(No Model.)

C. SONDERMANN.

LOCOMOTIVE.

No. 547,899. Patented Oct. 15, 1895.

Fig. 1

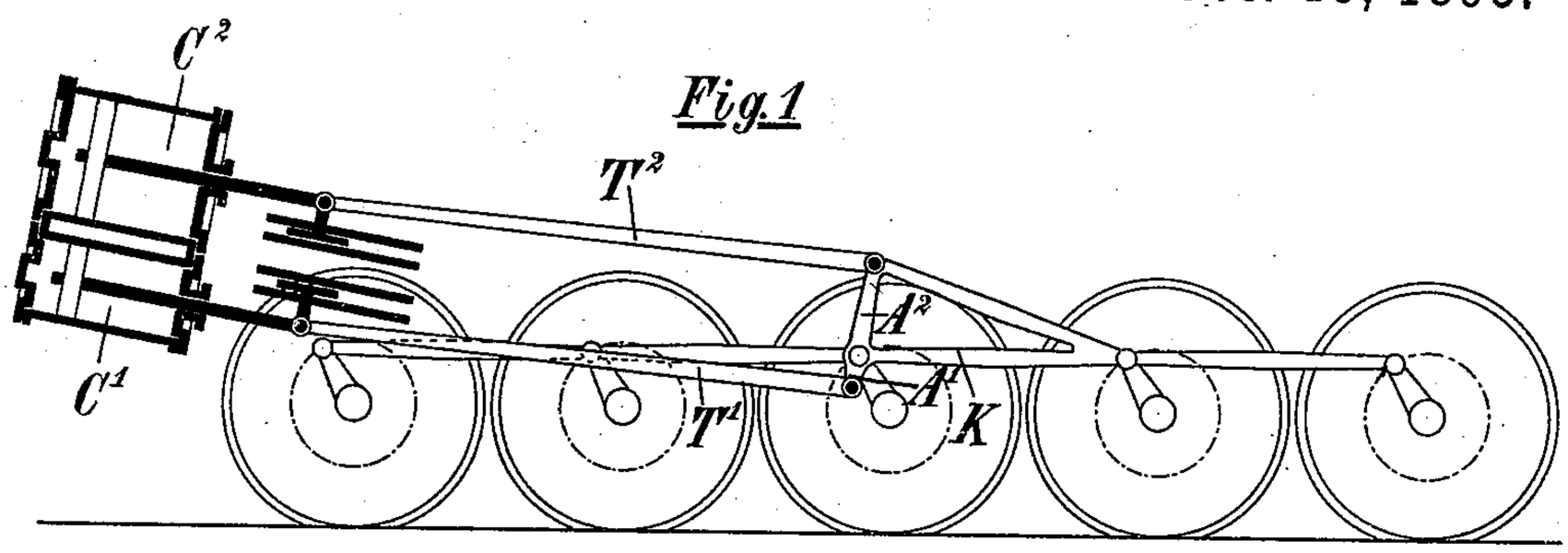


Fig. 2

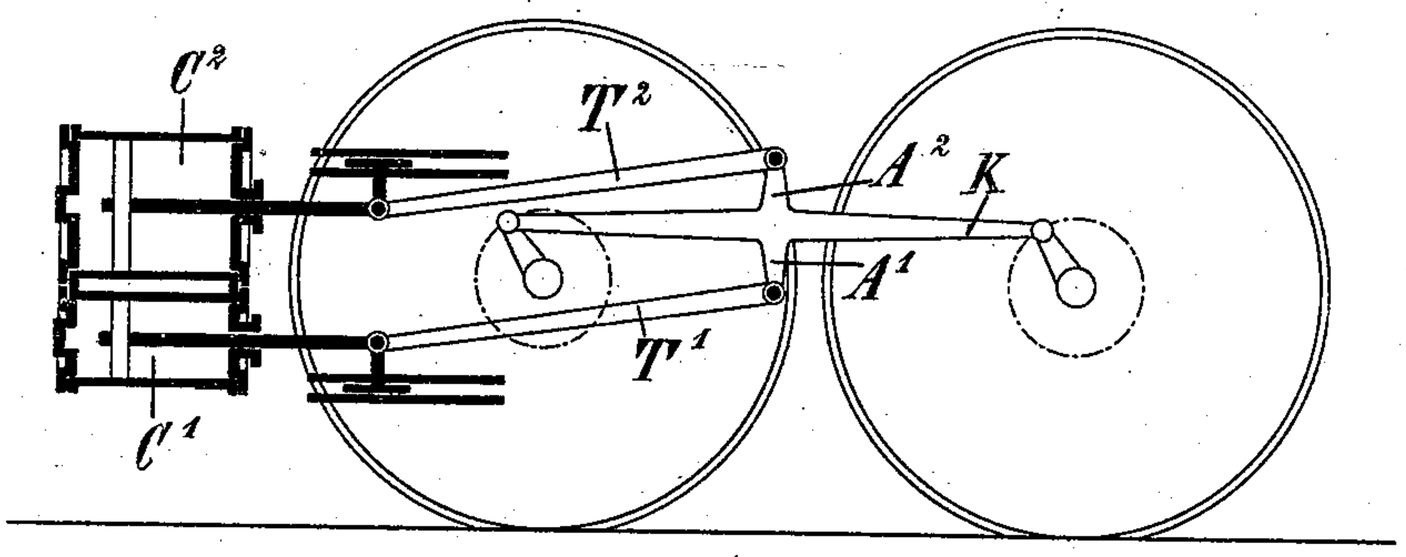


Fig. 3

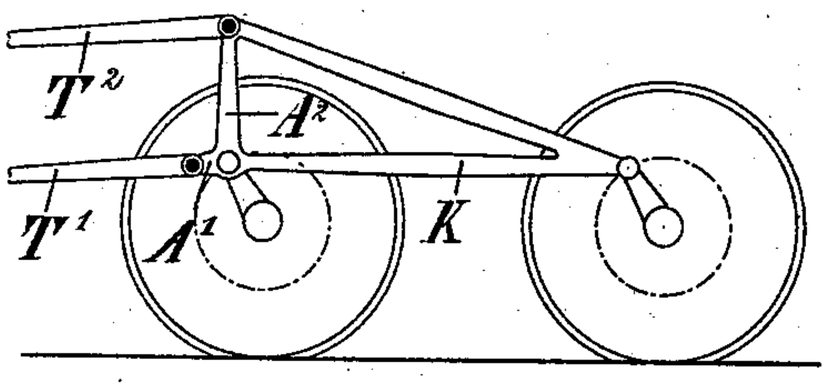
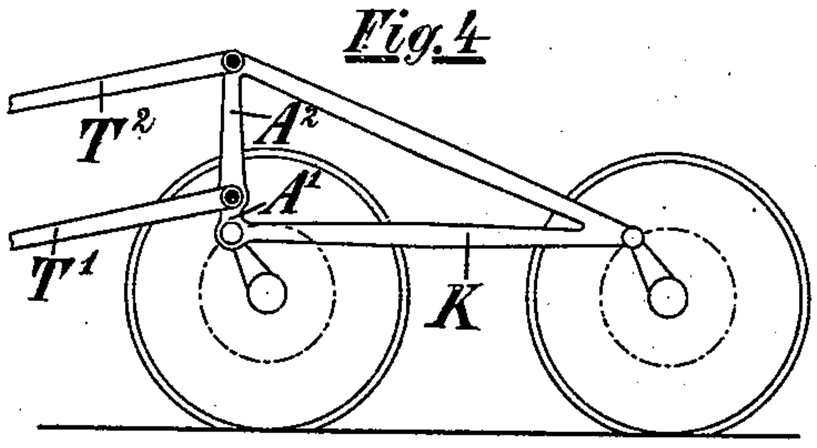


Fig. 4



Witnesses:
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UNITED STATES PATENT OFFICE.

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LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 547,899, dated October 15, 1895.

Application filed June 17, 1895. Serial No. 553,121. (No model.)

To all whom it may concern:

Be it known that I, CONRAD SONDERMANN, civil engineer, a citizen of the German Empire, residing at Stuttgart, Germany, have invented new and useful Improvements in Locomotives, Steam-Engines, and the Like, of which the following is a specification.

My invention relates to improvements in compound engines.

The object of the present invention is to remove the disadvantages in the well-known arrangement of superposed high and low pressure cylinders, such as have been hitherto almost exclusively employed in compound locomotives and other power-machines operated by steam, compressed air, &c., and especially twin and triple pumps and rolling-mills, which said disadvantages result from the transmission of the usually different pressures of the piston-rods to one cross-head, and thence by means of only one common driving-rod to only one of the crank-pins. These defects or disadvantages consist in bending moments on the cross-head and piston-rods, which frequently result in a fracture of these parts.

These disadvantages are removed by my invention, which consists in the features, details of construction, and combinations of parts, which will first be described in connection with the accompanying drawings, and then particularly pointed out in the claims.

In the drawings, Figure 1 is a diagrammatic view of a device embodying my invention. Figs. 2, 3, and 4 are similar views of other modifications of the same.

To remove the objections mentioned above, each of the cylinders C′ and C² is provided with a driving-rod or pitman T′ and T², respectively, which are connected at one end to the axis of the corresponding piston-rod, but are not connected with the crank-pins at the rotating ends, but with pins or studs of the arms A′ A² of a coupling-rod K. The pressures on the pistons are hence transmitted to two crank-pins simultaneously and in an advantageous manner. The pitmen T′ T² and the coupling-rod K are arranged in one plane of forces. Further coupling-rods may be arranged to branch off from the crank-pins or the coupling-rod to one or both sides. The arms or projections A′ A² may be arranged to lie away from the middle of the coupling-rod or they may be transferred to one end of the same. It is, moreover, permissible to make these projections unequal in length, Fig. 1. Finally, one of the arms or projections may form the continuation of the coupling-rod, Fig. 3, or both driving-rods or pitmen may be attached on the same side of the coupling-rod, as shown in Fig. 4. Where the cylinders are inclined to the horizontal, Fig. 1, this same inclination must be taken into account with respect to the projections A′ A², these projections being suitably shifted with respect to each other.

In the diagrammatic drawings a separate cross-head is shown for each piston-rod and pitman. It is to be understood, however, that a common cross-head may serve for both piston-rods, the guide for said cross-head being arranged either outside of the piston-rods, as shown in Fig. 2, or between the same, as illustrated in Fig. 1.

I claim—

1. The combination, with a pair of cylinders, a piston and a piston rod for each cylinder, and a pair of cranks, of a coupling rod connected to both cranks, a pair of wrist pins carried by the coupling rod, and a connecting rod for each piston rod, each connecting rod being connected to its respective wrist pin on the coupling rod, substantially as set forth.

2. The combination, with a pair of cylinders, a piston and a piston rod for each cylinder, and a pair of cranks, of a coupling rod connected to both cranks, a pair of wrist pins arranged one on each side of the coupling rod, and a connecting rod for each piston rod, each connecting rod being connected to its respective wrist pin, substantially as set forth.

3. The combination, with a pair of cylinders, a piston and a piston rod for each cylinder, and a pair of cranks, of a coupling rod connected to both cranks, a pair of wrist pins arranged at unequal distances from the coupling rod, and a connecting rod for each piston rod, each connecting rod being connected to its respective wrist pin, substantially as set forth.

4. The combination, with a pair of cylinders, a piston and a piston rod for each cylin-

der, and a pair of cranks, of a coupling rod connected to both cranks, a pair of wrist pins arranged at unequal distances from, and on opposite sides of, the coupling rod, and a connecting rod for each piston rod, each connecting rod being connected to its respective wrist pin, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CONRAD SONDERMANN.

Witnesses:

AUGUST B. SHUTZ,

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