of the wind.

It will be observed that with the construction disclosed the motor is located beneath the ridge of the usual double inclined roof thus obtaining the necessary head room without involving any special construction of the building.

The construction described has been found to readily and reliably operate doors many tens of feet in length and weighing many thousands of pounds and to promptly take care of the wind pressure acting on the door, which may occasionally amount to several tons.

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

1. In combination, a building having a doorway formed in the upper portion of one of its vertical walls, said doorway being of a width substantially equal to that of the wall in which it is formed, a second doorway formed below the first mentioned doorway and communicating therewith, an overhead traveling crane, the body of which is movable through the first mentioned doorway and having a cage movable through said second doorway, a door for the first doorway hinged

at the upper edge thereof, and a door or doors hinged at the sides of the second doorway. 65

2. In combination a crane door, hinge arms connected to the upper edge thereof and pivotally supported to turn about a horizontal axis, each of said hinge arms having a gear segment formed on it, a shaft, gears carried by the shaft and meshing with the gear segments on the hinge arms, a motor and gearing connecting said motor and said shaft including a worm and pinion. 70

3. In combination, a building having a doorway formed in the upper portion of one of the vertical walls, said doorway being of a width substantially equal to that of the wall in which it is formed, a second doorway formed below the first mentioned doorway and communicating therewith, an overhead traveling crane, the body of which is movable through the first mentioned doorway and having a cage movable through said doorway, a door or doors hinged at the sides of said second doorway, a door for the first mentioned doorway, hinged arms connected to the upper edge thereof and pivotally supported from the building to turn about a horizontal axis, each of said hinged arms having a gear segment formed on it, braces from the lower edge of the door to the hinged arm adjacent the gear teeth formed thereon, a shaft, gears carried by the shaft meshing with the segmental gears on the hinge arms, a motor and gearing connecting said motor and said shaft including a worm and pinion. 85

4. In combination, a building having a crane doorway formed in one of its vertical walls, a door for closing said opening, a plurality of hinge members connected to the upper edge of the door, pivotal supports for said hinge members carried within and by the building, a gear segment carried by each hinge member, gears meshing with said segments and means for simultaneously rotating said gears to turn all the hinges in the direction to move the door from the closed position in which it lies in a horizontal plane within the building. 100

5. In a building having the usual double inclined roof, a wall extending transversely to the ridge of said roof and having a wide doorway formed in its upper portion, the combination of a door for said doorway hinged at its upper horizontal edge to said building, a shaft extending parallel and adjacent to the upper edge of the door, gear connections at intervals along said shaft between it and the door and an electric motor for operating said shaft, arranged substantially beneath the ridge of said roof. 110

JAMES T. WALLIS.

Witnesses:

ARNOLD KATZ,  
JOHN E. HUBBELL.