No. 698,276.

Patented Apr. 22, 1902.

C. HAGANS.

LOCOMOTIVE ENGINE.

(Application filed Dec. 12, 1901.)

(No Model.)

Fig. 1.

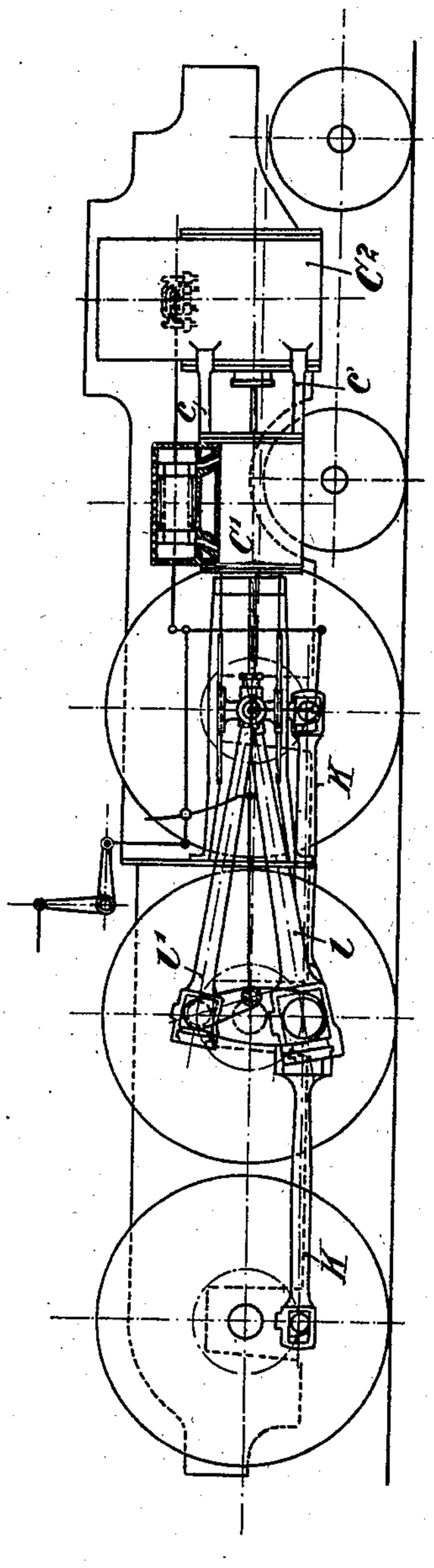


Fig. 2.

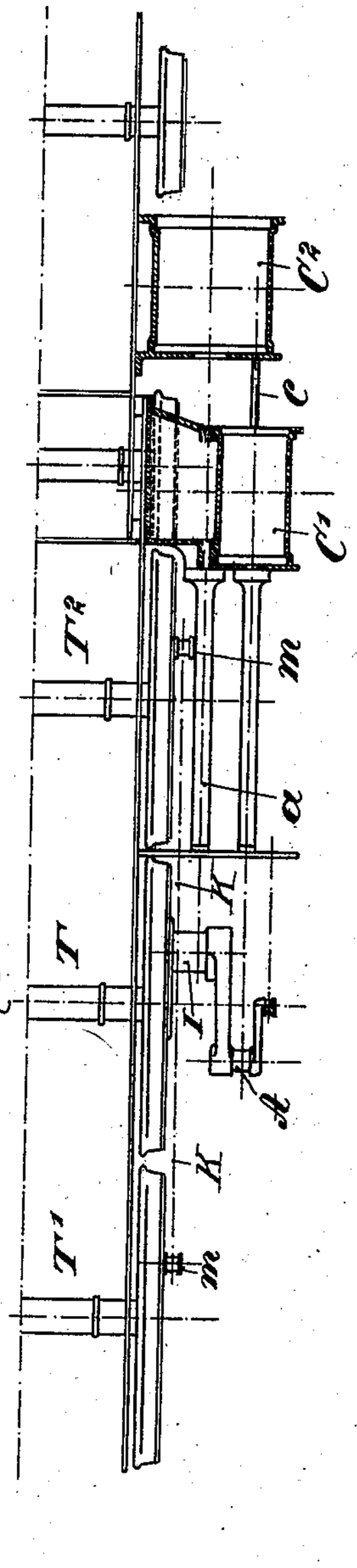
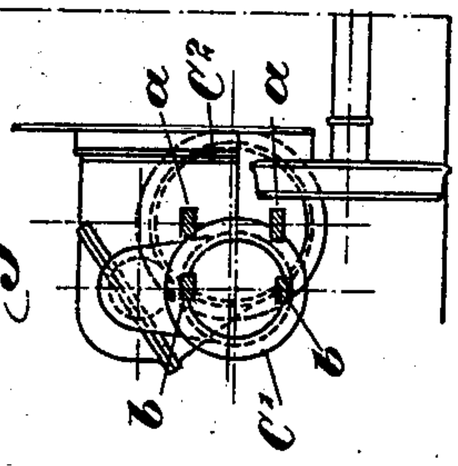


Fig. 3.



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UNITED STATES PATENT OFFICE.

CHRISTIAN HAGANS, OF ERFURT, GERMANY.

LOCOMOTIVE-ENGINE.

SPECIFICATION forming part of Letters Patent No. 698,276, dated April 22, 1902.

Application filed December 12, 1901. Serial No. 85,686. (No model.)

To all whom it may concern:

Be it known that I, CHRISTIAN HAGANS, manufacturer, a subject of the King of Prussia, German Emperor, residing at Erfurt, in the Kingdom of Prussia and German Empire, have invented certain new and useful Improvements in Locomotive-Engines, of which the following is a specification.

This invention relates to certain new and useful improvements in compound locomotive, with coupled axle provided at each side thereof near their front end, with a pair of outside cylinders arranged tandem, but laterally of a direct line joining their longitudinal axis.

In order that the invention may be the better understood, it is illustrated in the annexed drawings, wherein—

Figure 1 shows an elevation; Fig. 2, a plan, and Fig. 3 a cross-section.

The locomotive is provided at each side, near the front end thereof, with a pair of cylinders—the high-pressure cylinder C′ and the low-pressure cylinder C^2, respectively—arranged as outside cylinders, their connecting-rods acting jointly on the driving-axle T, the crank-pins being set at an angle of one hundred and eighty degrees to each other. For this purpose the connecting-rod *l* of the low-pressure cylinders C^2 is made to act on an inner crank-pin I and the connecting-rod *l*′ of the high-pressure cylinder C′ on an outer crank-pin A. The driving-axle T is coupled with the other axles T′ T^2 by coupling-rods K K. The coupling-rods K are driven from the inner crank-pin I of the crank *d* of axle T and act on the coupling-pins *m* of the axles T′ T^2. In order to render the mode of driving just described a feasible one, the cylinders C′ and C^2 must be arranged in the form of outside cylinders and close to and behind each other, so that the piston-rod or the connecting-rod of the low-pressure cylinder C^2 may pass at the back of the high-pressure cylinder C′.

Figs. 2 and 3 show cross-head guides *a* for the low-pressure cylinder C^2 and *b* for the high-pressure cylinder C′. The center lines of the cylinders being brought close to each other, the rolling motion of the engine is greatly reduced, and as the connecting-rods of both cylinders act on crank-pins of one or several coupled axles set at angles of one hundred and eighty degrees to each other vibration of the engine due to the reciprocating motion of the driving-gear is obviated or greatly reduced.

In order to take up the strains which, in consequence of the arrangement of the crank-pins on opposite sides, may arise in the cylinders C′ C^2 and prevent their being transmitted to the frame of the engine, the cylinders C′ and C^2 are connected with each other by rods *c c*, Figs. 1 and 2, which take up direct the strains acting in opposite directions to each other.

Instead of making the connecting-rods *l l*′ act direct on inside and outside crank-pins on one of the same cranks *d* they may also be made to act on cranks on various driving-axles; but the crank-pins must always be set at angles of one hundred and eighty degrees to each other.

I claim—

1. A compound locomotive provided at each side near the forward end thereof with a pair of cylinders arranged tandem but laterally of a direct line joining their longitudinal axis.

2. A compound locomotive-engine, provided with a pair of cylinders at each side near the forward end thereof and arranged tandem but laterally of a direct line joining their longitudinal axis, a pair of crank-pins carried by the drive-wheel of the locomotive and set at an angle of one hundred and eighty degrees to each other, suitable connections between the crank-pins and the cylinders, and means for connecting the cylinders to each other for the purpose of taking up strains set up in the cylinders in opposite directions.

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

CHRISTIAN HAGANS.

Witnesses:
PAUL TSIDEMANN,
AUGUST BIERVIZEL.