

No. 753,631.

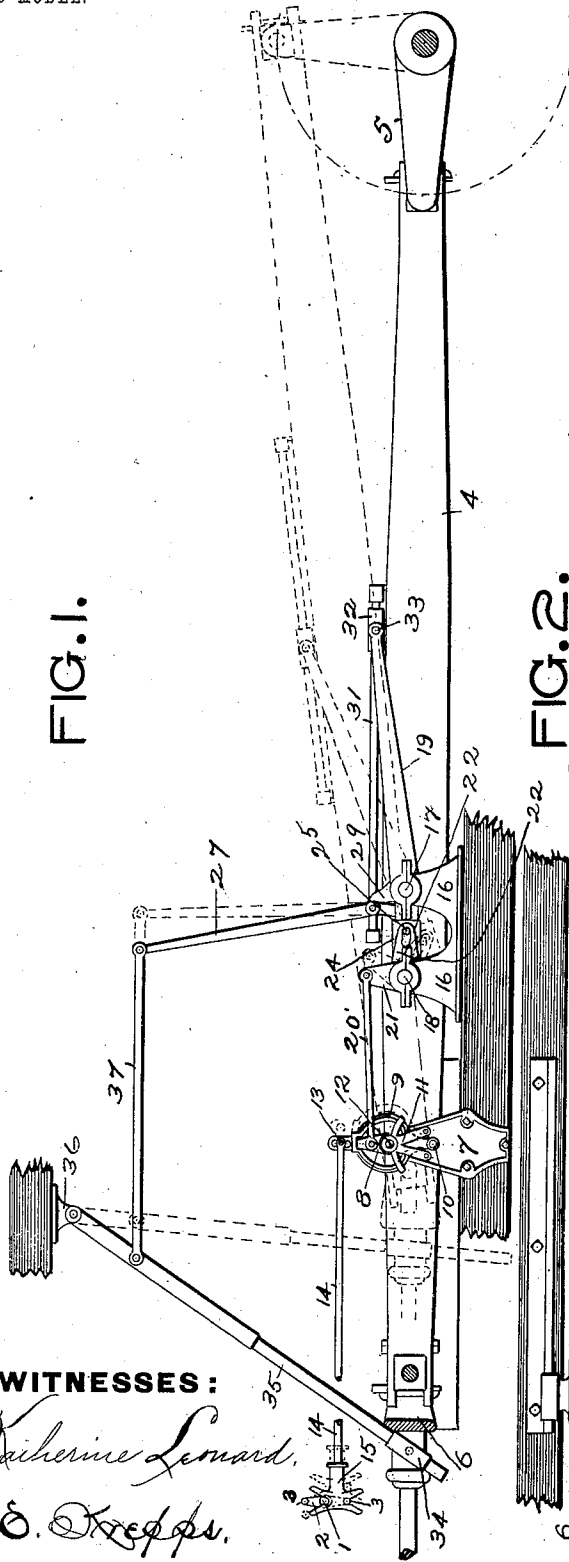
PATENTED MAR. 1, 1904.

C. ROGERS.  
CAM MOVEMENT FOR VALVES.  
APPLICATION FILED JUNE 26, 1903.

NO MODEL.

3 SHEETS—SHEET 1.

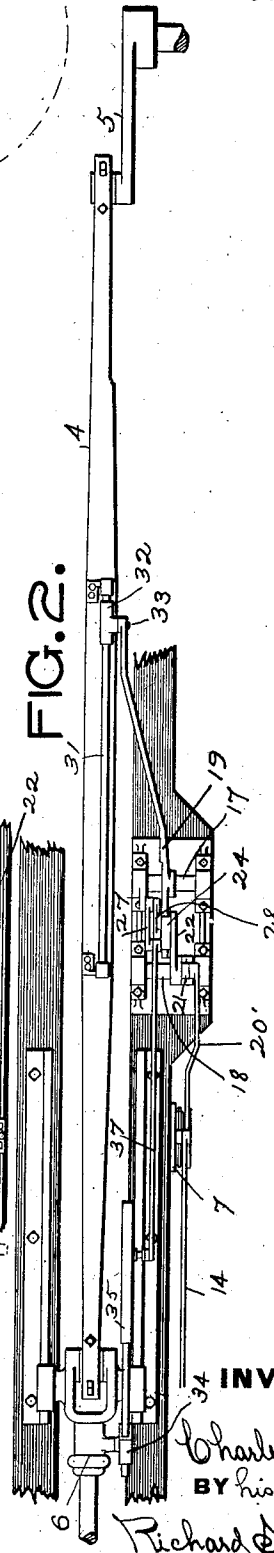
FIG. 1.



WITNESSES:

*Katherine Leonard,*  
*J. O. Krepps,*

FIG. 2.



INVENTOR

*Charles Rogers*  
BY his ATTORNEY  
*Richard S. Harrison*

No. 753,631.

PATENTED MAR. 1, 1904.

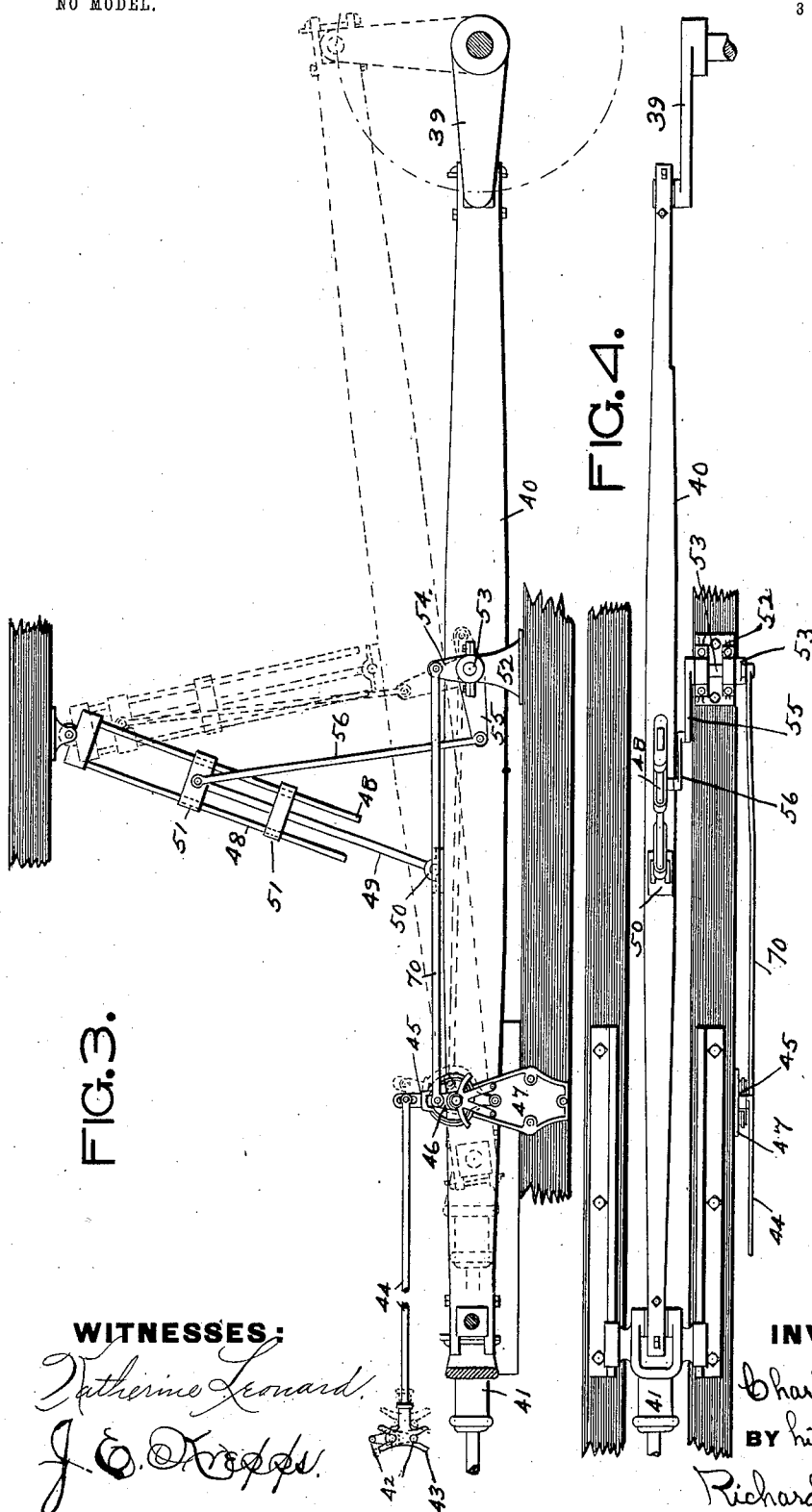
C. ROGERS.

### CAM MOVEMENT FOR VALVES.

APPLICATION FILED JUNE 26, 1903.

NO MODEL.

3 SHEETS—SHEET 2.



**WITNESSES:**

Katherine Leonard.  
J. O. Kopp.

**INVENTOR**

**Charles Rogers**  
**BY his ATTORNEY**  
**Richard S. Harrison,**

No. 753,631.

PATENTED MAR. 1, 1904.

C. ROGERS.  
CAM MOVEMENT FOR VALVES.

APPLICATION FILED JUNE 26, 1903.

NO MODEL.

3 SHEETS—SHEET 3.

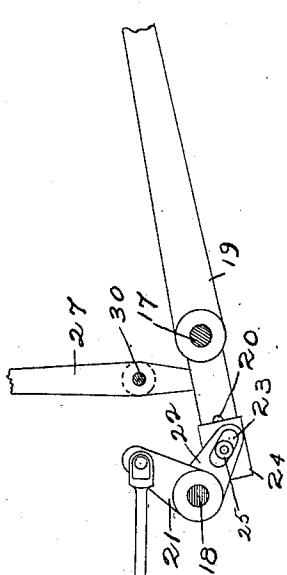


FIG. 6.

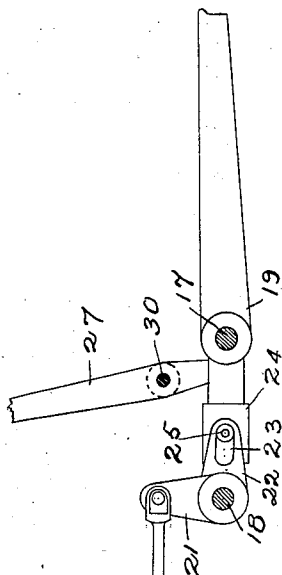


FIG. 5.

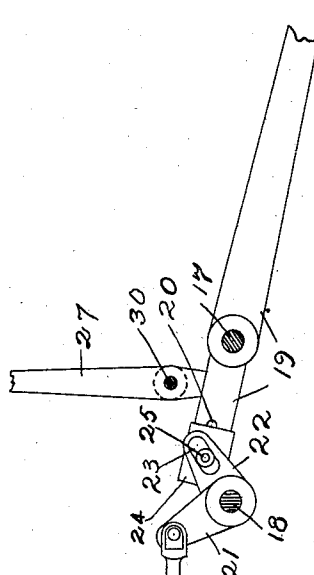


FIG. 7.

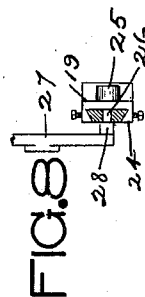


FIG. 8.

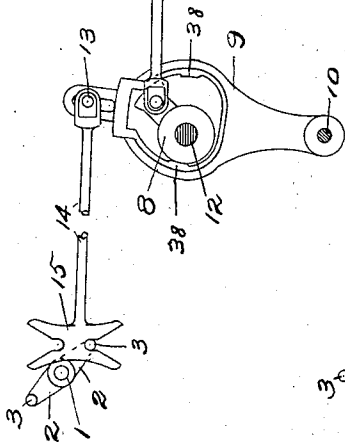


FIG. 9.

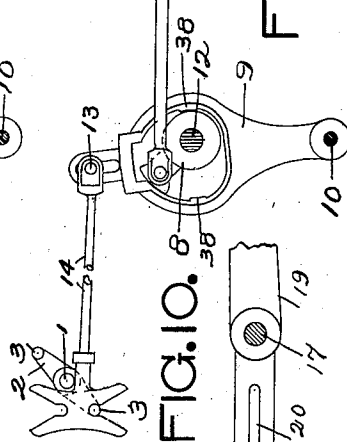


FIG. 10.

WITNESSES:

*Arthur Leonard*  
*F. O. Krepps*

INVENTOR

*Charles Rogers*  
BY his ATTORNEY  
*Richard D. Harrison*

# UNITED STATES PATENT OFFICE.

CHARLES ROGERS, OF PITTSBURG, PENNSYLVANIA.

## CAM-MOVEMENT FOR VALVES.

SPECIFICATION forming part of Letters Patent No. 753,631, dated March 1, 1904.

Application filed June 26, 1903. Serial No. 163,154. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES ROGERS, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Cam-Movements for Valves of Steamboat-Engines, of which improvement the following is a specification.

This invention relates to improvements in  
10 cam-movement for valves, and particularly applies to improvements in connection with the so-called "lever-engines," as employed on steamboats of the stern-wheel pattern. Heretofore in this class of engines the cam mechanism for operating the valves was located at the stern of the boat upon the main shaft of the paddle-wheel, where the same became broken or disabled by ropes, &c., becoming entangled in the mechanism, and thereby disabling the boat, besides was difficult to get at for oiling, repair, &c., and unreliable in its operation. Therefore the object of my invention is to provide a mechanism that is perfectly reliable and automatic in its operation  
25 and at the same time be stationed within the engine-room, where the same cannot become injured or disabled from the above causes and may be given proper attention without danger or inconvenience to the attendant.

30 In the accompanying drawings I have illustrated my improved valve-operating mechanism, in which drawings—

Figure 1 is a side view of the pitman-rod and crank and parts of the engine with my improved valve-operating mechanism operatively attached thereto. Fig. 2 is a plan view of the same. Fig. 3 is also a side view of said pitman-rod and crank and parts of the engine with my improved valve-operating mechanism operatively attached thereto, a portion of said mechanism being modified to suit conditions where the other equivalent part cannot be employed. Fig. 4 is a plan view of that of Fig. 3. Fig. 5 is an enlarged side view of the cam and attending detail parts as it would appear when in its normal position. Fig. 6 is a side view of the same as it would appear when moved by the pitman in one direction. Fig. 7 is a side view of the same as it would

appear when moved by the pitman in the opposite direction. Fig. 8 is an end sectional view through the pitman-connecting lever, showing the slide and slide-connecting lever. Fig. 9 is a side view of said slide and lever detached from the pitman-connecting lever. 55 Fig. 10 is a side view of a portion of said pitman-connecting lever.

Further referring to said drawings for a description of the detail part and their operative connection, the numeral 1 designates the oscillatable valve-stem of the engine, upon which are secured the usual cranks 2, carrying outwardly-extended pins 3.

The numeral 4 designates the pitman-rod, which is connected at one end to the crank 5, 65 attached to the shaft of the paddle-wheel at the stern of the boat and at its opposite end to the cross-head 6 of the engine.

The above-referred-to parts being old and well known in the art, the brief description 70 above given will suffice.

Secured to a beam or other suitable fixed support alongside of the pitman-rod is the vertically-disposed plate 7, having pivoted to its upper end the cam 8. This plate is further provided with a cam-yoke 9, inclosing the cam and pivotally attached to said plate 10, said yoke being held in operative position by a plate 11, secured to said plate 7 and engaging over the end of the cam-pivoting stud 12. 80 The upper end of said cam-yoke is provided with an adjustable stud 13, and connected by one of its ends thereto is a rod 14, carrying at its opposite end an X-shaped member 15 to engage over one of the outwardly-extended 85 pins of the valve-crank. At a suitable distance away from said cam-carrying plate is secured a pair of standards 16, within the bearings of which are secured a pair of shafts 17 and 18, said shaft 17 having secured thereto the lever 19, the short end of which is provided with a longitudinal slot 20 and said shaft 18 with the cranks 21 and 22, the latter crank being also provided with a longitudinal slot 23 and the former crank connected to the 95 cam 8 by a rod 20'. A slide 24 is fitted over the short end of said lever 19, which slide is provided with a roller 25 to extend into the

longitudinal slot of the said crank 22. This slide has a pin 26 projecting from its opposite side through the longitudinal slot in the said lever 19 and is connected by said pin to the lower end of the vertically-disposed lever 27 by a link 28, said lever 27 being pivotally secured to a projection 29 on one of the standards by a stud 30. Upon the pitman-rod is suitably secured a slide-rod 31, upon which rod is fitted a suitable slide 32, carrying a stud 33, which stud passes through and connects with the end of the said lever 19.

To the cross-head 6 of the engine is pivotally secured a slide-box 34, through which passes a lever 35, connected at its upper end to an overhead bracket 36, said lever being connected to the aforesaid lever 27 by a rod 37.

In operation the pitman-rod being connected with lever 19 causes the latter to perform an oscillating movement, and as said lever is connected at its short end to the crank 22 by means of the slide and roller, as set forth, the shaft upon which the cranks 21 and 22 are secured is caused to partially turn upon its axis, causing the cam 8 to be oscillated through the medium of the rod connecting the same with said crank 21. As the cam moves from its normal position the upper end thereof, passing out of the offset in the cam-yoke, is caused to move and transmit an oscillating movement to the valve through the medium of the rod 14, member 15, and valve-pins. Now as the pitman-rod will vary in its forward and after centers, occasioned by the crank in rotating, a variable movement would also be transmitted to the valve were it not for the fact that the slide 24, which connects the lever 19 with the crank 22, is caused to move upon said lever, as shown in Figs. 5, 6, and 7, through the medium of the members connecting the same with cross-head, as set forth, the roller 25, carried by said slide, being caused to adjust within the longitudinal slot of the crank, thereby shortening and lengthening or varying the fulcrum-point of action to make up for or equalize the variable movement of the said lever 19.

The peculiar shape given the cam and cam-yoke is such that the cam, in being moved out of its normal position, will cause said yoke to move a predetermined distance or until the projection 38 on the inner face thereof engages the hub of the cam, and upon assuming this position the cam is free to move or oscillate through a greater arc without further disturbing the position of the yoke or valve controlled thereby.

In the present steamboats the structure varies to such a degree that it becomes necessary to employ an equivalent means, differing in structure from that already described, for preventing the variable motion being transmitted from the pitman-rod to the cam mechanism controlling the engine-valve.

At Figs. 3 and 4, where the variation in structure is shown, the numeral 39 indicates the crank of the paddle-wheel; 40, the pitman-rod; 41, the cross-head of the engine; 42, the crank-pins on the valve; 43, the X-shaped member connected by a rod 44 with cam-yoke 45; 46, the cam; 47, the plate upon which said cam and yoke are mounted, all of which are substantially the same as previously set forth. In this instance a pendulum comprehending parallel bars 48 is suspended from overhead, and between these bars extends a rod 49, which is pivotally connected at its lower end to a bracket 50, carried by the pitman-rod, said rod 49 being provided with slides 51 to slidably engage upon said pendulum-bars. A pair of standards 52, carrying a shaft 53, provided with cranks 54 and 55, is arranged alongside of the pitman-rod, the crank 54 being connected to the cam 46 by a rod 70 and the crank 5 with one of the slides 51 by a rod 56. In this case the pitman in moving back and forth and ascending and descending causes the pendulum to oscillate and vary the distance between the suspended point thereof and the pivoting-point of the rod 49, carrying the slides with the crank 55. The ever-changing pivoted point of connection between said slide and pendulum equalizes or makes up for the variation in the pitman-rod, with the result that the crank controlling the movement of the cam moves at a uniform rate. The connecting-stud of the valve-controlling rod, with the cam-yoke, may be adjusted in the longitudinal opening of said yoke, so as to increase or decrease the movement of the valve, as desired.

In reversing the engine the member 43 is disengaged from the one valve-pin and placed over the other in the usual manner.

It is readily seen that the mechanism shown and described to effect the desired result is simple and practical and may be arranged within the boat without alteration to the structure and in position where the same cannot be injured by ropes, &c., and the attendant may give the same attention without inconvenience or danger.

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

1. In a valve-controlling mechanism for steamboat-engines, an oscillatable cam, a yoke inclosing and oscillated by said cam, a valve-controlling rod connecting said yoke with the engine-valve crank, and members connecting said cam with and movable by the pitman-rod, said yoke being provided with an offset to engage the operative end of the cam when in its normal position and having its wall thereto of peripheral contour corresponding to the throw of the cam to prevent further oscillation of the yoke after said cam has passed a given point in either direction.

2. In a valve-controlling mechanism for steamboat-engines, an oscillatable cam, a yoke inclosing and oscillated by said cam, a valve-controlling rod connecting said yoke with the engine-valve crank, adapted to be adjusted to increase or decrease the valve movement, and members connecting said cam with the pitman-rod, said yoke being provided with an offset to engage the operative end of the cam when in its normal position and having its wall thereto of peripheral contour corresponding to the throw of the cam to prevent further oscillation of the yoke after said cam has passed a given point in either direction.

3. In a valve-controlling mechanism for steamboat-engines, an oscillatable cam, a pivoted yoke inclosing and oscillated by said cam, an adjustable valve-controlling rod connecting said yoke with the engine-valve crank, and members connecting said cam with the pitman-rod, said yoke being provided with an offset to engage the operative end of the cam when in its normal position and having its wall thereto of peripheral contour correspond-

ing to the throw of the cam to prevent further oscillation of the yoke after said cam has passed a given point in either direction.

4. In a valve-controlling mechanism for steamboat-engines, an oscillatable cam, a yoke pivoted at one end and oscillated by and inclosing said cam, an adjustable valve-controlling rod connecting with the free end of said yoke and the engine-valve crank, and members connecting said cam with the pitman-rod, said yoke being provided with an offset to engage the operative end of the cam when in its normal position and having its wall thereto of peripheral contour corresponding to the throw of the cam to prevent further oscillation of the yoke after said cam has passed a given point in either direction.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

CHARLES ROGERS.

In presence of—

RICHARD S. HARRISON,  
A. J. MALONEY.