

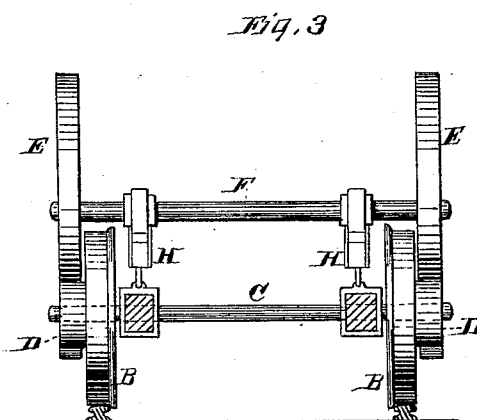
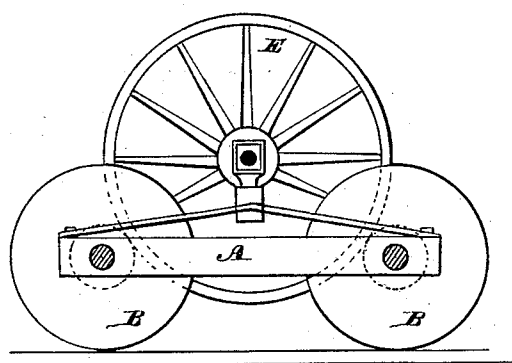
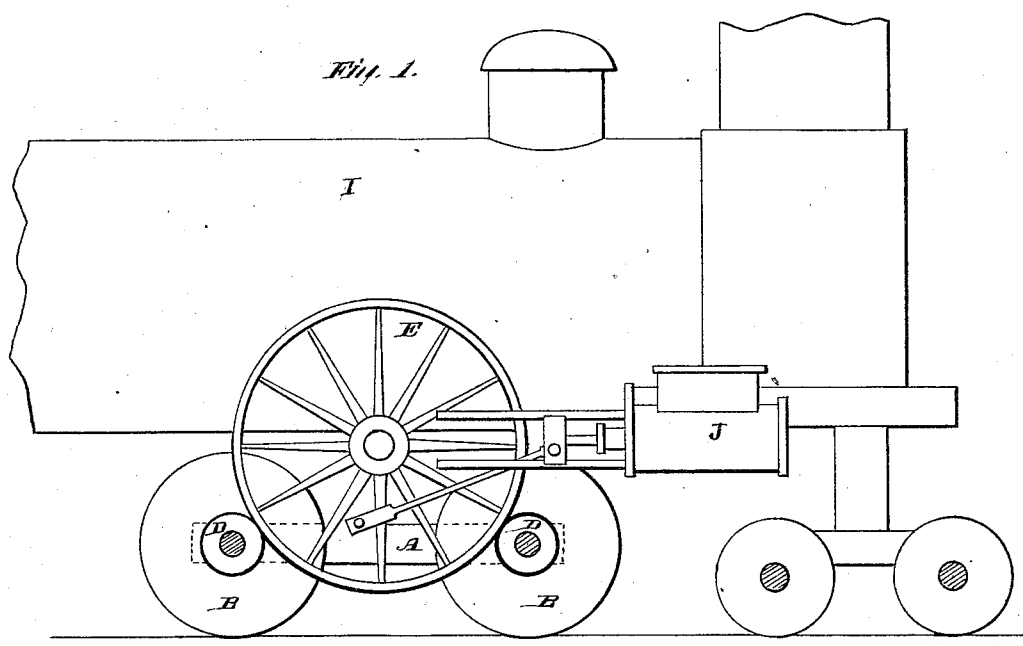
(No Model.)

2 Sheets—Sheet 1.

J. T. DAVIS.  
LOCOMOTIVE.

No. 247,802.

Patented Oct. 4, 1881.



Witnesses  
Geo. H. Strong.  
Frank A. Grook.

Inventor  
John T. Davis  
B. Dewey & Co.  
Attys

(No Model.)

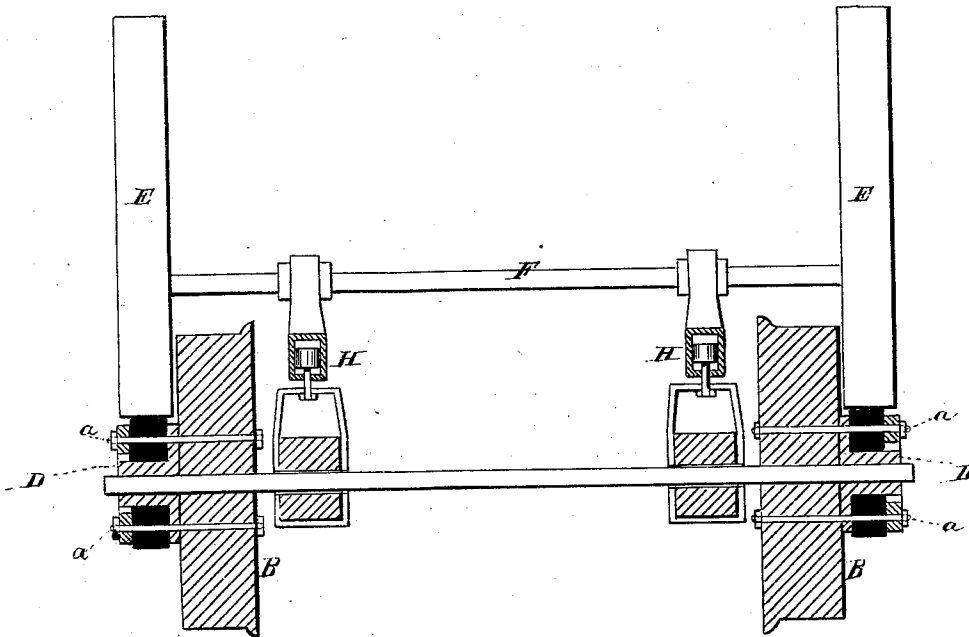
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*Fig. 4.*



Witnesses  
Geo. H. Strong.  
Frank M. Brooks

Inventor  
John T. Davis  
By Dawsey & Co.  
Atty's

# UNITED STATES PATENT OFFICE.

JOHN T. DAVIS, OF SAN FRANCISCO, CALIFORNIA.

## LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 247,802, dated October 4, 1881.

Application filed February 4, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN T. DAVIS, of the city and county of San Francisco, State of California, have invented an Improved Locomotive; and I hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to certain improvements in that class of locomotives in which the driving-wheels act by rolling-friction upon corresponding friction-wheels secured to the same axle as the bearing-wheels, which run upon the track, and which have a smaller diameter than said bearing-wheels.

It consists in a means for increasing the frictional contact between the drivers and the driven wheels by means of hydraulic rams and in certain details of construction, more fully described hereinafter.

The object of my invention is to acquire increased speed with less power, whereby economy of fuel and wear will result.

Referring to the accompanying drawings, Figure 1 is a view of my invention. Fig. 2 is a longitudinal section. Fig. 3 is a transverse section. Fig. 4 is a detail of construction.

Let A represent a truck having the four bearing-wheels B, which are to run upon the rails. The axles C of these wheels are made long enough to project through and extend upon the outside sufficiently to carry friction-wheels. These friction-wheels consist of two circular flanges or plates, the inner one of which is provided with an elongated hub, perforated to fit the projecting axle and extending outwardly, the other flange or plate fitting the axle and being pressed close to the end of the elongated hub of the inner one, thus forming a space or groove between the two plates or flanges. Within the groove thus made by the flanges of the friction-wheels paper is compressed by any suitable means to sufficient hardness to make a friction-surface around the wheels or hubs D, as shown in Fig. 4.

To secure the friction-wheels D to the wheels B, bolts *a* are driven through both flanges and the intervening paper of the said friction-wheels and through the wheels B, being secured on the inside of the said wheels B.

When the compressed-paper surface becomes worn out of the circular, or otherwise unfit for use, it can be removed and other paper com-

pressed around the friction-wheels, which will be of great convenience in not having to change the wheels B. The friction-wheels are secured rigidly to the wheels B, so that when they are turned by any power they also turn the wheels B.

Let E represent the upper driving-wheels. The bearing-wheels B are separated sufficiently to allow the drivers E to drop between them so low that the axle F of said drivers may pass beneath the boiler of the engine without unduly elevating it. These upper driving-wheels, E, rest upon the paper friction-surface of the wheels D, and thus have four frictional points upon the said wheels.

By holding the upper driving-wheels down upon the frictional wheels it will be seen that when the driving-wheels are revolved they will revolve the wheels B, and by increasing the difference between the diameters of the drivers E and the diameters of the frictional wheels D the velocity of the locomotive is increased. Thus the speed of the lower wheels can be increased or diminished by increasing or diminishing the size of the drivers E or the size of the friction-wheels D.

In order to have the upper drivers, E, operate the supplementary or bearing wheels B, they must be held down upon the friction-wheels. For this purpose I have placed upon the frame of the truck A hydraulic rams H, just under the axle F of the upper driving-wheels, and connected with said axle by a strap-joint, as shown, and with the frame of the truck. Proper pump attachments connect the hydraulic rams with the water-tank, said rams being operated by a lever in the cab of the engine under the control of the engineer, so that in starting the whole weight of the boiler may be thrown upon the upper drivers, increasing the friction. Thus the upper drivers, E, may be pressed down upon the friction-wheels D with whatever power is necessary for the required speed.

An important feature in this construction is the placing of the drivers between the friction-wheels D, because of the leverage obtained by this position of the drivers. When the power is applied to draw the axle of the drivers downward it produces, as a resultant, a pressure upon the separated friction-wheels, which is greater than the actual power applied in pro-

portion to the distance which these wheels are separated from each other and the length of the arc of the driving-wheels, which lies below the axle of the friction-wheels. This leverage  
 5 upon these wheels tends to separate them, and must be resisted by a powerful truck-frame, A, which is properly trussed and stayed to resist the strain. The journals of the axles C of the bearing-wheels may be surrounded by rollers,  
 10 so as to form an anti-frictional journal-box, which will prevent undue friction of the journals when this leverage is applied. Another advantage of this position of the drivers between the wheels D is that all vertical move-  
 15 ments of the bearing-wheels B, caused by roughness of the track or for other reasons, are not transmitted to the drivers in a direct vertical line with their axle, and the effect upon these drivers is diminished in proportion to  
 20 the amount in which the axle is out of the vertical line with the axles of the bearing-wheels. The rams H will also lift the drivers, when necessary, as on a downgrade, and permit the wheels B to travel without the aid of the friction.  
 25 It is obvious that I may have one or two sets of upper drivers by having one or two trucks of bearing-wheels.

The boiler I, engine-frame, and cylinders J may be supported entirely upon two or more  
 30 sets of bearing and driving wheels, as herein described; or the rear end may be supported by a single set of these wheels, while the front may rest upon trucks of the ordinary construction. The pistons and piston-rods of the en-

gine may be connected with the drivers E in 35 the ordinary manner.

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

1. In a locomotive, and in combination with 40 the drivers E, lying between and acting upon the friction-wheels D, so as to drive the wheels B by rolling contact, the hydraulic rams H, for drawing the axle F of the drivers toward the truck-frame of the bearing-wheels, where-  
 45 by a greater power is produced to increase the frictional contact between the drivers and the frictional wheels, substantially as described.

2. In combination with the truck A, having wheels B, said wheels having attached to their 50 outsides the friction-wheels D, and the upper driving-wheels, E, resting upon the friction-wheels D, the hydraulic rams H, set upon the truck A and under the axle F of the wheels E, and connecting the two together, said rams H  
 55 having pump-connections under the control of the engineer, whereby pressure is brought upon the upper driving-wheels, E, to force them down upon the friction-wheels D, substantially as described. 60

In witness whereof I have hereunto set my hand.

JNO. T. DAVIS.

Witnesses:

FRANK A. BROOKS,  
 S. H. NOURSE.