(No Model.) 3 Sheets—Sheet 1.

O. W. KELLY & L. F. DIETER.

TRACTION ENGINE.

No. 307,398. Patented Oct. 28, 1884.

Fig. 1

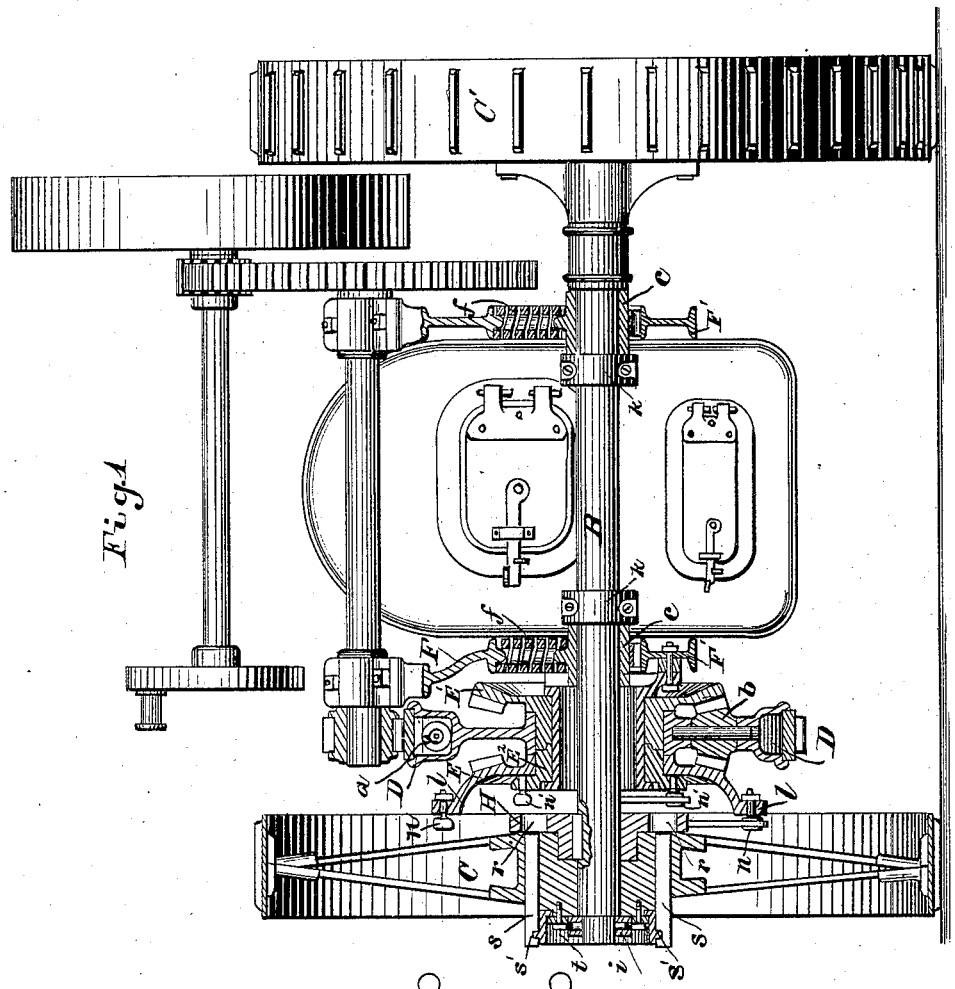

Fig. 3

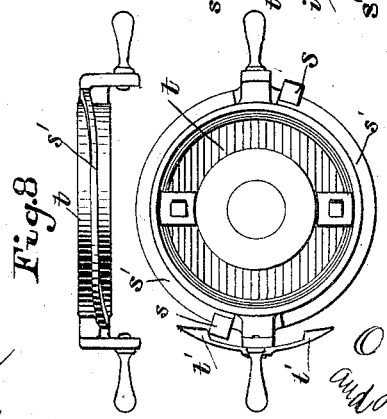

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Fig. 2

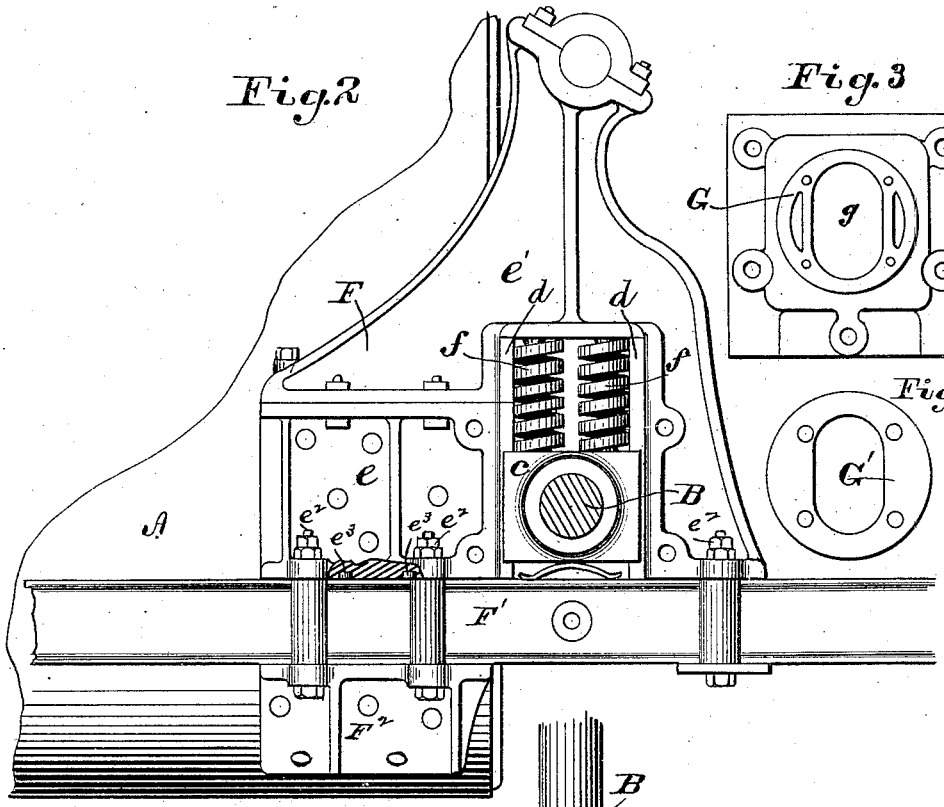

Fig. 3

Fig. 3a

Fig. 4

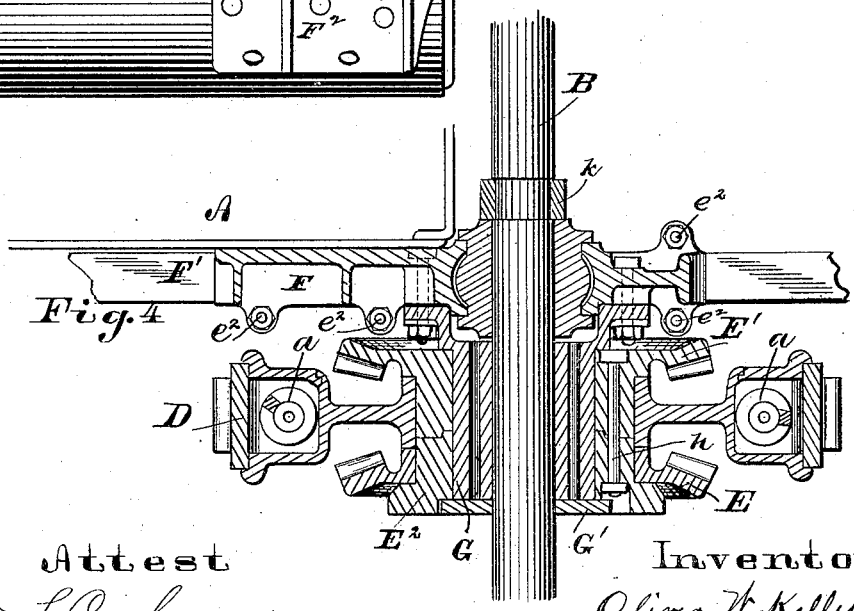

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Fig. 5

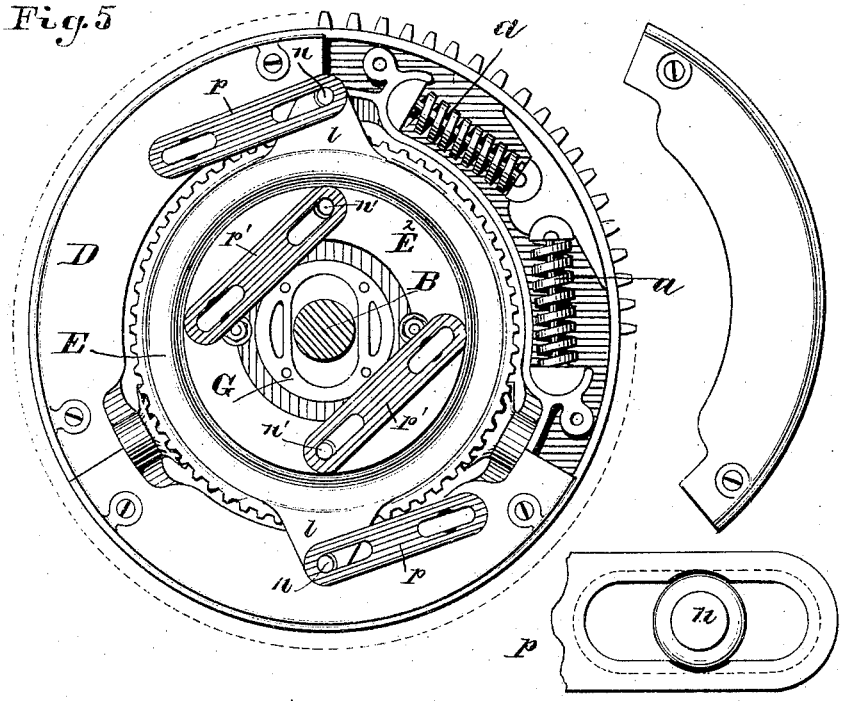


Fig. 6

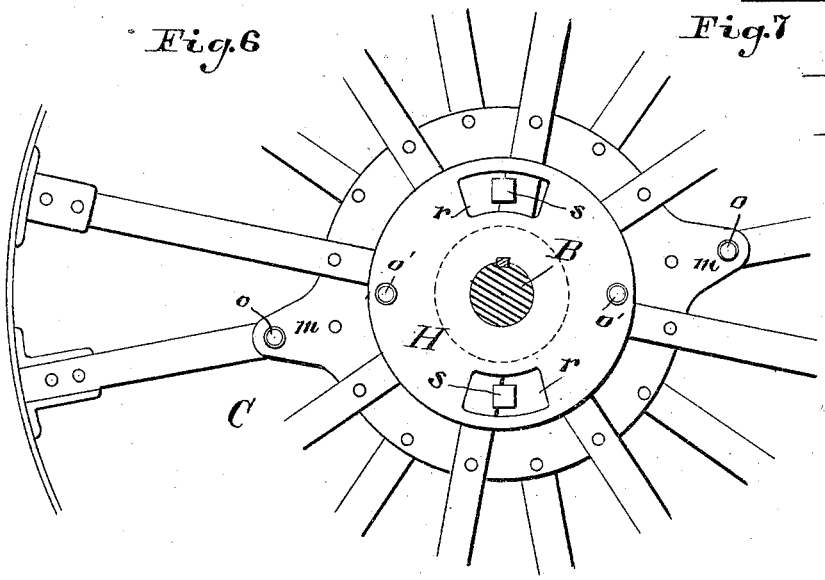
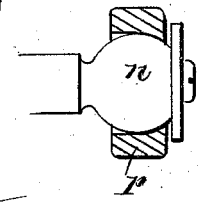


Fig. 7



Attest

W. T. Cushman

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Inventors

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and Louis F. Dieter

By their Attorney

Paul A. Staley

UNITED STATES PATENT OFFICE.

OLIVER W. KELLY AND LOUIS F. DIETER, OF SPRINGFIELD, OHIO, ASSIGNORS TO THE SPRINGFIELD ENGINE AND THRESHER COMPANY, OF SAME PLACE.

TRACTION-ENGINE.

SPECIFICATION forming part of Letters Patent No. 307,398, dated October 28, 1884.

Application filed August 25, 1884. (No model.)

To all whom it may concern:

Be it known that we, OLIVER W. KELLY and LOUIS F. DIETER, citizens of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Traction-Engines, of which the following is a specification.

It has become common in traction-engines to use a compensating mechanism through which the power to drive the traction-wheels is transmitted. This compensating mechanism is adapted to transmit the power to the traction-wheels equally when the engine is moving in a straight line, but in changing direction, as in turning corners, &c., a compensating movement is effected, by which one wheel is permitted to turn faster than the other or to stop entirely while the other wheel is revolved. The most common way of attaching the compensating mechanism is to place it directly on the main axle, to which one of the traction-wheels is rigidly secured, the other traction-wheel being adapted to turn loosely on the axle. An independent connection between the compensating mechanism and the respective traction-wheels is accomplished by securing one of the compensating-gears rigidly to the axle, the other being connected to the loose traction-wheel and adapted to turn loosely upon the axle. By this construction, however, all shocks or jars occasioned by the traction-wheels running over protruding stones or in passing over rough or uneven ground is transmitted directly to the compensating-gear, bringing a heavy strain thereon. By our invention herein described we have sought to overcome this difficulty by a novel arrangement of the compensating mechanism on a sleeve placed around the axle in combination with springs, whereby the entire driving-gear, including engine and boiler, is supported from the main axle by an elastic or yielding support adapted to cushion the jars or jolts upon the traction-wheels and thus relieve the gearing from the strain occasioned thereby. Means are also provided for transmitting an elastic rotary strain from the motive power to the traction-wheels, so that the strain upon the gearing due to the varying conditions under which the engine must work, is reduced to the minimum.

Our invention consists in the organizations and combinations of parts hereinafter described and claimed.

In the accompanying drawings, which form a part of this specification, Figure 1 is a rear elevation view, partly in section, of a traction-engine embodying our invention. Fig. 2 is a side elevation showing the frame to which the supporting-sleeve is attached, and also showing the position of the springs on which the boiler and gearing are supported. Fig. 3 is an end view of the sleeve removed, the cover or outer flange of said sleeve being separated therefrom and shown in Fig. 3ª. Fig. 4 is a horizontal sectional view of the sleeve and frame, showing the arrangement of the compound elastic gear and the compensating mechanism on the sleeve. Fig. 5 is an elevation of the compound elastic gear and the compensating mechanism on the sleeve, showing the springs for transmitting the rotary strain and the connection from the respective gears of the compensating mechanism to the traction-wheels. Fig. 6 is a view of the inner side of the loose traction-wheel and the clutch secured rigidly on the shaft. Figs. 7 and 8 are detailed views hereinafter referred to.

Like parts are indicated by similar letters of reference throughout the several views.

In said drawings, A represents the boiler; B, the main axle, and C C′ the traction-wheels. The power to drive the traction-wheels is transmitted from the engine by means of suitable gearing to the spur-gear D. This spur-gear D is made into two parts, provided with springs *a a a* for transmitting a rotary strain from the outer ring to the inner core or spider. It is termed by us "the compound elastic gear," and its construction and operation is fully described in a former application filed by us March 4, 1884, and numbered 123,036. Small bevel-pinions *b b b*, journaled centrally in the inner core or spider of the compound elastic gear D, engage on either side with the respective compensating-gears E and E′, and form the compensating mechanism, the operation of which is fully set forth in the above-named application. The main axle B is journaled at each side of the boiler in bearings *c c*, adapted to move vertically on slides *d*, formed in the side frame, F F, on each side of the boiler. These side frames are each composed of two

parts, *e* and *e'*, (see Fig. 2,) and are secured to the side sills, F' F', which consist, preferably, of wrought-iron I-beams, and extend longitudinally along each side of the fire-box. The part *e* of each side frame is bolted securely to the boiler and rests at the bottom against the top of the sill F'. Immediately opposite the piece *e*, and bearing against the bottom of the sill F', is a saddle, F^2, also bolted securely to the boiler. The saddle F^2 and the part *e* of frame F are connected together by bolts e^2 e^2, which clamp the sill tightly between the said saddle and frame. In addition to the bolts e^2 e^2, pins or studs e^3 (see Fig. 2) are inserted in the sills F', and project into the part *e* of frame F, thus effectually preventing any longitudinal movement of said frame on the sills. The piece *e* is bolted at the top to the part *e'* of the frame F, which rests thereon. This part *e'* is also bolted in the rear of the bearings to the sill F'. The slide *d*, on which the bearing *c* moves, is formed on the forward side directly on the piece *e* of the side frame, so that the forward thrust of the traction-wheels is brought directly thereon, and thus transmitted directly to the boiler and to the sills F'.

Resting upon the top of the bearings *c c*, and extending vertically between said bearings and the side frame, F, are springs *f f*, adapted to support the weight of the boiler and gearing upon said bearings. The side frame, F, next to the compensating mechanism, is faced off on the outside and adapted to receive a sleeve, G, which is bolted or otherwise secured thereon, immediately opposite the bearing *c*. This sleeve G is provided with a slotted opening, *g*, through which the axle B extends, the said opening being sufficiently large to permit a vertical movement of the axle sufficient to compress or expand the springs *f f*.

Upon the sleeve G is journaled the compensating mechanism in the following manner: The inner compensating-gear, E', is provided with a hub of considerable length, turned off and adapted to form a bearing for the compound elastic gear D. It is also bored out and journaled directly upon the sleeve G, which is turned down to form a journal therefor. The other compensating-gear, E, is journaled on the hub of a wrist plate or disk, E^2, said hub being of an equal diameter with the hub of gear E', and also bored out to fit the sleeve G. The wrist-plate E^2 and gear E', with the compound elastic gear D and compensating-gear E, journaled on the hubs thereof, are secured rigidly together by bolts *h*, which pass longitudinally through said hubs. The wrist-plate and inner compensating-gear are thus joined together by a sleeve, on which is journaled the spur-gear D and the outer compensating-gear, E. The hubs of these last-mentioned gears are turned out and faced off, so that they fit snugly, yet turn freely thereon. The whole is then secured on the sleeve G, and held against lateral motion thereon by a cover or flange, G', which is bolted or otherwise secured on the outer end of said sleeve. The sleeve G being secured directly to the side frame, F, which in turn rests upon the springs *f f*, the compensating mechanism, as well as the other gearing, boiler, engine, &c., are supported on said springs, the axle, with its bearings and traction-wheels, being alone subject to the jolts and shocks from the uneven roads. The compensating mechanism being placed upon a sleeve which is supported upon the axle by springs, the said axle will be capable of a vertical vibration within said sleeve, which will vary the relative positions of said axle to-said compensating mechanism. Now, in order that the compensating mechanism may perform its functions, the compensating-gears must be independently connected to the respective traction-wheels by means adapted to permit of the vertical vibration of said axle without affecting the successful working of the compensating mechanism. We preferably accomplish this as follows: Upon the axle B, just beyond the end of the sleeve G, is keyed or otherwise rigidly secured a clutch-plate, H. On the outside of the clutch-plate, and adapted to turn loosely upon the axle, is the traction-wheel C, held from lateral movement on said axle between the clutch-plate H and a collar, *i*, secured to the axle at its outer end. The other traction-wheel, C', is secured rigidly to the axle in the ordinary manner. The axle is held against lateral movement through its bearings by collar *k k*, made in halves and secured rigidly thereon inside and against the respective bearings *c c*. On the periphery of the outer compensating-gear, E, are formed lugs *l l*, preferably two in number, and on opposite side of center of said gear. The hub of the loose traction-wheel C is also provided on its periphery with lugs *m m*. In these lugs *l l* and *m m* on the respective wheels are secured wrist-pins *n n* and *o o*, preferably at an equal distance from the center of the wheels to which they belong. A connection is established from the wrist-pins *n n* in gear E to the corresponding wrist-pins in wheel C by means of links *p p*. In a similar manner the wrist-plate E^2 is provided in its face with wrist-pins *n' n'*, which are connected to wrist-pins *o' o'* in the face of clutch-plate H by links *p' p'*. It will be seen that the compensating-gears are thus connected independently to the respective traction-wheels.

The links *p p* and *p' p'* are each provided with slotted holes where they are connected onto the respective wrist-pins, so that one link of each pair will always be in a position to drive either forward or backward without regard to the relative position of the axle and compensating mechanism. The wrist-pins are each preferably made crowning on their face, the slotted holes in the links being correspondingly concaved, so that the said links may readily adapt themselves to any position of the axle in respect to the compensating-gears without cramping the links on the wrist. Each of the slotted holes in the respective links are

cut in straight from one face of the link, as shown in Fig. 7, so that the link may be readily placed upon the wrist. This opening will be placed, preferably, near the center of the slotted hole, so that when the wrist is in either position of forward or backward motion the links cannot slip off from the wrists. If desired, a washer may be secured on the end of each wrist, as shown in Fig. 7, as an additional safeguard against the links coming off. It will be seen that by this construction the compensating mechanism is relieved from all the jolts or shocks to which the traction-wheels and axles are subjected, while at the same time the said compensating mechanism is enabled to perform its functions as heretofore.

To provide for connecting the traction-wheels rigidly together upon the axle when desired, the clutch-plate H is provided with openings *r r*, to receive the sliding clutch-pins *s s*, which are adapted to slide longitudinally through bearings in the hub of the loose traction-wheel C. These clutch-pins *s s* at the outer end engage with the cam-projections *s' s'* on a cam-collar, *t*, said cam-collar being secured to the hub of the traction-wheel, so as to turn thereon, and adapted, when turned in one direction, to press the pins into engagement with the clutch-plate H, and when turned in the other direction to withdraw said pins from said clutch. The cam-collar is provided on opposite sides with spring-clutches *t' t'*, which, when turned to either position, engage with one of the pins *s* and holds said collar from revolving. (See Fig. 8.) The openings *r r* in the clutch-plate H are made considerably larger than the pins *s s*, so that said pins may readily enter therein. The clutch-plate H, being secured rigidly to the axle, it will be seen that when the sliding pins are engaged therewith the traction-wheel C will be connected to said axle, and both traction-wheels will turn rigidly together.

It is obvious that various changes and modifications may be made in the mechanism for carrying out our invention. We do not, therefore, limit ourselves to the exact constructions shown.

We claim—

1. A sleeve around the axle and a compensating mechanism on said sleeve, in combination with the springs *f f*, substantially as and for the purpose set forth.

2. In a traction-engine, a sleeve around the axle, springs supporting the said sleeve, a compensating mechanism on said sleeve, and a connection between the compensating-gears and the respective traction-wheels, said connection being adapted to permit of a vertical movement of said axle in said sleeve, substantially as and for the purpose set forth.

3. The combination, with side frames attached to the boiler, said side frames being provided with openings for the axle-bearings, which slide therein, and springs placed between said bearings and frame of the sleeve secured to the said side frame and adapted to form a bearing for a compensating-gear and axle passing through said sleeve, and means, substantially as set forth, for connecting the compensating-gear to the respective traction-wheels on said axle, as specified.

4. The sleeve around the axle, springs supporting said sleeve, a compensating mechanism on said sleeve, an elastic connection between said compensating mechanism and the engine-shaft, and means permitting of a vertical movement of the axle for connecting the compensating-gears to the respective traction-wheels, substantially as set forth.

5. The combination, with the sleeve around the axle, and springs supporting said sleeve, of a clutch-plate and traction-wheel secured rigidly to said axle, and a traction-wheel loose upon said axle, of a compensating mechanism on said sleeve, and links for connecting the compensating-gears to the loose traction-wheel and the clutch-plate, respectively, substantially as and for the purpose set forth.

6. The combination, with a sleeve around the axle, and springs supporting said sleeve, of an inner compensating-gear having a wrist-plate secured thereto, said gear and wrist-plate being journaled on said sleeve and adapted to form a bearing for an elastic gear, and the outer compensating-gear, bevel-pinions in said elastic gear adapted to engage on either side with the respective compensating-gears, and means for connecting the compensating-gears to the respective traction-wheels, substantially as and for the purpose set forth.

7. The combination, with traction-wheel adapted to turn loosely upon the axle, a clutch-plate secured rigidly to said axle, and pins adapted to slide in bearings through the hub of said traction-wheel, of the cam-collar provided on its periphery with cam-projections engaging with said pins and adapted to bring said pins into engagement with said clutch when revolved in one direction and withdraw said pins when revolved in the opposite direction, substantially as and for the purpose set forth.

8. The combination, with the traction-wheel loose on the axle, the clutch secured rigidly to the axle, sliding pins in said traction-wheel adapted to engage with said clutch, and a cam-collar for moving said pins, of catches and springs for holding said cam-collar in different positions, substantially as and for the purpose set forth.

9. The combination, with the main axle-bearing, of side frames provided with slides for said bearing, said side frames being composed of two parts, one of which is secured directly to the boiler and adapted to receive the forward thrust of said bearings, substantially as and for the purpose set forth.

In testimony whereof we have hereunto set our hands this 16th day of August, A. D. 1884.

OLIVER W. KELLY.
LOUIS F. DIETER.

Witnesses:
RANDOLPH COLEMAN,
PAUL A. STALEY.