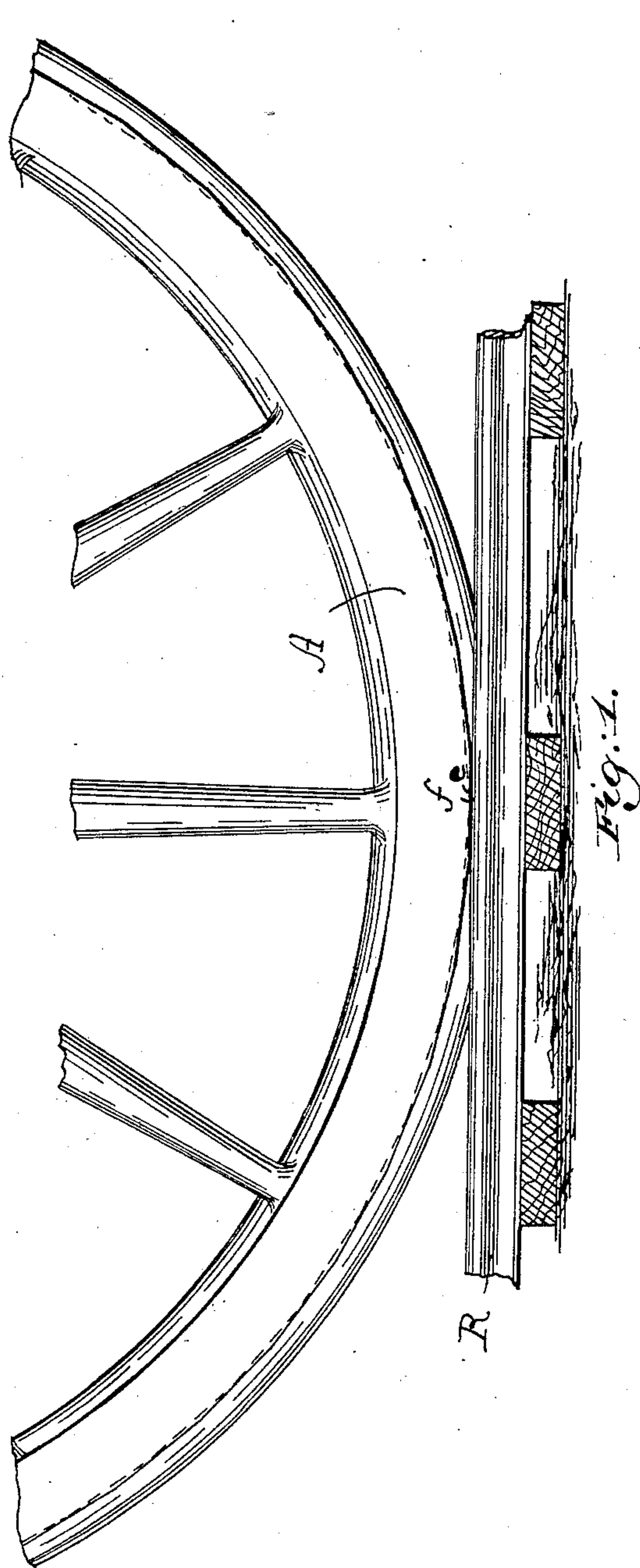


(No Model.)

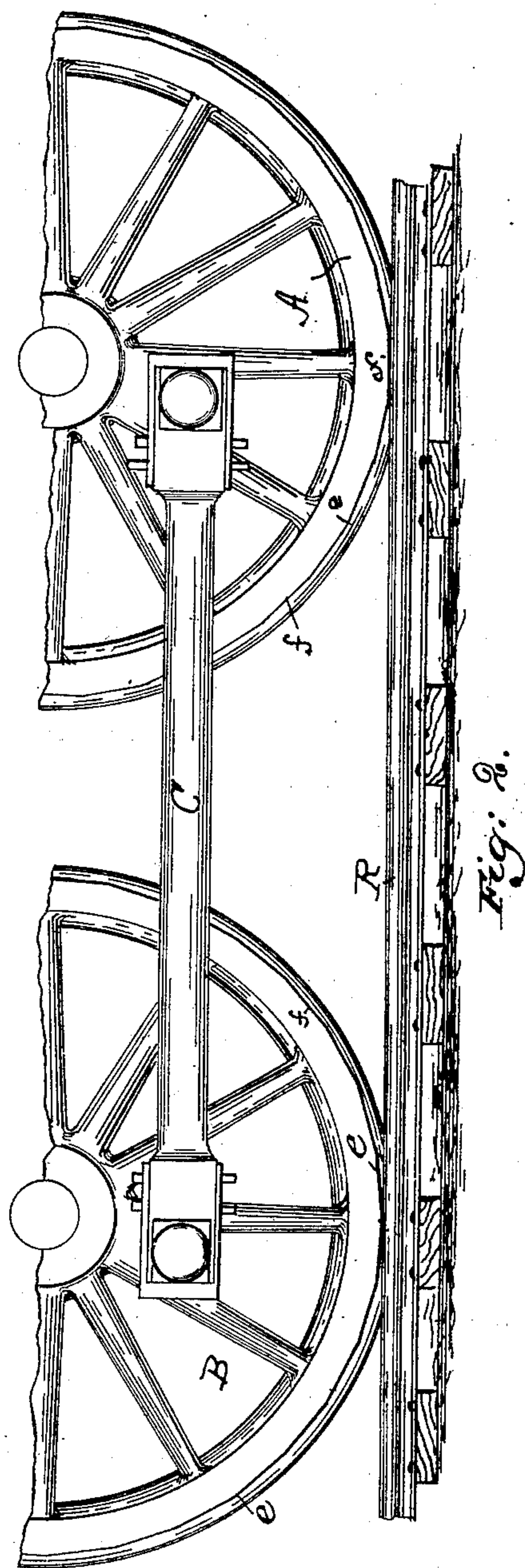
H. W. LADD.  
LOCOMOTIVE ENGINE.

No. 359,080.

Patented Mar. 8, 1887.



*Fig. 1.*



*Fig. 2.*

*Witnesses*  
*Charles Loomis*  
*Alvin Frank*

*Inventor.*  
*Herman W. Ladd.*  
*by N. H. French*  
*Attorney*



# UNITED STATES PATENT OFFICE.

HERMON W. LADD, OF BOSTON, MASSACHUSETTS.

## LOCOMOTIVE-ENGINE.

SPECIFICATION forming part of Letters Patent No. 359,080, dated March 8, 1887.

Application filed November 8, 1886. Serial No. 218,273. (No model.)

*To all whom it may concern:*

Be it known that I, HERMON W. LADD, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Locomotive-Engines, of which the following, taken in connection with the accompanying drawings, is a specification.

In order to increase the traction-power of locomotive-engines and to lessen the liability of their driving-wheels to slip upon the rails, it has been proposed to form the peripheral bearing portion of such wheels not in true circles but in polygons of a very great number of sides, or, in other words, of a succession of short flat planes at such angle to each other as the size of the wheel and length of each plane shall determine. By this construction, instead of the single line of contact where a circular wheel touches and rests upon the rail, there are at intervals flat planes of considerable area, which will not so readily slip in starting or drawing a heavy train. The difficulty with this plan is that as soon as such wheels begin to revolve and advance the contact of said plane surfaces with the rails is interrupted and the wheels rest upon the angles between adjacent planes until the next surfaces come to a bearing upon the rails. Thus the benefit of said construction is intermittent and the relief sought by it is but partially attained. Furthermore, when all the driving-wheels have these plane faces simultaneously on the track and the locomotive is to advance, the entire structure must be lifted slightly to pass from one plane to the next over the intermediate angle:

My improvement consists in said polygonal driving-wheels so connected in pairs on different tracks or in succession on the same track as to cause one of two connected wheels to bear by one of its plane faces on the rail while the wheel connected with it bears by one of said angles on its rail. In other words, the connection of one wheel with the other is such that the two wheels of one pair or the wheels

of two pairs come alternately and successively to a bearing of their plane surfaces on the rail and are not both or all of them at the same time resting on such surfaces.

The drawings illustrate my improvement, Figure 1 showing, somewhat exaggerated, a portion of the rim of a locomotive driving-wheel, A, with a polygonal periphery resting by one of its plane faces *f* on the rail R, while the position of the other wheel on the same axle is indicated by dotted lines, representing the angle between two plane faces presented to the tread-surface of the rail. Fig. 2 shows two such driving-wheels, A and B, on one rail and connected by the coupling-bar C, the wheel A having a plane surface, *f*, bearing on the rail, while the other wheel, B, presents an angle, *e*, thereto.

By my improvement the described connection of these polygonal wheels overcomes the resistance due to lifting the entire weight at once, since the action of one wheel or pair of wheels offsets that of the other, and the weight is neutralized. It also subdivides the intervals of least traction-power in one wheel or pair of wheels and introduces, at the instant, others at the point of greatest efficiency.

I claim as my invention—

In a locomotive-engine, the driving-wheels having polygonal peripheries, as described, and so arranged and connected by their axles and coupling-bars that when the apex of the angle between two plane faces of one wheel is presented to the tread of the rail a flat face of the connected wheel bears upon the rail, for the purpose set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 5th day of November, A. D. 1886.

HERMON W. LADD.

Witnesses:

A. H. SPENCER,  
ELIHU G. LOOMIS.