(No Model.) 2 Sheets—Sheet 1.

O. CROSBY.

LOCOMOTIVE CRANE.

No. 587,299. Patented Aug. 3, 1897.

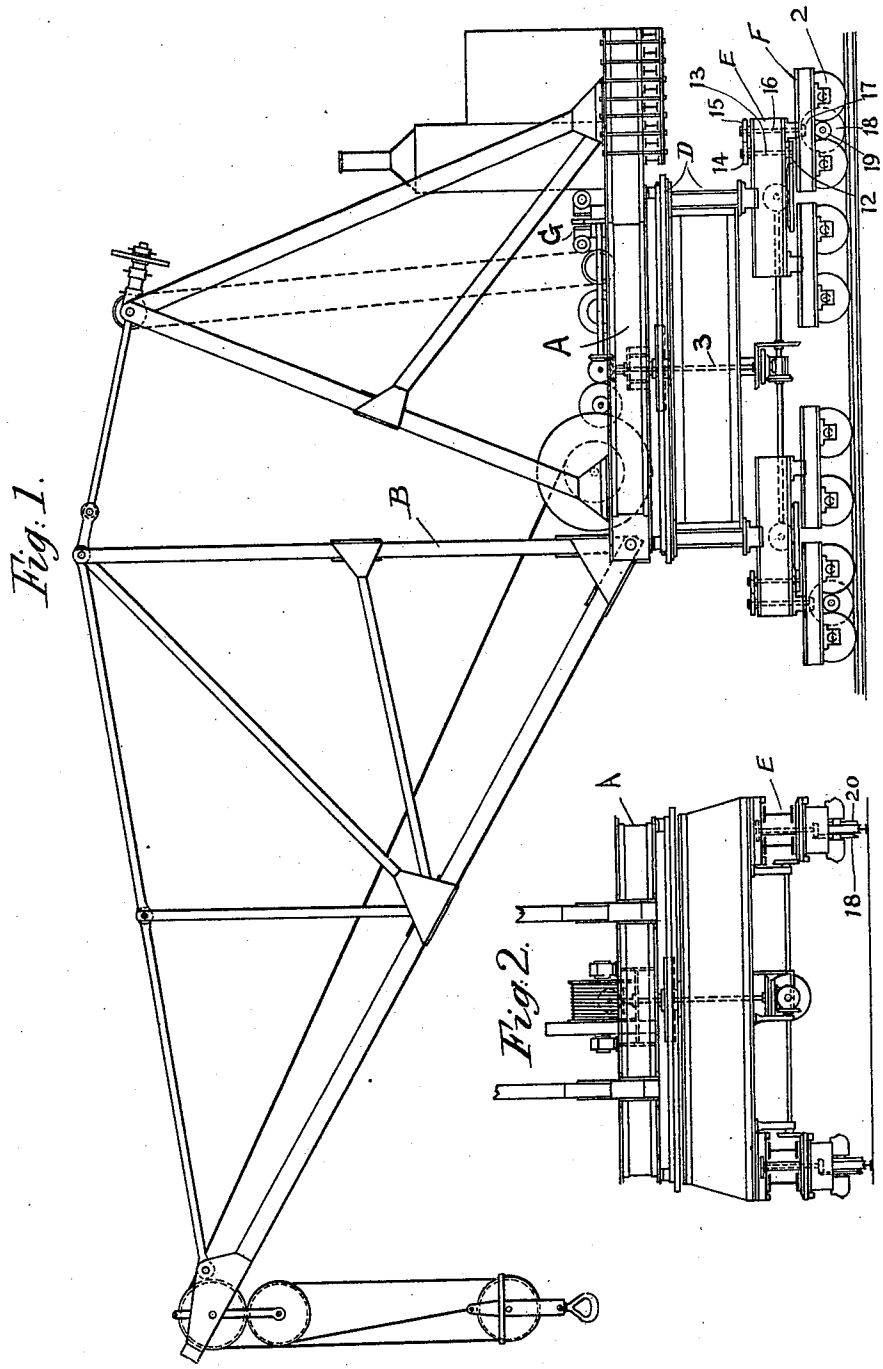

Fig. 1.

Fig. 2.

Witnesses:
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(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

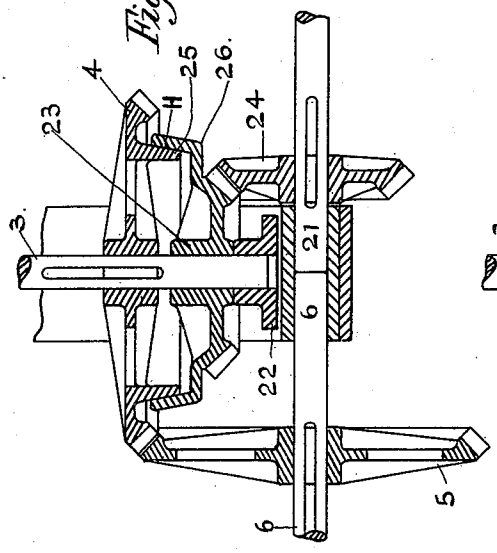


Fig. 5.

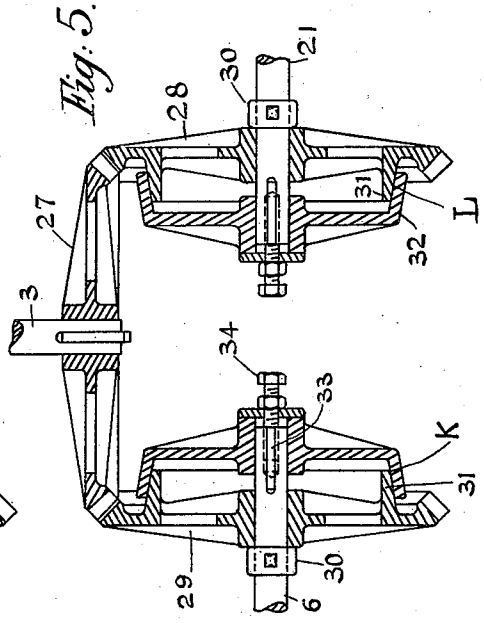
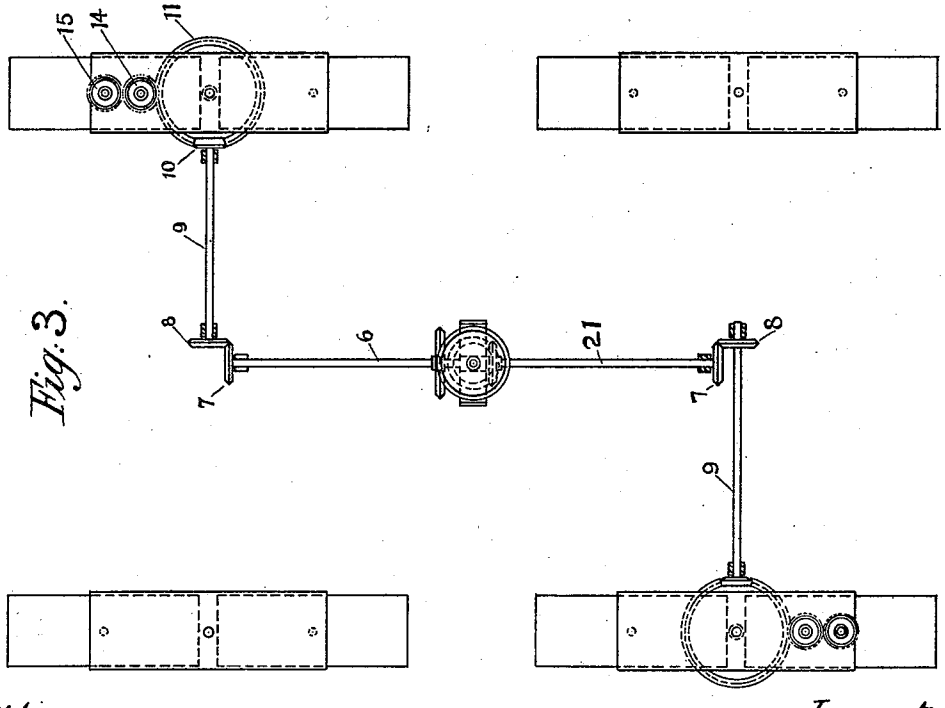


Fig. 3.



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UNITED STATES PATENT OFFICE.

OLIVER CROSBY, OF ST. PAUL, MINNESOTA.

LOCOMOTIVE-CRANE.

SPECIFICATION forming part of Letters Patent No. 587,299, dated August 3, 1897.

Application filed March 12, 1894. Serial No. 503,227. (No model.)

To all whom it may concern:

Be it known that I, OLIVER CROSBY, of St. Paul, Ramsey county, Minnesota, have invented certain Improvements in Locomotive-Cranes, of which the following is a specification.

My invention relates to improvements in locomotive-cranes, its object being to provide means for positively driving from a common source of power the traction-wheels standing on opposite rails, while permitting such variations in relative movement as is necessitated by curves in the track.

To this end my invention consists in gearing the traction wheel or wheels on the outer curve positively to the driving power and in interposing between the traction-wheels on the inner curve and the driving power a slipping or friction coupling or connection which will permit a relatively lower speed for such wheels than for those on the outer curve.

My invention further consists in the construction and combination hereinafter specifically described and claimed.

In the accompanying drawings, forming part of this specification, Figure 1 is a side elevation of a locomotive-crane equipped with my improved means for driving the traction-wheels, showing the relative positions of the parts. Fig. 2 is an end elevation of the same, the crane being removed. Fig. 3 is a conventional plan view of the trucks and the driving-gear therefor. Fig. 4 is a sectional detail of the combined positive and friction train, and Fig. 5 is a similar detail of a modified construction in which both driven parts have friction connections with the driving part.

In the drawings, A represents the rotating platform, on which is mounted the crane B and is itself mounted upon the platform D, upon which it rotates, supported upon wheels or rolls. (Not shown.) The platform D is mounted upon equalizing-platforms E, which are in turn mounted upon the bogie-frames F. These bogie-frames are connected to the equalizing-platform by means of vertical pivots (not shown) and rest upon traction-wheels 2, the pivotal connection permitting them to turn on curved tracks independently of the equalizing-platforms.

Passing through the center of the platforms A and D is the vertical driving-shaft 3, having suitable driving connection with the engine G, which is mounted upon the rotating platform. To the lower end of the shaft 3 is keyed the bevel-gear 4, which meshes with a similar gear 5, keyed upon the counter-shaft 6, supported underneath the platform and running lengthwise of the structure and journaled in suitable bearings underneath the same. The other end of the shaft is fitted with the bevel-gear 7, meshing with the similar gear 8 on the transverse shaft 9, which, by means of the bevel-pinion 10, drives the combined bevel and spur gear 11, journaled upon one of the equalizing-platforms E, arranged over the rail of the outer curve of the track. The power is conveyed from the gear 11 to the traction-wheels 2 of one of the bogies underneath the equalizing-platform by means of the pinion 12, meshing with the spur-teeth upon the gear 11. This pinion is mounted upon the vertical shaft 13 in the equalizing-frame, the upper end of which is fitted with a pinion 14, meshing with the corresponding pinion 15 upon the vertical shaft 16, the lower end of which extends downward and is fitted with the bevel-pinion 17, which drives the bevel-gear 18. To this is fixed a pinion 19, which meshes with the gears 20, fixed to the traction-wheels 2. A similar counter-shaft 21, with a corresponding train, has driving connection with the traction-wheels, supporting one of the equalizing-platforms upon the opposite side of the track.

The lower end of the shaft 3 takes a bearing in a step 22, supported upon the abutting ends of the shafts 6 and 21. Between the step 22 and the gear 4 is loosely mounted upon the shaft the bevel-gear 23, which meshes with a similar bevel-gear 24, keyed to the shaft 21. The gear 23 is driven from the gear 4 by means of the friction-clutch H, the male part 25 upon the gear 4 wedging into the female part 26 on the gear 23, the weight of the shaft 3 and its attachments furnishing the pressure necessary to drive the gear 23 from the gear 4, thus constituting a gravity-operated friction-gear. It will thus be seen that the traction-wheels connected to the shafts 6 are positively driven at a uniform speed with relation to the shaft 3, while the traction-wheels connected to the shaft 21

on the inner curve of the track can travel at a lower speed on the curve without slipping because of the slip which takes place in the frictional clutch H. In other words, the wheels on the outer curve of the track travel at a uniform relative speed, while the wheels on the inner curve of the track travel at a less speed, varying with the curvature of the track.

In Fig. 5 is shown a modified construction of train in which the bevel-gear 27 is keyed to the shaft 3 and meshes with the idlers 28 and 29, mounted upon the shafts 6 and 21, which are held in place by suitable collars 30. The gears 28 and 29 are operatively connected to their respective shafts by means of frictional clutches K and L of the same type as the clutch H, the male member 31 being fixed to the gears and the female member 32 being slidably mounted upon the shaft and held by a feather-key 33, the position being adjusted by means of the set-screw 34. It will thus be seen that by means of the set-screw 34 any desired frictional pressure may be exerted and yet the traction-wheels to which the shafts are connected are driven at a variable relative speed according to the curvature of the track, the difference in speed being permitted by the slipping of the parts in the corresponding clutch.

I claim—

1. In combination with a railway-vehicle having traction-wheels on opposite rails independently connected to the vehicle, the common driving mechanism, the positive-gear connection between said driving mechanism and one of said traction-wheels, and the friction-gear interposed between said driving mechanism and an oppositely-arranged traction-wheel.

2. A variable-speed train, comprising in combination, the common driving part, the plurality of independent driven parts, the positive-gear connection between said driving part and one of said driven parts, and the friction-gear interposed between said driving part and other of said driven parts.

3. The combination of the common driving-shaft, the plurality of counter-shafts, the positive gear for driving one counter-shaft from said driving-shaft, and the friction-gear connecting said driving-shaft with another counter-shaft, whereby the latter is permitted to travel at less than normal speed by reason of interposed resistance.

4. The combination of the common driving-shaft, the plurality of counter-shafts, the positive gear for driving one counter-shaft from said driving-shaft, and the friction-gear connecting said driving-shaft with another counter-shaft, whereby the latter is permitted to travel at a relatively variable speed.

5. The combination of the vertical driving-shaft, the horizontal counter-shafts, the positive-gear connection between said driving-shaft and one of said counter-shafts, and the gravity friction-gear between said driving-shaft and the other counter-shaft.

6. The combination of the vertical driving-shaft, the pair of horizontal counter-shafts, the gear upon the driving-shaft meshing with the gear upon one of said counter-shafts so as to positively drive the same at a relatively uniform speed, the loose gear upon the driving-shaft engaging a gear upon the other counter-shaft and the gravity friction-clutch interposed between said loose gear and said driving-shaft.

7. In a locomotive-train, in combination the bogie-trucks arranged on opposite sides of the platform, each vibratable about a vertical axis and each provided with two track-wheels, the common driving mechanism and the trains of gears connecting a track-wheel in each of said trucks with said driving mechanism and having means for driving the wheel upon the outer curve at a uniform relative speed, and the wheel upon the inner curve at a variable less relative speed.

In testimony whereof I affix my signature in presence of two witnesses.

OLIVER CROSBY.

Witnesses:
T. D. MERWIN,
H. S. JOHNSON.