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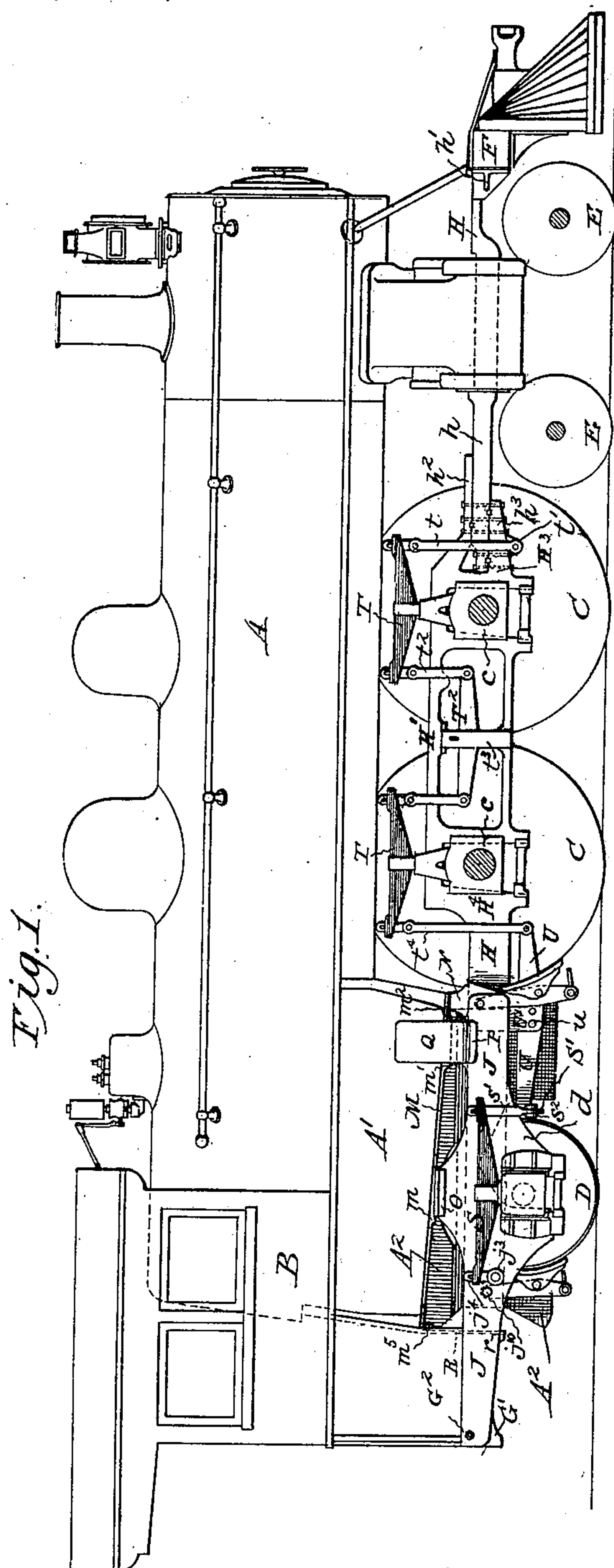
J. E. SAGUE.
LOCOMOTIVE.

(Application filed Aug. 13, 1900.)

Patented Feb. 5, 1901.

(No Model.)

6 Sheets—Sheet 1.



1. bit

Witnesses
Lidney P. Hogginsworth
Ed. Balloch

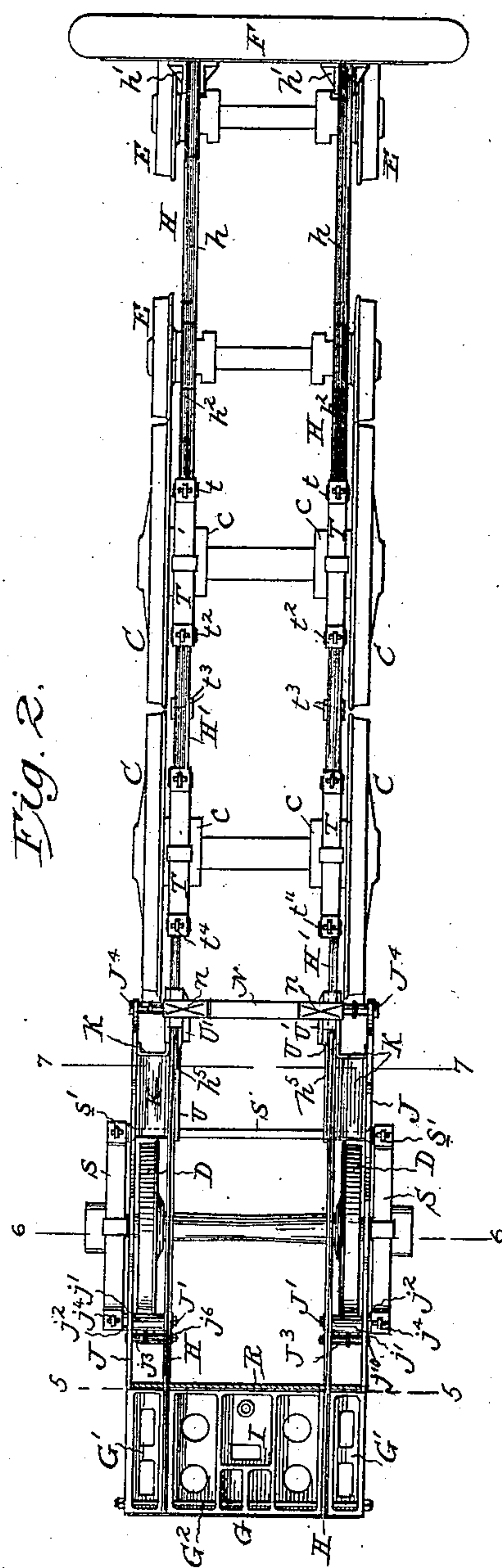


Fig. 2.

Inventor;
James F. Sague,
by his attorneys
Raldon, Dandson & Light.

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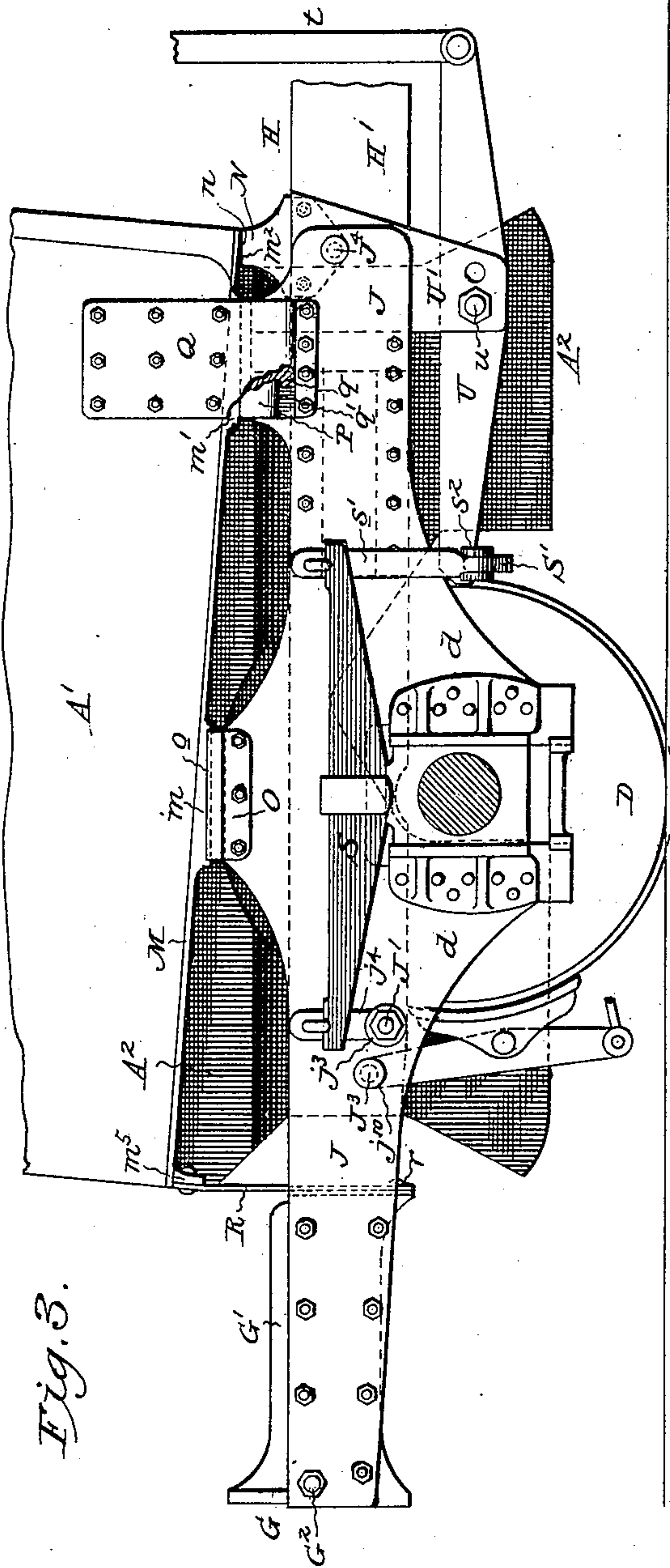


Fig. 3.

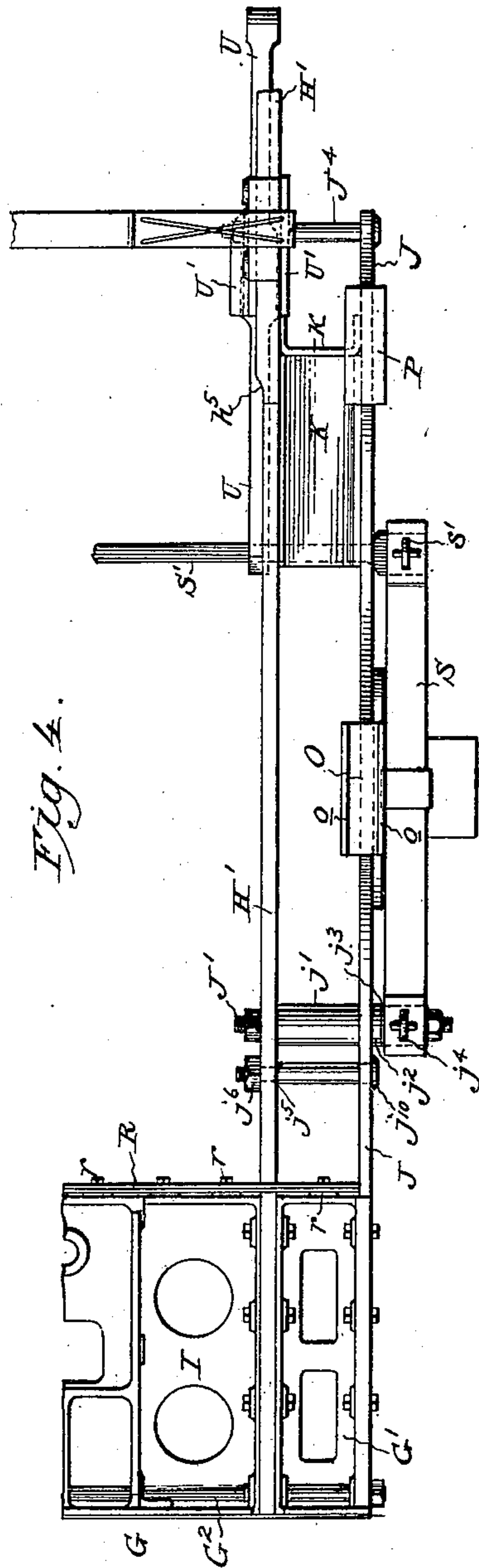


Fig. 4.

Witnesses
Sidney P. Hollingsworth
E. A. Bullock

Inventor:
James E. Sague,
by his attorneys
Baldwin Davidson & Wight.

No. 667,340.

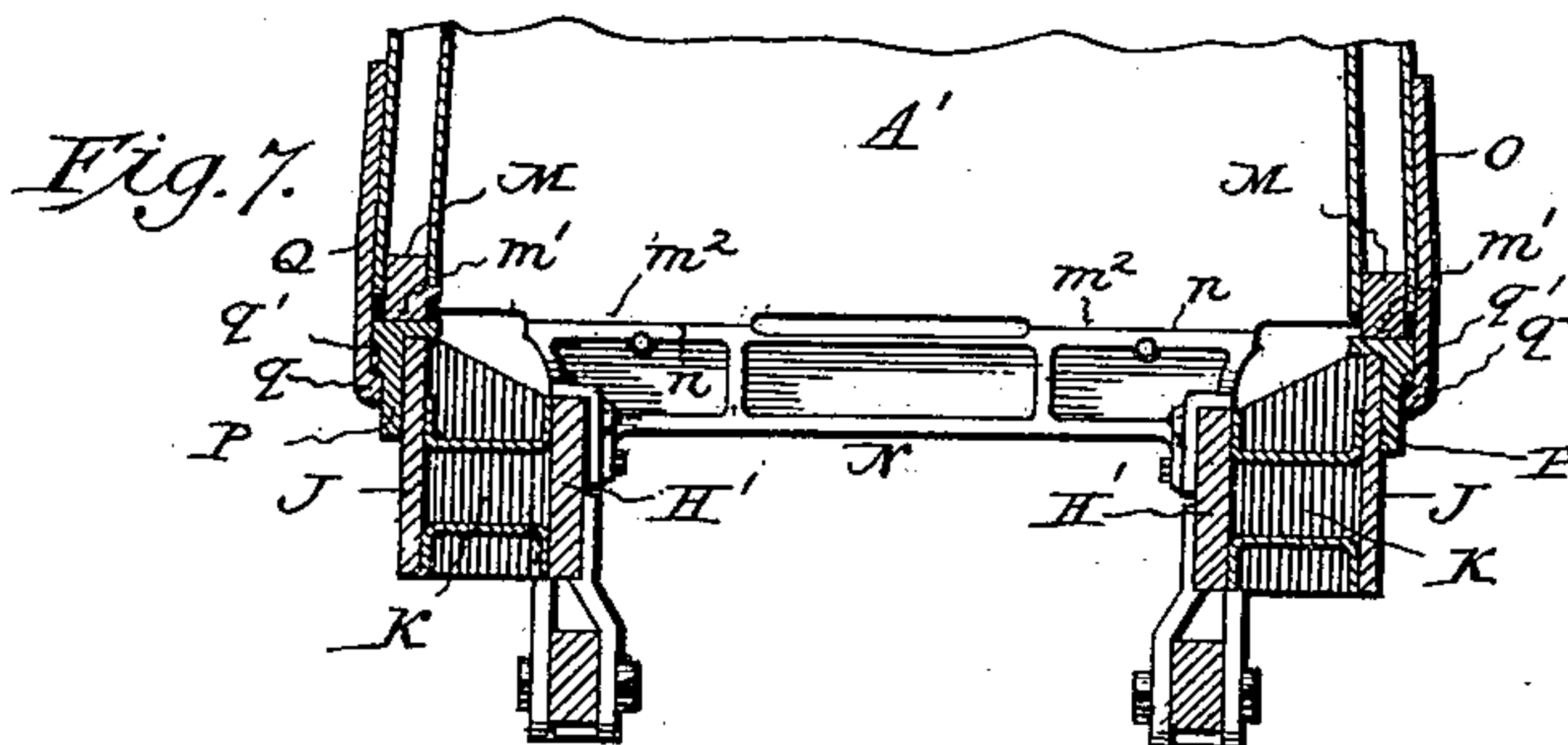
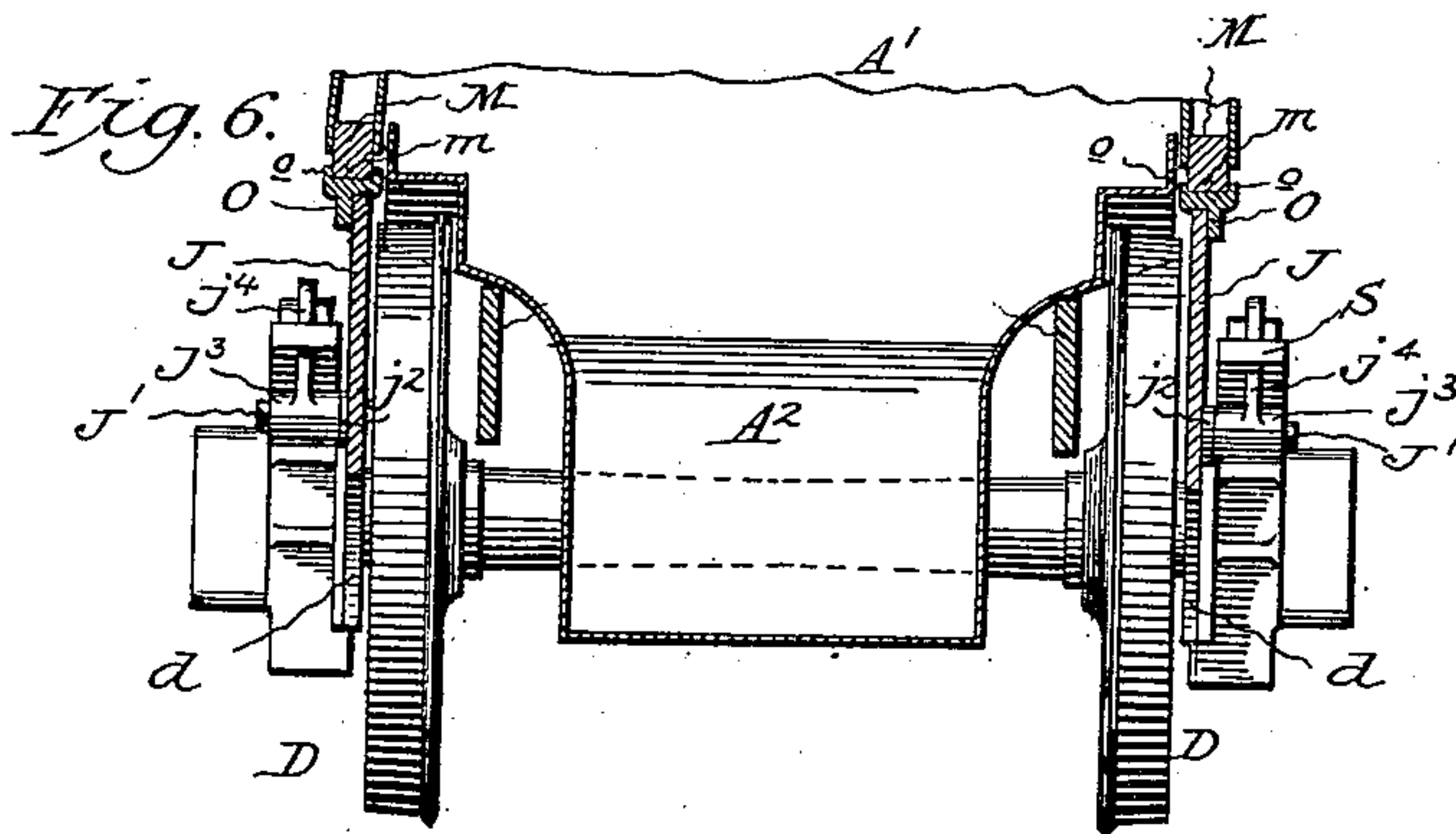
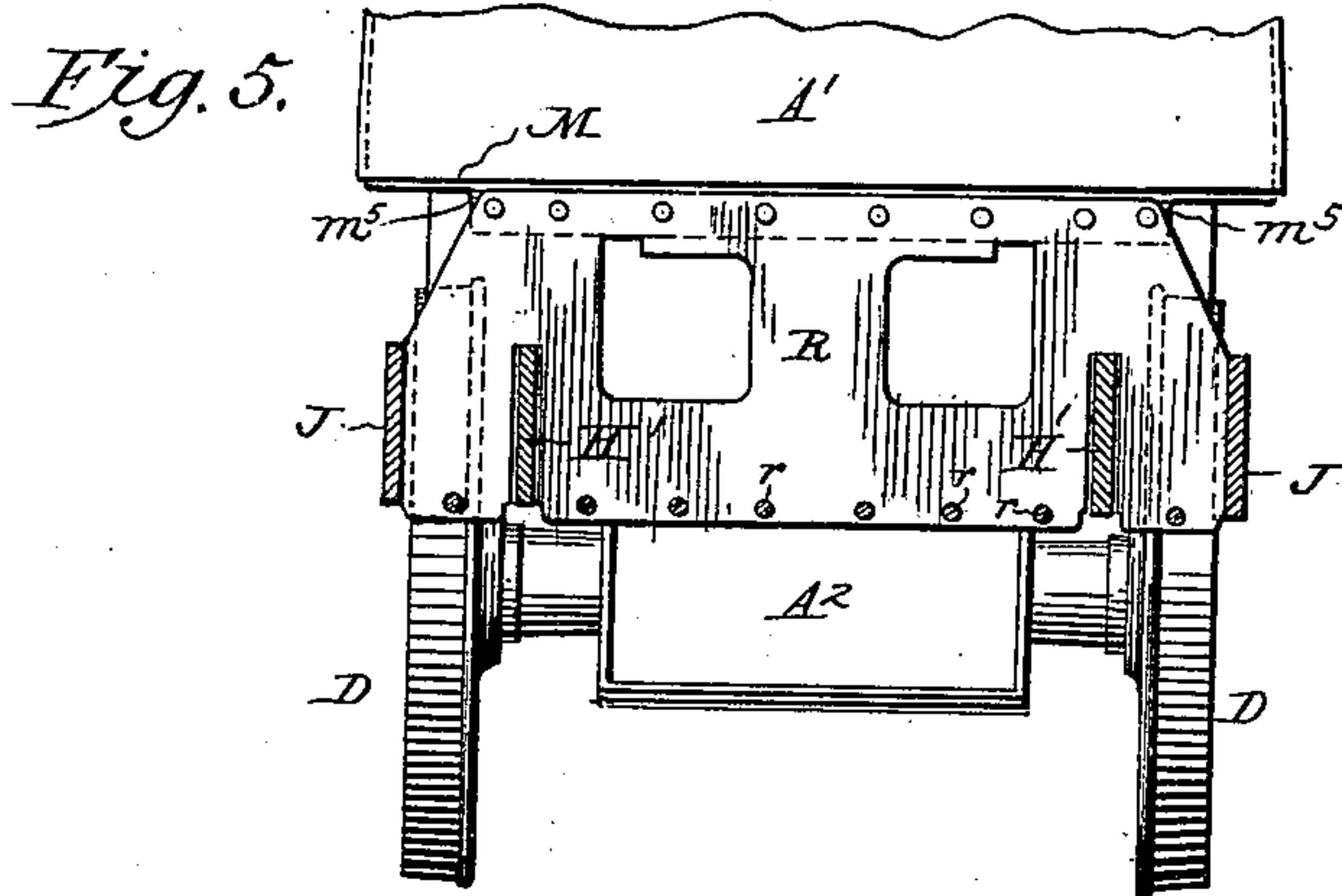
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6 Sheets—Sheet 3



Witnesses
Ludwig P. Hollingworth
E. A. Bellock

Inventor;
James E. Sague,
by his attorneys
Bredwin, Davidson & Mylet

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LOCOMOTIVE.

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Fig. 8.

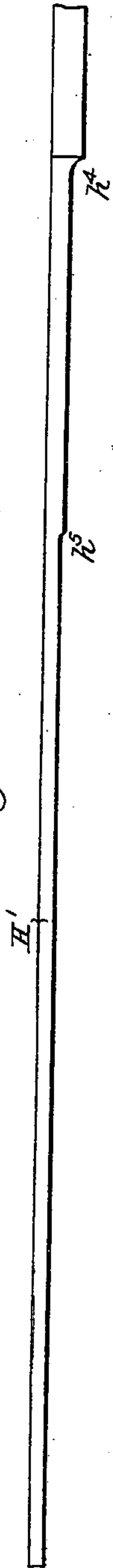


Fig. 9.

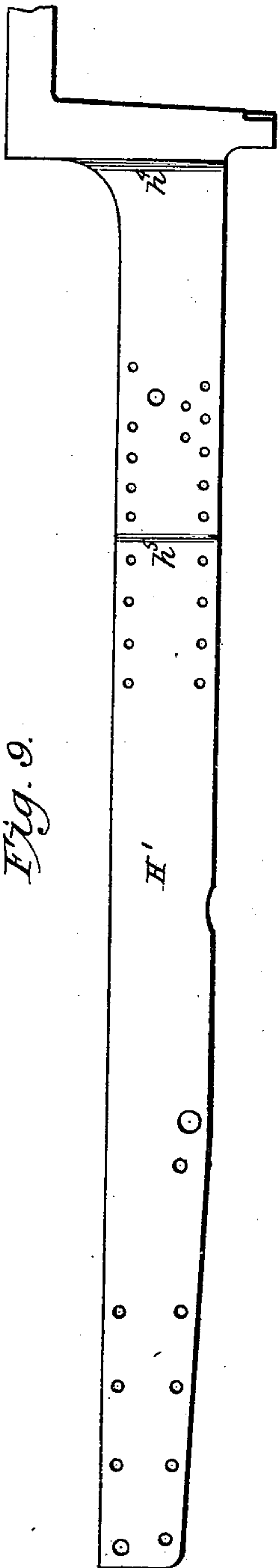


Fig. 10.

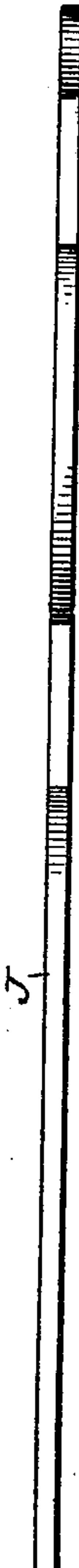


Fig. 11.

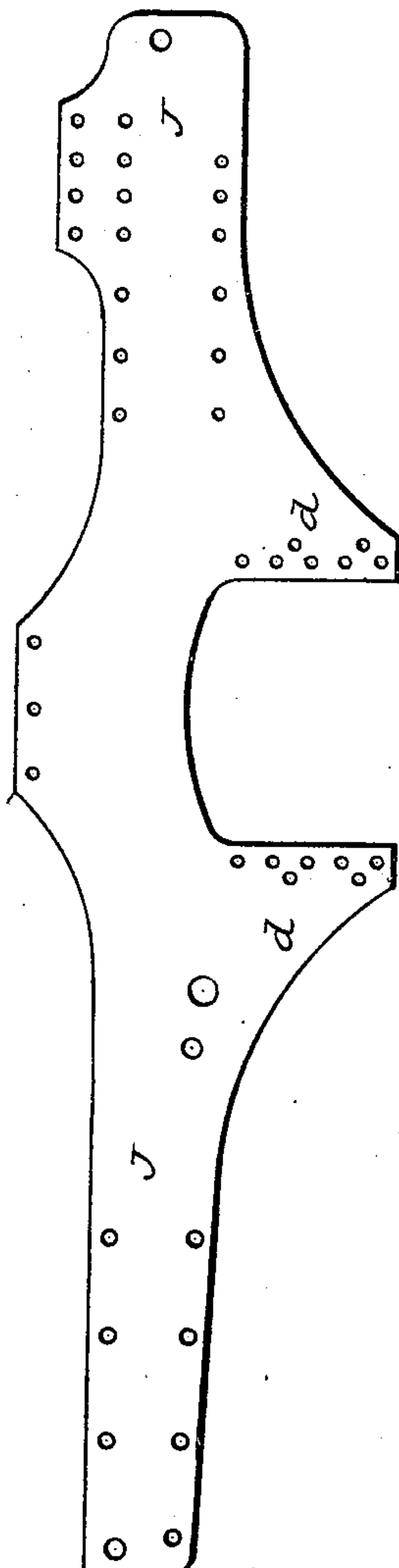
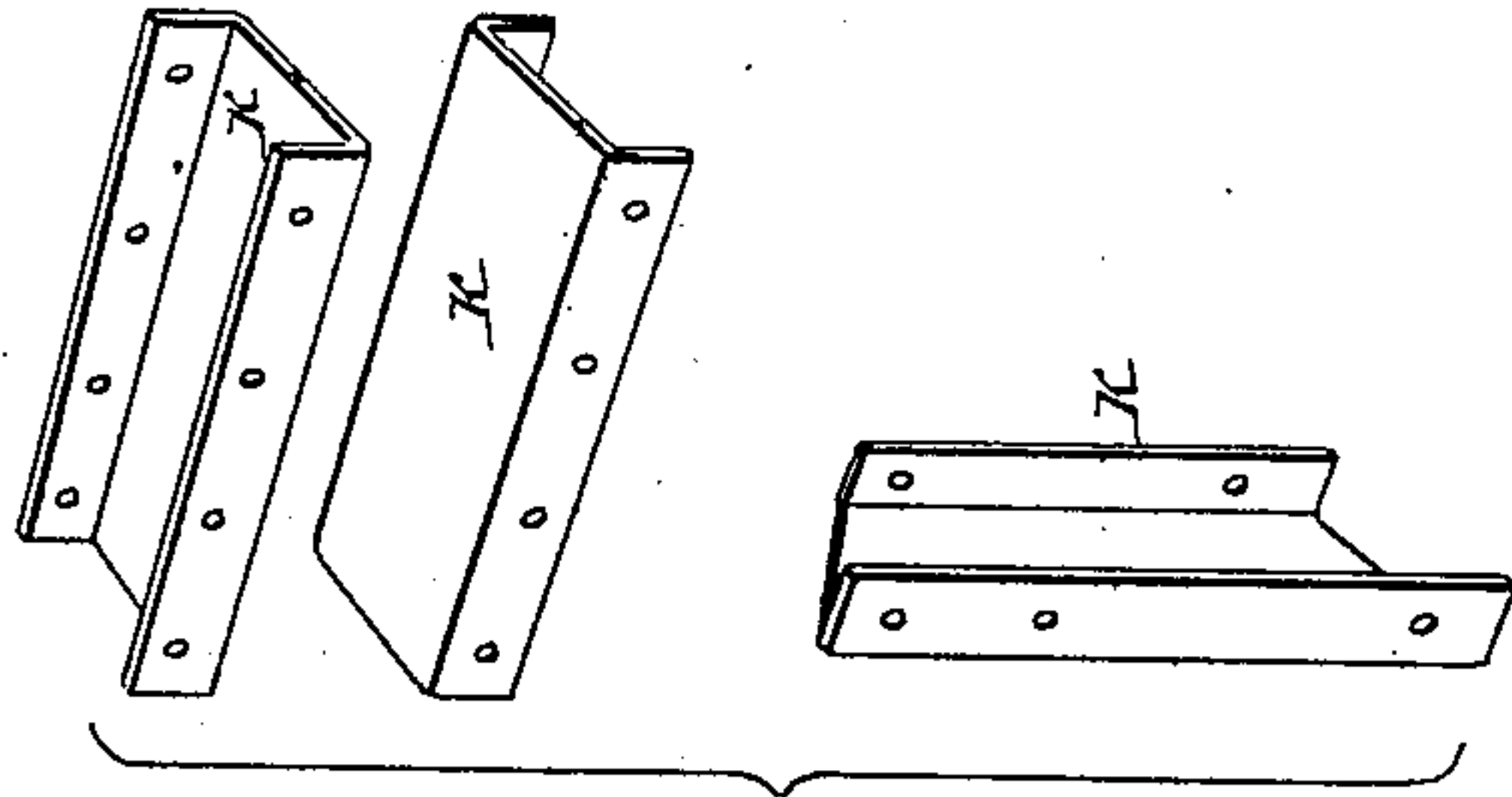


Fig. 12.



Witnesses
Sidney R. Hockingworth
E. A. Bullock.

Inventor;
James E. Sague.
by his attorneys
Barclay Davidson Wight.

No. 667,340.

Patented Feb. 5, 1901.

J. E. SAGUE.

LOCOMOTIVE.

(Application filed Aug. 13, 1900.)

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Fig. 13.

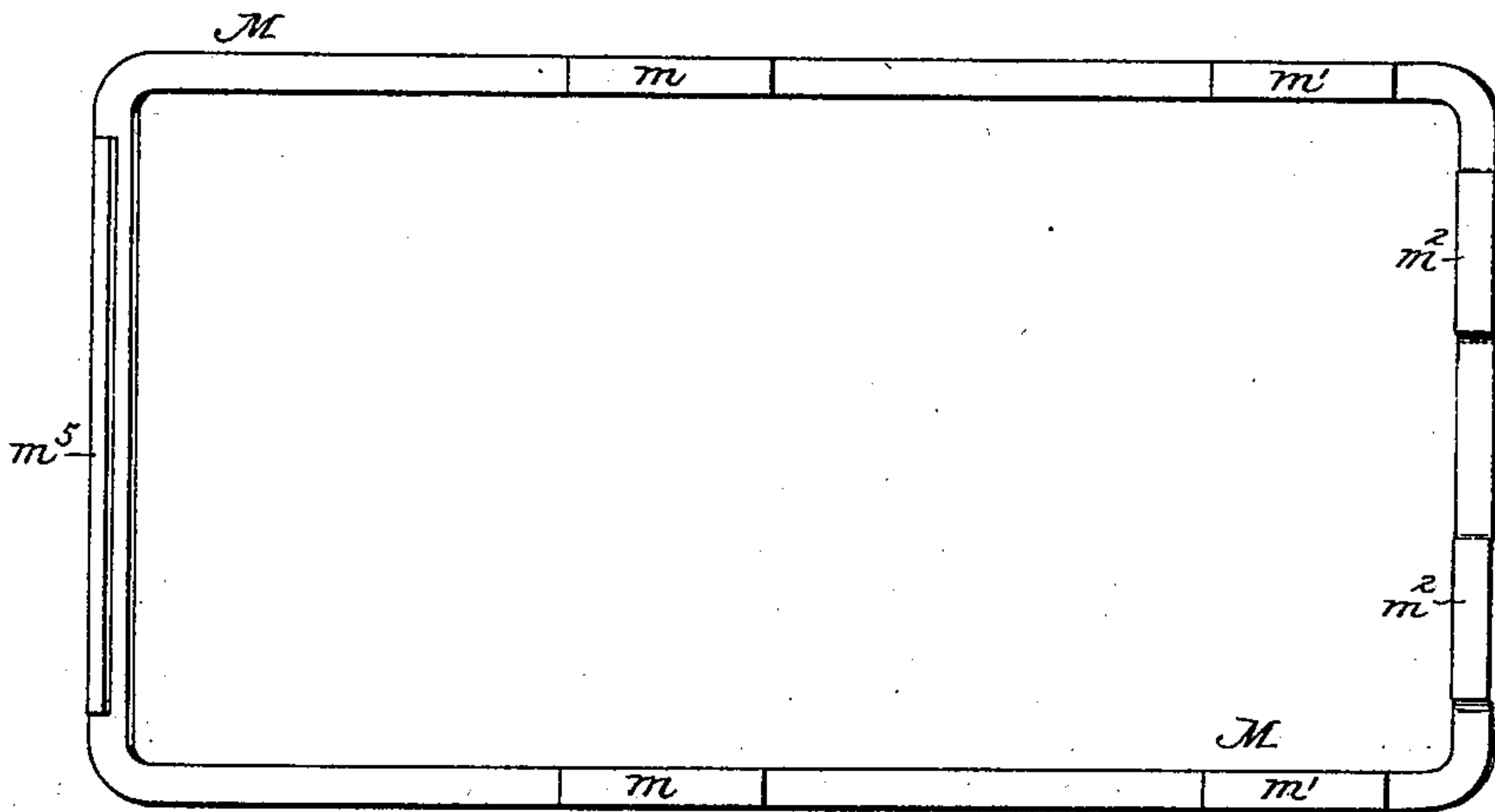


Fig. 14.

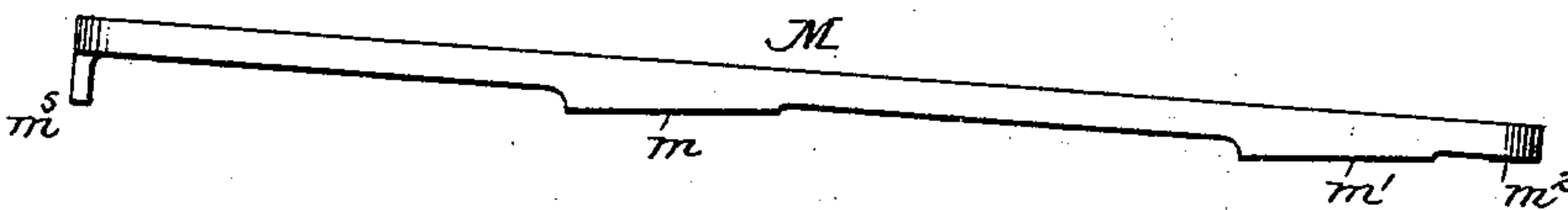


Fig. 15.

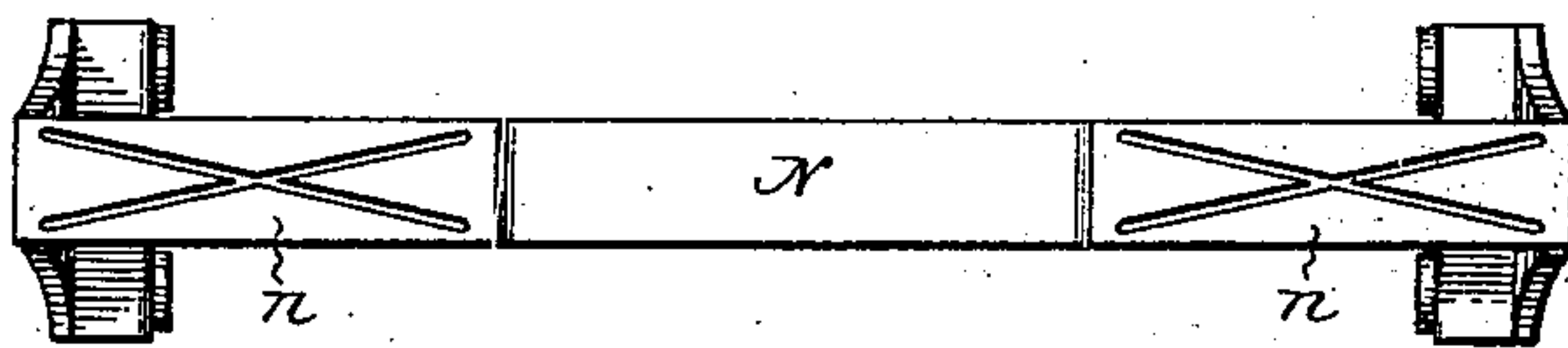


Fig. 16.

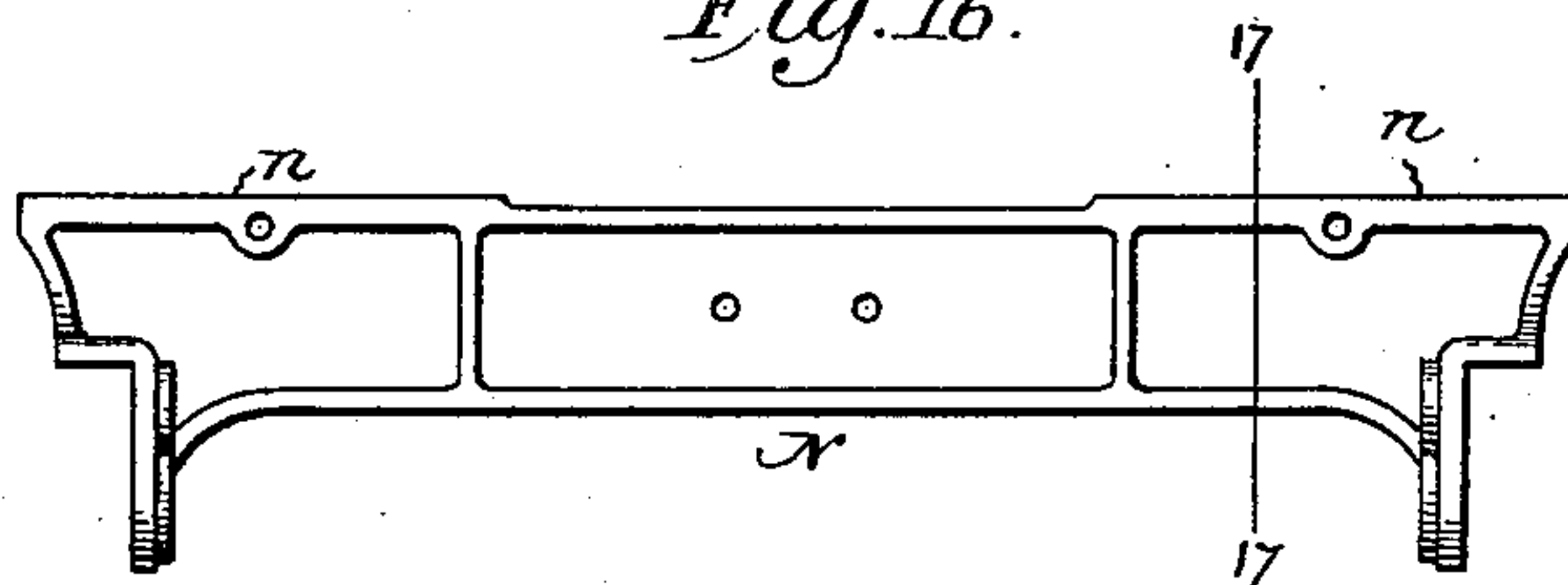
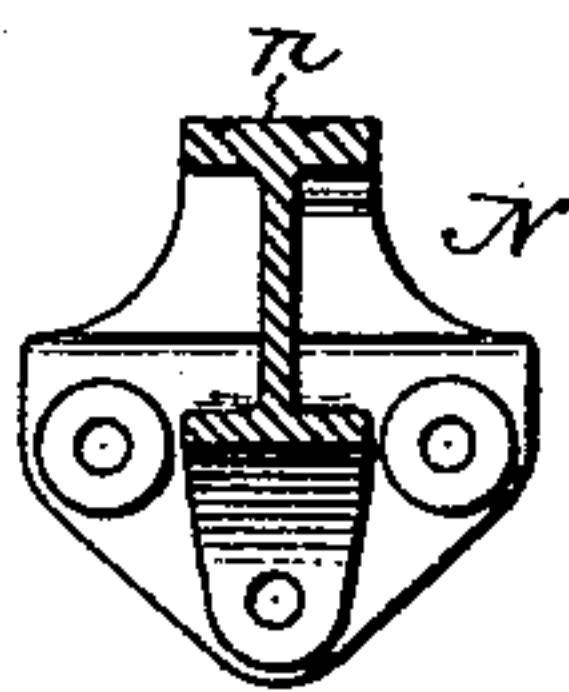


Fig. 17.



Witnesses
Sidney P. Hoellingsworth
E. A. Balloch.

Inventor;
James E. Sague,
by his attorneys
Aldwin Davidson Wright.

No. 667,340.

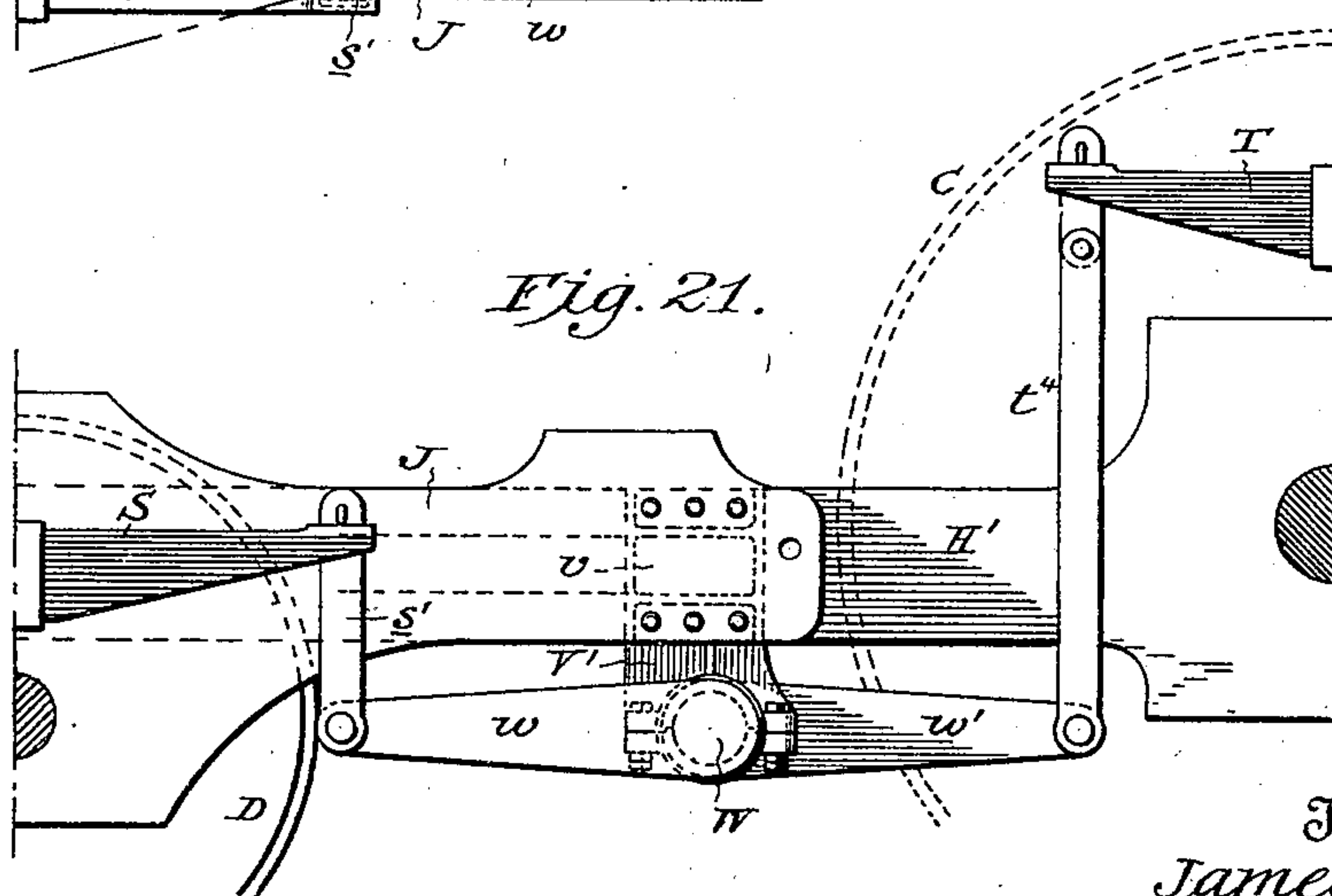
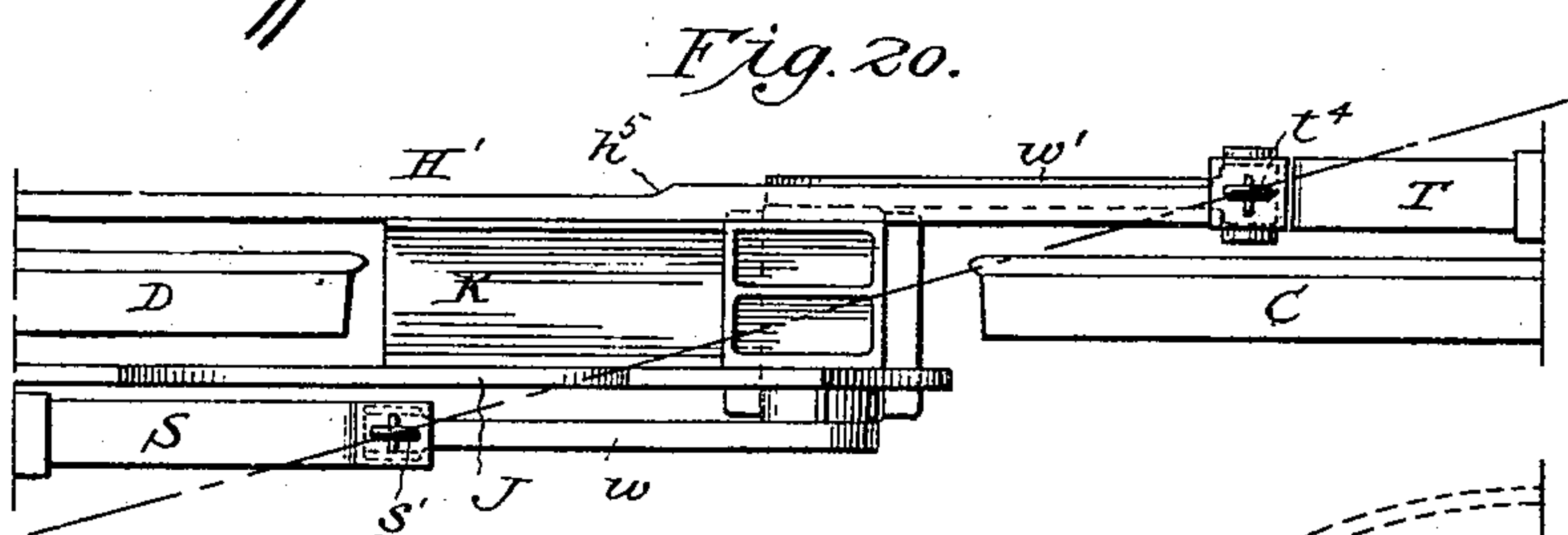
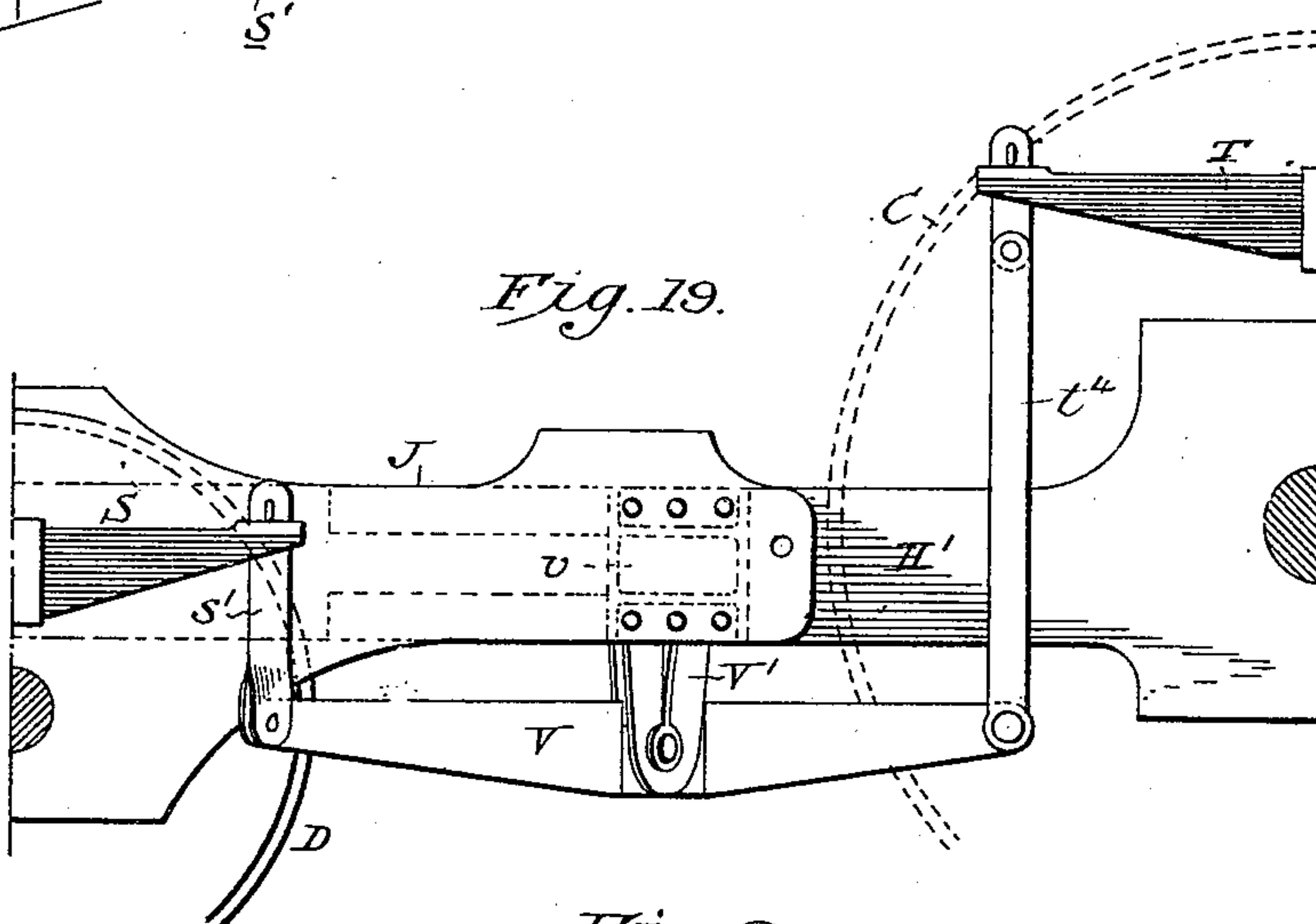
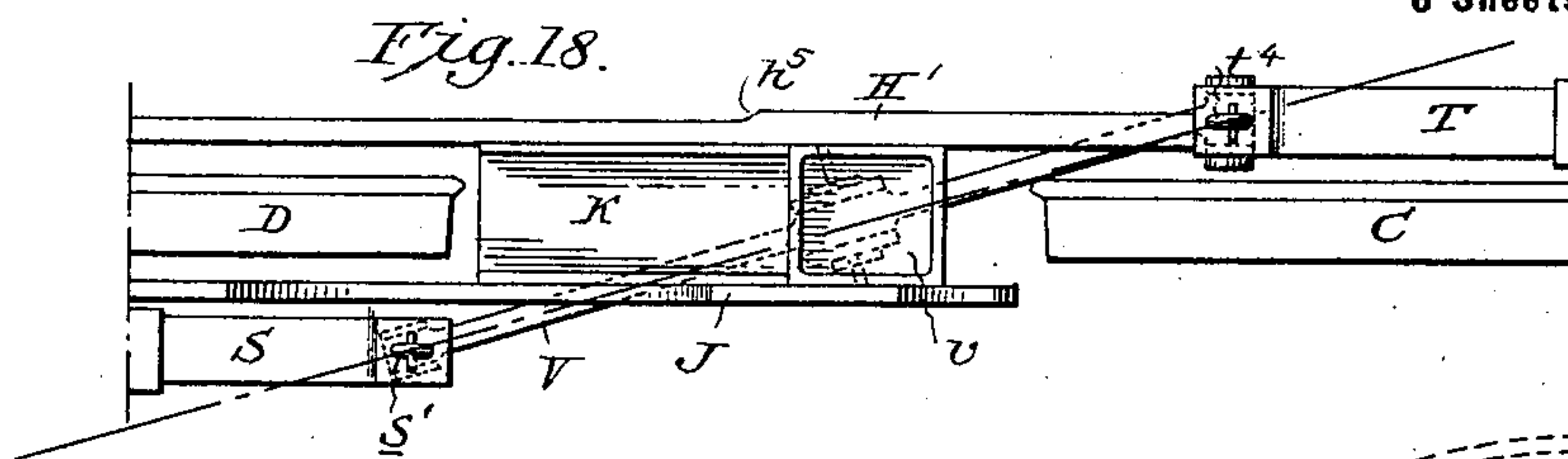
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6 Sheets—Sheet 6.



Witnesses
Sidney P. Hollingsworth
E. A. Ballock

Inventor:
James E. Sague,
by his attorneys
Baldwin, Davidson & Light

UNITED STATES PATENT OFFICE.

JAMES E. SAGUE, OF SCHENECTADY, NEW YORK.

LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 667,340, dated February 5, 1901.

Application filed August 13, 1900. Serial No. 26,779. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. SAGUE, a citizen of the United States, residing at Schenectady, in the county of Schenectady and State of New York, have invented certain new and useful Improvements in Locomotives, of which the following is a specification.

This invention relates to that class of locomotives in which the fire-box is made of extra width in order to obtain an ample grate area without unreasonably increasing the length thereof. It is desirable that the fire-box should be located at the rear of the locomotive in order that the fireman and engineer may be together. In such locomotives it is necessary to provide one or more pairs of supporting or trailing wheels under the fire-box, and in order to obtain the greatest width of fire-box and ash-pan the sides of the ash-pan should be brought as close as possible to the inner sides of the trailing wheels. In the improved locomotive hereinafter described the axle-boxes of the trailing wheels are arranged outside the truck-frame, by which construction the sides of the ash-pan may be arranged close to the inner sides of the trailing wheels, thus giving to the ash-pan a greater width than could be obtained where the axle-boxes are arranged inside the wheels. Such an arrangement also prevents the journals of the trailing wheels from being heated by close proximity to the ash-pan. The bearings are readily accessible for oiling, &c., and the lateral distance between the points of support is increased, thus making the engine much steadier and freer from a tendency to roll, as is the case where the axle-boxes are arranged inside the wheels.

While, broadly stated, it is not new to arrange the axle-boxes of trailers outside the wheels, it is new to so arrange the axle-boxes in connection with the improved devices employed for equalizing the weight, as hereinafter described.

The equalizing mechanism is of an improved construction and arranged in an improved way. Springs are mounted on top of the axle-boxes of the driving-wheels and the trailers and they are connected together by links and levers in such manner as to properly distribute the weight. The fire-box is of extra width, as above stated, and it is supported on de-

vices which allow slight longitudinal movement incident to expansion and contraction, while preventing lateral movement or lurching.

The present invention also involves certain improvements in the main frame of the truck specially adapted for a locomotive of the type before mentioned. These improvements, together with further details of construction, will be hereinafter fully explained.

In the accompanying drawings, Figure 1 shows a side elevation of a locomotive embodying the present invention. Fig. 2 is a plan view of the truck thereof. The remaining figures are on an enlarged scale. Fig. 3 is a view in side elevation of a portion of the rear end of the locomotive. Fig. 4 is a top plan view of the same with the boiler removed. Fig. 5 shows a cross-section on the line 5 5 of Fig. 2. Fig. 6 shows a cross-section on the line 6 6 of Fig. 2. Fig. 7 shows a cross-section on the line 7 7 of Fig. 2. Fig. 8 is a plan view of a portion of one of the side pieces of the main frame. Fig. 9 shows a side elevation of the same. Fig. 10 is a plan view of one of the outside frame-pieces. Fig. 11 shows a side elevation of the same. Fig. 12 shows perspective views of filling-pieces employed for separating the outside frame-pieces from the side pieces of the main frame. Fig. 13 shows a bottom plan view of the foundation-ring of the fire-box. Fig. 14 shows a side elevation thereof. Fig. 15 is a top plan view of a cross-beam employed for bracing the side pieces of the main frame between the trailing wheels and the driving-wheels and for supporting the front end of the fire-box. Fig. 16 shows a front elevation of the same. Fig. 17 shows a cross-section thereof on the line 17 17 of Fig. 16. Fig. 18 is a detail view in plan, showing a modified way of connecting the springs of the trailing wheels with the springs of the driving-wheels. Fig. 19 shows a side elevation of the same. Fig. 20 is a detail view in plan, showing another modified way of connecting the springs of the trailing wheels with the springs of the driving-wheels; and Fig. 21 shows a side elevation of the same.

The boiler A and cab B, with their appurtenances, are of usual construction. The fire-box A' and ash-pan A² are of an improved

construction and are mounted on an improved frame supported on driving-wheels C, trailing wheels D, and pilot-wheels E. The main frame is continuous, the front ends of the side pieces H thereof being secured to a buffer F, while the rear ends are connected by a frame G. The sides H are each made in two parts, the part h being preferably of relatively small area in cross-section, its front end being secured to a bracket h' , attached to the buffer, while its rear end is keyed between the jaws h^2 h^3 of a skeleton frame H', which extends therefrom to the rear cross-frame G. This frame H' is formed with pedestals or guides H³ H⁴ for the boxes c of the driving-wheels. The frame-pieces H', it will be observed, extend continuously to the back end of the locomotive over the axle of the trailing wheels, thereby transmitting the strains in a straight line.

It will be observed by reference to Figs. 2, 8, and 9 that the rear end of each side piece H' is made relatively narrow by being reduced at h^4 and h^5 , so as to increase the space between them to permit of the use of a wide ash-pan. The side pieces h and H' of the main frame on opposite sides are similar in form and are connected at their rear ends to the foot-plate I, which is bolted to them.

The outside frame pieces or plates J are of the form shown in Figs. 10 and 11, each having a guide or pedestal d extending over the axle-box of the corresponding trailer, and they are arranged outside the vertical plane of the trailing wheels over the trailing axle. The rear ends of the frame-pieces H' also extend above the trailing axle and inside the wheels, as indicated in Figs. 2 and 6.

Filling-pieces K (shown in perspective in Fig. 12) are interposed between the front ends of the outside frame-pieces J, and the adjacent sides of the frame-pieces H' are bolted thereto. The outside frame-pieces J and the inside frame-pieces H' are also connected together between the cross-frame G and the trailing axle by means of bolts. (Shown particularly in Fig. 4.) The bolt J' on each side of the truck extends through a sleeve j' , interposed between the plates J and H'. The bolt J' is provided with a collar j^2 on its outer end, and it is also extended from this collar outwardly to receive the hub j^3 , to which a link j^4 is connected. A bolt J³ is also employed for connecting the plates J and H' on each side of the truck. This bolt is headed on the outside at j^{10} and shouldered at j^5 . It is screw-threaded at its inner end and receives a nut j^6 . By means of the bolts J³ and J' and the parts connected therewith the frame-pieces are securely united. A bolt J⁴, similar to the bolt J³, is also employed for connecting the extreme front end of the plate J with the corresponding inner plate H'. Filling-pieces G' are interposed between the rear ends of the plates J and H' and are securely bolted thereto by the short bolts g , while a long through-bolt G² is made to pass through

the rear ends of all the frame-pieces J and H' and through the flanges of the filling-pieces G' and the foot-plate I. By this construction a very strong and rigid supporting-frame is provided, which is proof against lateral as well as longitudinal strains that may be brought upon the frame by the working of the locomotive.

In order to connect the boiler firmly to the back end of the frame and at the same time allow for freedom of expansion, a novel method of supporting the fire-box is provided. The bottom of the foundation-ring M (shown in Figs. 13 and 14) is formed with projections m , m' , and m^2 , which have machined surfaces and which project below the lower edges of the fire-box, as indicated in Figs. 6 and 7. The projections m are located on opposite sides of the fire-box a little to the rear of the middle portion thereof. The projections m' are arranged at the sides of the fire-box, near the front thereof, while the two projections m^2 are arranged under the front edge of the fire-box at equal distances from its opposite ends. The projections m^2 rest upon machined surfaces n , formed on a cross-beam N, connecting the plates H' of the main frame in the manner indicated in Fig. 7. The projections m rest on brackets O, secured to the outside frame-pieces J directly over the axle of the trailing wheels. These brackets O have longitudinal flanges o , into which the projections m extend, which construction prevents lateral expansion, but allows a longitudinal movement incident to expansion or contraction of the boiler. There might be a tendency for the frame-pieces J to bend just over the trailing axle; but the flanged brackets connected to the foundation-ring in the manner above described prevent any such bending. The projections m' rest on brackets P, secured to the frame-plates J near their front ends, as indicated in Figs. 3 and 7.

In order to hold the front end of the fire-box close to the frame and to provide against lurching or rolling and side motion of the front end of the fire-box, plates Q are provided. These are bolted to the sides of the fire-box and extend down below the foundation-ring and at their lower ends are each provided with a flange q , fitting under a shoulder q' in the bracket P. It will be observed that the brackets O and P extend across the edges of the plates J. The upper surfaces of the brackets are machined correspondingly with the machined under surfaces of the projections m and m' .

The foundation-ring is formed at its rear end on its under side with a flange m^5 , to which is secured a plate R, which is bolted at r to the rear cross-frame G. This plate R is slotted, as shown in Fig. 5, to extend over the main frame-pieces H', while its opposite side edges are arranged inside the frame-pieces J. The plate R being thin opposes practically no resistance to longitudinal bending, and thus permits free expansion and contraction

of the boiler, whereas it has great strength vertically and laterally, and thus secures the boiler to the frame and prevents any danger of lateral or vertical motion.

5 The fire-box, it will be observed, extends laterally outside the plane of the wheels, while the ash-pan extends below the plane of the axles, but is suitably shaped on its under side to extend over the axle of the trailing wheels.

10 Springs S are mounted on the axle-boxes of the trailers. One end of each spring is connected with a link j^4 , projecting from the hub j^3 , mounted on the bolt J^1 . The opposite end of each spring S is connected with a link s' , which is pivotally connected at s^2 with an equalizing-bar S' , which extends crosswise of the truck and connects the link s' of one spring S with the corresponding link s' on the opposite side of the truck. The bar S' , it will

20 be observed by reference to Fig. 2, extends beneath the frame-pieces H' and J and a short distance beyond the outside of the frame-piece J, so as to be in line with the springs S. The springs S are of sufficient length to hold the links s' in such position as to support the cross equalizing-bar S' in front of the trailing wheels. On top of each axle-box c of the drivers is mounted a spring T. The axle-boxes of the drivers, it will be observed, are

30 arranged inside the wheels, and the springs T are therefore out of line with the springs S. The front end of each spring T of each front driving-wheel is connected by links t with a bracket t' on the corresponding frame-piece H' . The opposite end of each of these springs is connected by links t^2 with a lever T^2 , centrally pivoted between vertical plates t^3 , secured to the frame-piece H' . The opposite end of the lever T^2 is connected to one end of

40 the spring T of the corresponding rear driver, while the rear end of this spring is connected by links t^4 with the front end of a longitudinal equalizing-lever U, pivoted at u to a bracket U' , secured to the frame-piece H' . As shown in the drawings, the bracket U' is provided with two bolt-holes; but only one need be provided, two being employed for the purpose of adjustment, if desired. The levers U are free to rock on their pivots, and their rear

50 ends extend over and rest on the cross equalizing-bar S' . The arrangement of springs and connections is the same on opposite sides of the truck and it is such that the weight is evenly distributed. Any unusual weight occurring over the trailing wheels is transmitted partially to the springs of the driving-wheels. It will be observed that the brackets U' are arranged directly under the brackets P, which support the front end of the fire-box, and thus the load is more directly transmitted. It will also be observed that the front ends of the frame-pieces J terminate in rear of the rear driving-wheels.

65 While it is important that the springs S should be arranged on top of the axle-boxes of the trailing wheels, the springs T may be hung from the axle-boxes of the driving-

wheels instead of being arranged on top of them, as shown.

The arrangement of the double frame, 70 formed by the side pieces H' and the outside pieces J affords a very efficient method of hanging the brakes. As indicated, the brake-shoes are hung from the pins J^3 and J^4 , the driving-wheels being arranged about midway 75 between the plates J and H' and the pins J^3 and J^4 being in proper position to hang the brake-shoes.

In some cases it is desirable to dispense with the cross-bar S' , as it is often desirable 80 to secure the full length of the ash-pan and avoid the necessity of reducing its area in order to accommodate the cross-bar in the manner indicated in Fig. 3 by dotted lines. To accomplish this, the link s' on each side 85 of the truck may be connected to a lever V, arranged diagonally, as indicated in Figs. 18 and 19. This lever is pivoted to a bracket V' , depending from a filling-piece v , arranged between the front end of the plate J and the 90 plate H' . The opposite end of the lever V is connected by a link t^4 with the rear end of the spring T over the axle-box of the rear driving-wheel. The lever V is inclined sufficiently to permit of the connection of the 95 two springs; but the inclination is slight and will permit the ash-pan to extend forward without reduction more than sufficient to accommodate the axle of the trailers.

Instead of employing a diagonally-arranged 100 lever the construction shown in Figs. 20 and 21 may be used. In this instance a bracket V' depends from a filling-piece v , secured to the frame-plates J and H' on each side of the truck, and carries a journal-box, through 105 which extends a short shaft W, to the outer end of which is secured an arm w , attached to the link s' . The inner end of the shaft W carries an arm w' , attached to the link t^4 . The shaft W is just long enough to permit 110 the spring S to be connected with the spring T, which latter is inside the vertical plane of the spring S. The latter arrangement is perhaps better adapted to accommodate the brake mechanism, as it affords more clear- 115 ance for the brakes. The arrangement on opposite sides of the truck is of course precisely the same.

While the drawings show two sets of driving-wheels and two pairs of pilot-wheels, the 120 invention is obviously applicable where a single pair of driving-wheels or more than two pairs are employed or to a locomotive in which a two-wheeled forward truck is used. It is obvious also that the invention may be 125 applied to a locomotive having two or more pairs of supporting or trailing wheels with outside bearings instead of one pair of such wheels.

I do not herein claim the specific forms of 130 equalizing mechanism shown in Figs. 18 to 21, inclusive, as such mechanism is claimed in my application for patent filed October 19, 1900, the mechanism shown in Figs. 18 and

19 being claimed in my application, Serial No. 33,552, and the mechanism shown in Figs. 20 and 21 being claimed in my application Serial No. 33,553.

5 Where I have referred in the specification and claims to the "truck" of the locomotive, I intend to mean the "frame" which supports the boiler, fire-box, &c., and do not refer particularly to any one part of the running-gear.

10 I claim as my invention—

1. The combination of the driving-wheels, their axles and axle-boxes, the trailing wheels, their axle and axle-boxes, the front side pieces, the rear side pieces secured to the rear ends
15 of the front side pieces and extending over the axles of the drivers and trailers to the rear end of the truck, the outside frame-pieces extending over the boxes of the trailing wheels and arranged outside the trailing wheels,
20 means for connecting the outside frame-pieces to the rear side pieces, a cross-frame in rear of the trailers, to which the rear ends of the rear frame-pieces are secured, and a fire-box extending over the trailing wheels and sup-
25 ported on the outside frame-pieces.

2. The combination of the driving-wheels, their axles and axle-boxes, the main side frames extending from front to rear of the truck, and over the axles of the drivers, the
30 trailing wheels, their axle and axle-boxes, the outside frame-pieces extending over the boxes of the trailers, outside the trailing wheels, means for securing the outside frame-pieces to the inside frame-pieces, and a fire-box ex-
35 tending over the trailing wheels and supported on the outside frame-pieces.

3. The combination of the driving-wheels, their axles and axle-boxes, the main frame inside pieces extending from front to rear of
40 the truck, the trailing wheels, their axle and axle-boxes, the outside frame-pieces arranged outside the trailing wheels and over the axle-boxes thereof, a plate connecting the rear ends of the inside main frame-pieces, filling-pieces
45 interposed between the outside frame-pieces and the inside frame-pieces, means for securing the filling-pieces to the side frames, and a fire-box extending over the trailing wheels and supported on the outside frame-pieces.

50 4. The combination of the driving-wheels, their axles and axle-boxes, the side frames extending from front to rear of the truck, the trailing wheels, their axle and axle-boxes, the outside frame-pieces formed with pedest-
55 als or guides for the axle-boxes of the trailing wheels, means for securing the outside frame-pieces to the inside frame-pieces, and a fire-box extending over the trailing wheels and supported on the outside frame-pieces.

60 5. The combination of the driving-wheels, their axles and axle-boxes, the trailing wheels, their axle and axle-boxes, the outside frame-pieces arranged outside the trailing wheels, the foot-plate connecting the rear ends of the
65 inside frame-pieces, filling-pieces interposed between the rear ends of the outside frame-pieces and the rear ends of the inside frame-

pieces, filling-pieces interposed between the front ends of the outside frame-pieces and the adjacent portions of the inside frame-
70 pieces, and a fire-box extending over the trailing wheels and supported on the outside frame-pieces.

6. The combination of the driving-wheels, their axles and axle-boxes, the trailing wheels, their axle and axle-boxes, the inside frame-
75 pieces arranged inside the driving-wheels and trailing wheels, the outside frame-pieces arranged outside the trailing wheels and terminating in rear of the rear driving-wheels,
80 means for connecting the inside frame-pieces to the outside frame-pieces, and a fire-box extending over the trailing wheels and supported on the outside frame-pieces.

7. The combination of the driving-wheels, their axles and axle-boxes, the trailing wheels, their axle and axle-boxes, the inside frame-
85 pieces, the outside frame-pieces, arranged outside the trailing wheels, the bolts, J^3 , J^4 , connecting the outside frame-pieces with the in-
90 side frame-pieces, and arranged respectively in rear of the trailing wheels and the rear driving-wheels, and brake mechanism suspended from these bolts.

8. The combination of the driving-wheels, their axles and axle-boxes, the trailing wheels, their axle and axle-boxes, the main frame
95 side pieces which are reduced in width at their rear portions, and a fire-box having an ash-pan arranged between the reduced por-
100 tions of the frame-pieces.

9. The combination of the driving-wheels, their axles and axle-boxes, the trailing wheels, their axle and axle-boxes, the inside frame-
105 pieces extending over the axle-boxes of the driving-wheels, and over the trailing axle and having their rear portions reduced in width, the outside frame-pieces arranged outside the trailing wheels and provided with supports
110 for a fire-box, and a fire-box resting on the supports of the outside frame-pieces and having an ash-pan arranged between the reduced portions of the inside frame-pieces.

10. The combination of the driving-wheels, their axles and axle-boxes, the trailing wheels, their axle and axle-boxes, the inside frame-
115 pieces arranged over the axle-boxes of the driving-wheels and the axle of the trailing wheels, the outside frame-pieces arranged over the axle-boxes of the trailing wheels, and pro-
120 vided with brackets having bearing-surfaces, the fire-box, and a bottom ring formed with projections having bearing-surfaces resting on said brackets.

11. The combination of the driving-wheels, their axles and axle-boxes, the trailing wheels, their axle and axle-boxes, the inside frame-
125 pieces, arranged over the axle-boxes of the driving-wheels, the outside frame-pieces arranged over the axle-boxes of the trailing
130 wheels, brackets secured thereto having bearing-surfaces, a cross-beam attached to the side frames and having a bearing-surface on its upper side, a fire-box and a bottom ring

formed with projections having bearing-surfaces resting on the bearing-surfaces of the brackets, and on the bearing-surface of the cross-beam.

5 12. The combination of the inside frame-pieces, the outside frame-pieces, the driving-wheels, their axles and axle-boxes, the trailing wheels, their axle and axle-boxes, the fire-box, the bottom ring secured thereto, projec-
10 tions on the under side of the bearing-ring having bearing-surfaces, brackets secured to the outside frame-pieces directly over the axle-boxes of the trailing wheels, and other
15 brackets secured to the outside frame-pieces, upon which projections of the bottom ring rest.

13. The combination of the driving-wheels, their axles and axle-boxes, the trailing wheels, their axle and axle-boxes, the inside frame-
20 pieces, the outside frame-pieces arranged outside the trailing wheels over the axle-boxes thereof, the fire-box, the bottom ring secured thereto and formed with projections having bearing-surfaces, flanged brackets secured to
25 the outside frame-pieces over the axle-boxes of the trailing wheels upon which some of the projections of the bottom ring rest, and other brackets secured to the outside frame-pieces upon which other projections from the bot-
30 tom ring rest.

14. The combination of the driving-wheels, their axles and axle-boxes, the trailing wheels, their axle and axle-boxes, the flanged bearing-
35 brackets secured to the outside frame-pieces directly over the axle-boxes of trailing wheels, the shouldered bearing-brackets secured to the truck-frame, the fire-box, the bottom ring thereof formed with bearing-surfaces resting on said brackets, and plates secured to the
40 fire-box and having flanges extending under the shoulders of the shouldered brackets.

15. The combination of the side frame-pieces, the rear cross-frame connecting them, the fire-box having the flanged bottom ring
45 and the vertical plate secured to the flange of the bottom ring and to the rear cross-frame.

16. The combination of the inside frame-pieces, the rear cross-frame connecting their rear ends, the fire-box, and the vertical plate
50 secured to the fire-box and to the rear cross-frame and provided with slots through which the rear portions of the side frames extend.

17. The combination of the inside frame-pieces, the outside frame-pieces attached
55 thereto, the rear cross-frame connecting the rear ends of the inside frame-pieces, the fire-box, the vertical plate arranged between the outside frame-pieces and having slots through which the inside frame-pieces extend, and
60 connections between the upper end of the vertical plate and the fire-box and between the lower end of the vertical plate and the rear cross-frame.

18. The combination of the inside frame-
65 pieces, the outside frame-pieces connected

therewith, the rear cross-frame connecting the rear ends of the inside frame-pieces, bearing-
brackets secured to the outside frame-pieces, the fire-box, the bottom ring thereof formed with projections having bearing-surfaces
70 adapted to slide longitudinally in the bearing-brackets, and a flexible plate secured to the bottom ring and to the rear cross-frame.

19. The combination of the driving-wheels, their axles, the axle-boxes of the driving-
75 wheels arranged inside said wheels, the trailing wheels, their axle, the axle-boxes thereof arranged outside the trailing wheels, a fire-box extending over and beyond the trailers, springs mounted on top of the axle-boxes of
80 the driving-wheels, and mounted on the axle-boxes of the trailing wheels, and links and levers connecting the springs on the axle-boxes of the trailers with the springs on the axle-boxes of the driving-wheels.
85

20. The combination of the outside frame-pieces, the inside frame-pieces, the fire-box extending over the outside frame-pieces and supported thereon, the driving-wheels, their
90 axles, the axle-boxes of the driving-wheels arranged inside said wheels, springs attached to the axle-boxes of the driving-wheels, the trailing wheels, their axle, the axle-boxes thereof arranged outside the wheels, support-
95 ing-springs arranged on top of the boxes of the trailing wheels, springs attached to the boxes of the driving-wheels, and connections between the forward ends of the springs of the trailers and the springs of the driving-
100 wheels for equalizing the weight, substantially as described.

21. The combination of the outside frame-pieces, the inside frame-pieces, the fire-box extending over the outside frame-pieces and supported thereon, the driving-wheels, their
105 axles, the axle-boxes thereof arranged inside the wheels, the trailing wheels, their axle, the axle-boxes thereof arranged outside the wheels, springs arranged on top of the axle-boxes of the trailing wheels and having their
110 front ends extending beyond the peripheries of the wheels, the cross equalizing-bar connected with the front ends of said springs, springs attached to the axle-boxes of the driving-wheels, longitudinal equalizing-levers
115 pivoted to the main frame and resting on the cross equalizing-bar, and connections between these levers and the springs of the driving-wheels.

22. The combination of the driving-wheels, 120
their axles, the axle-boxes thereof arranged inside the wheels, the trailing wheels, their axle, the axle-boxes thereof arranged outside the wheels, the springs mounted on the axle-
125 boxes of the trailing wheels, springs mounted on the axle-boxes of the driving-wheels, the longitudinal equalizing-levers pivoted to the main frame and connected with the springs of the trailing wheels and the springs of the driving-wheels, the fire-box, the bottom ring 130

formed with projections having bearing-sur-
faces, the frame of the truck, the brackets
secured thereto on which the bottom ring
rests, and the plates secured to the fire-box
5 engaging bearing - brackets on the truck-
frame arranged approximately over the piv-
otal connection between the longitudinal
equalizing-levers and the truck-frame.

In testimony whereof I have hereunto sub-
scribed my name.

JAMES E. SAGUE.

Witnesses:

H. W. DENNINGTON,
GEO. S. CLARE.