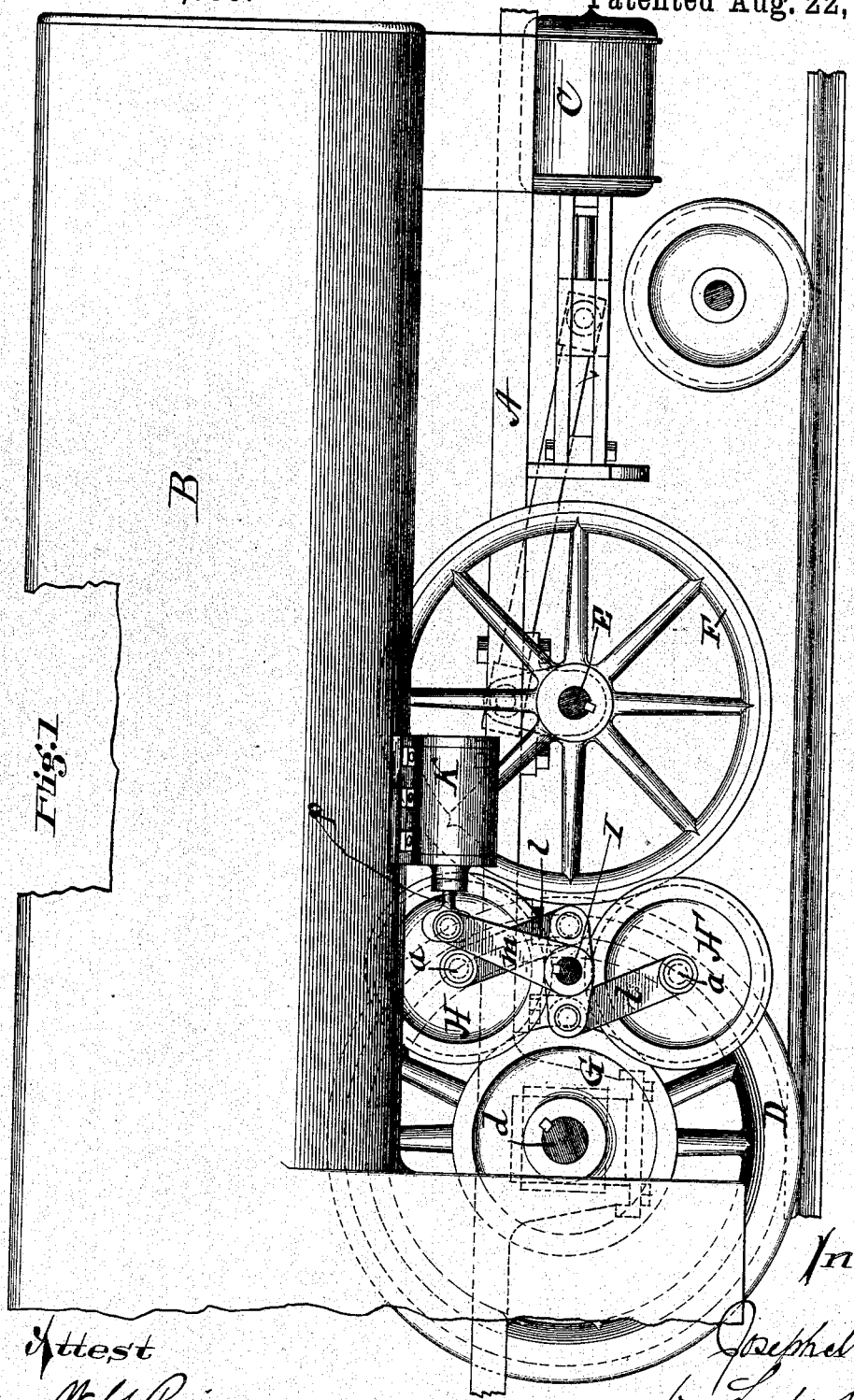
(No Model.)

2 Sheets—Sheet 1.

J. M. STORY.

LOCOMOTIVE.

No. 262,995. Patented Aug. 22, 1882.



Inventor

Joseph M. Story.

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Attest

W. G. Rainey

Geo. B. Muschler

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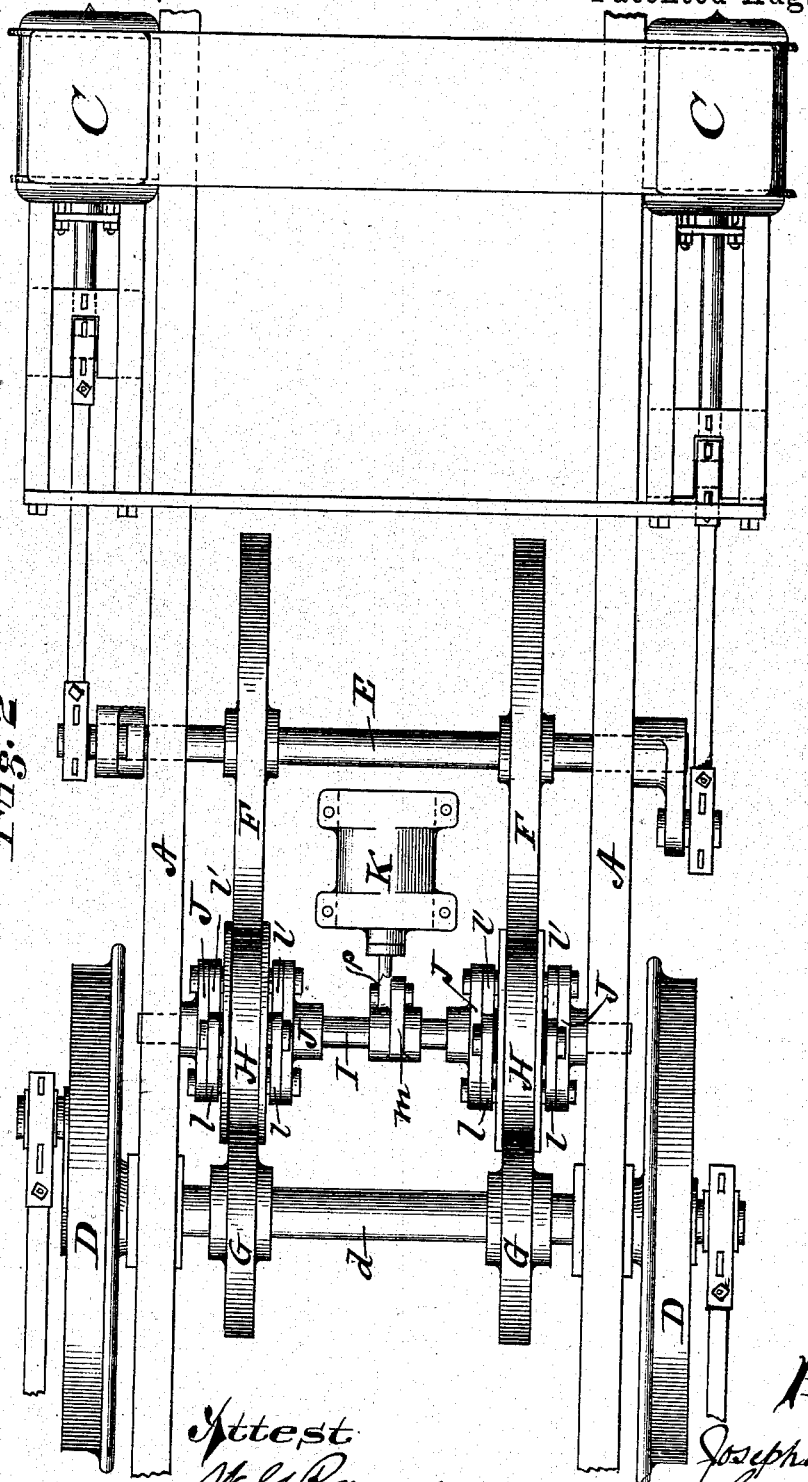

Fig. 2.

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UNITED STATES PATENT OFFICE.

JOSEPH M. STORY, OF SPRING CITY, TENNESSEE.

LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 262,995, dated August 22, 1882.

Application filed May 4, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH M. STORY, a citizen of the United States, residing at Spring City, Tennessee, have invented new and useful Improvements in Locomotives, of which the following is a specification.

My invention relates to locomotives, its object being to improve the driving mechanism, with particular reference to obtaining high speeds, and secure certain other advantages hereinafter specified; to which end it consists in applying the power of the driving-engines in the first instance to a counter-shaft journaled in the frame independently of the ground-wheel axles, and communicating the power of rotation thence by friction-wheels upon the counter-shaft and axle and an intermediate adjustable friction-gear.

It consists, further, in the arrangement of the friction-gear in relation to the locomotive, whereby the center of gravity is preserved at a low point.

It consists, further, in the construction and arrangement, for use in a locomotive, of a driving mechanism embodying driving and driven friction-wheels, and an intermediate transmitting friction-gear adjustably controlled by the engine-driver as to the frictional pressure of contact.

In consists, further, in the means whereby the adjustable contact of the intermediate friction-gear is maintained and regulated.

My invention is embodied in mechanism illustrated in the accompanying drawings, in which Figure 1 is a partial side elevation of a locomotive exhibiting my improvements, and Fig. 2 a partial plan view of the locomotive-frame, showing the construction and arrangement of the driving mechanism.

Referring to the drawings, in which parts are designated by the same letters of reference employed in the specification, the construction and arrangement of my improvements will be readily understood.

The frame A, boiler B, and other general features of the locomotive remain the same as employed in the prevailing modern practice. Sufficient space is allowed between the cylinder C and forward driving-wheels, D, to permit the interposition of the power-transmitting mechanism in which my invention resides. This consists mainly of a counter-shaft, E, journaled in the frame A parallel to and in, or approximately in, the same horizontal plane with the main driving-axle *d*, and upon the counter-shaft are mounted two friction-pulleys, F. The counter-shaft E extends through the frame and is provided with terminal cranks, to which the connecting-rods of the driving-engines are connected and the driving power applied. Corresponding with the friction-pulleys F F are friction-pulleys G G upon the main driving-axle *d*. The two sets of pulleys are not in contact, but the driving power is communicated from one to the other by means of two sets of intermediate idler friction-pulleys, H H′, four in number, constructed and arranged as follows: The idler-pulleys H H′ are provided with double flanges upon the face, forming a substantially rectangular groove of sufficient width to take in the faces of the main pulleys F G. The idler-pulleys are of greater diameter than the space between the two peripheries of the main pulleys F G, and are arranged so that of each set the idlers H are interposed between and in contact with the faces of the main pulleys F G above the horizontal plane of their axes and the idlers H′ below that plane. The idler-pulleys are maintained by links or "hangers" *l l′*, connecting the studs *a*, constituting their pivot-shafts, with short double cranks J J upon a second counter-shaft, I, journaled in the engine-frame, between and in the horizontal plane of the counter-shaft E and the driving-axle *d*.

The device in which the idlers are mounted is simply what is known as a "toggle," its main function being to draw the idlers together in order to increase the frictional contact pressure between themselves and the main pulleys F G, or to force the idlers apart in order to relieve that pressure. The arrangement and function is clearly indicated in Fig. 1. The idlers H H being of uniform size and of greater diameter than the shortest horizontal distance between the pulleys F and G, and resting respectively above and below the horizontal plane of the centers of the main pulleys, it will be clearly perceived that the idlers act as wedges in respect to the main pulleys in any vertical movement, and that the contact-pressure would be increased or diminished by drawing together or separating the idlers H H′ in a vertical plane. This movement is effected by any

suitable device. For example, a reciprocating piston, P, operating in an auxiliary steam or air cylinder, K, arranged beneath the boiler to act upon a crank-arm, *m*, secured upon the shaft I. The admission of steam to the cylinder K is controlled by the engineer, and is intended to enable the tractive pressure to be increased according to the necessities of use, as in starting a train, ascending grades, &c., or diminished, as in case of descending grades, or in light pulling. In many cases the pressure might be totally relieved and the engine allowed to rest in descending heavy grades, &c., thereby saving needless wear and tear upon the operating machinery.

The supporting device for the idler-pulleys is by its form of construction flexible, and enables the pressure to be constantly and uniformly maintained under every varying condition of actual use. The flanges upon the intermediate idler-pulleys are of sufficient depth and strength to hold and guide them perfectly at all times upon the main pulleys, even when the pressure is relieved.

For the purpose of permitting the independent resilient action of the main driving-axle in its spring-boxes, the auxiliary counter-shaft I is mounted in spring-bearings, also permitting a limited vertical movement, and its piston connections are arranged accordingly. Thus the entire system of supporting-links and toggle in which the idler transmitting-pulleys are mounted is enabled to move vertically to accommodate the movement of the driving-axle *d* in its bearing-jaws in passing over irregularities of the track without impairing the frictional relations of the main pulleys F G. Its adjustment in this respect is automatic, as will be obvious.

An incidental advantage growing out of this improvement is that the driving-cylinders C need not be arranged in the horizontal plane of the main shaft E, because the latter is held in fixed bearings in the frame and in no way affected by the bearing-springs of the locomotive. The cylinders may be arranged in any position or at any angle most convenient or desirable without affecting the steadiness of the locomotive in running.

It will be obvious that the arrangement of the driving mechanism in the horizontal plane of the frame A brings the center of gravity of the machine very low, which is a consideration of the highest importance in high-speed engines.

Having described my invention, I claim and desire to secure by Letters Patent—

1. In a locomotive, a counter-shaft journaled in or upon the frame beneath the boiler, and constituting the main shaft of the driving-engines, provided with friction-pulleys adapted to engage by means of interposed idlers with friction-pulleys upon the driving-axle, substantially as set forth.

2. In a friction-gear-driving mechanism for locomotives, a counter-shaft carrying friction-pulleys, corresponding friction-pulleys upon the driving-axle, and interposed double idler friction-pulleys adjustable toward and from each other to vary the pressure upon the main friction-pulleys, substantially as set forth.

3. In combination with the main pulleys F G, the interposed adjustable mechanism consisting of idler-pulleys H H′, arranged to play in contact with the main pulleys above and below the plane of their centers, and hung in links or yokes *l* from toggle-cranks J, upon a shaft, and adapted by the rotation of the shaft to be drawn toward each other or forced apart to vary the pressure upon the pulleys F G, substantially as set forth.

4. In combination with the adjustable system of idler friction-pulleys, hung in links upon toggle-cranks mounted on a governing shaft, the auxiliary cylinder K, piston *p*, and crank *m*, as a means of operating the shaft and regulating the movements of the idler-pulleys, substantially as set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOSEPH M. STORY.

Witnesses:
FRANC NEAL,
ALBERT G. WETMORE.