

(No Model.)

A. A., E. & H. BLACKMAN.

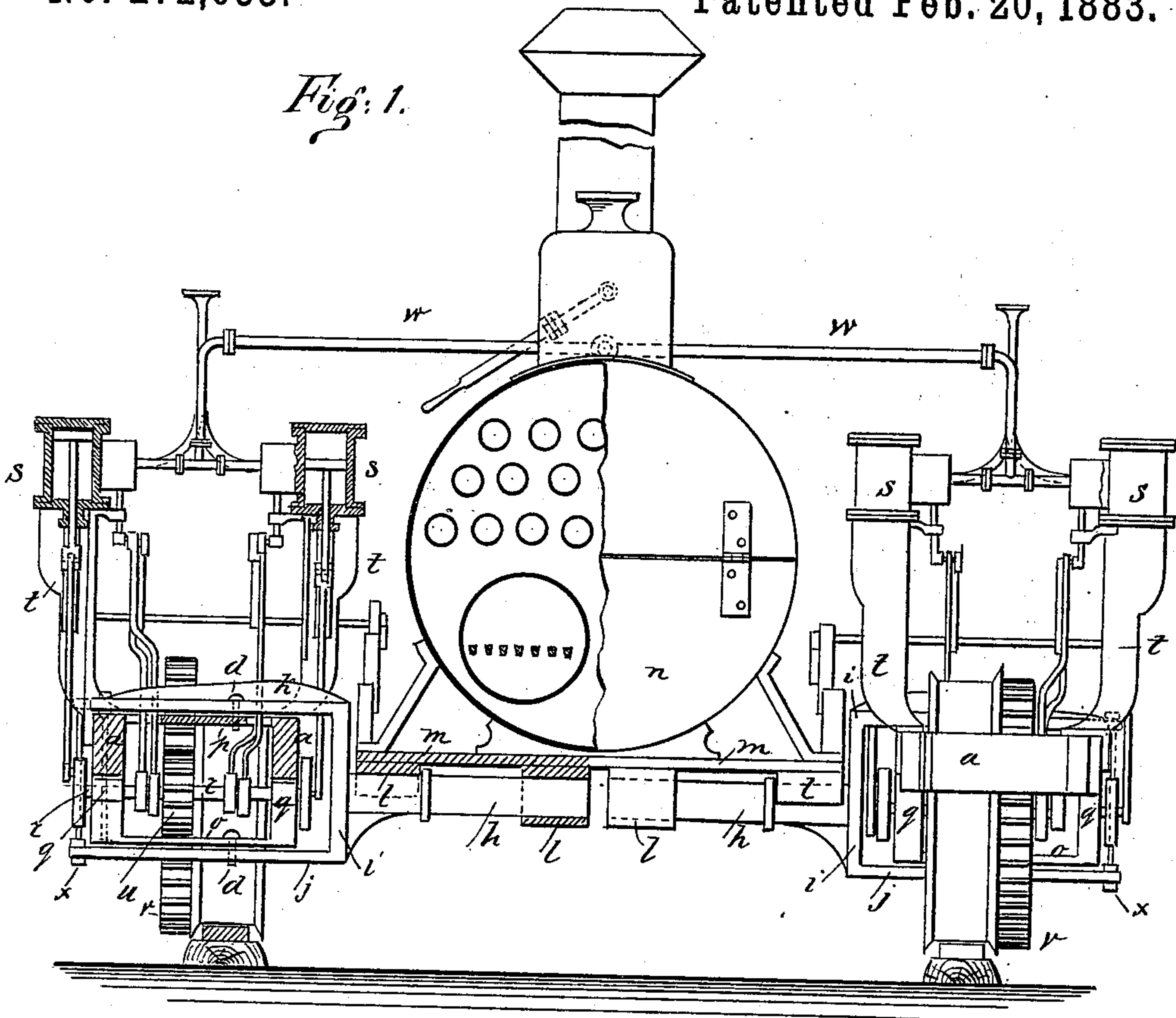
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LOCOMOTIVE.

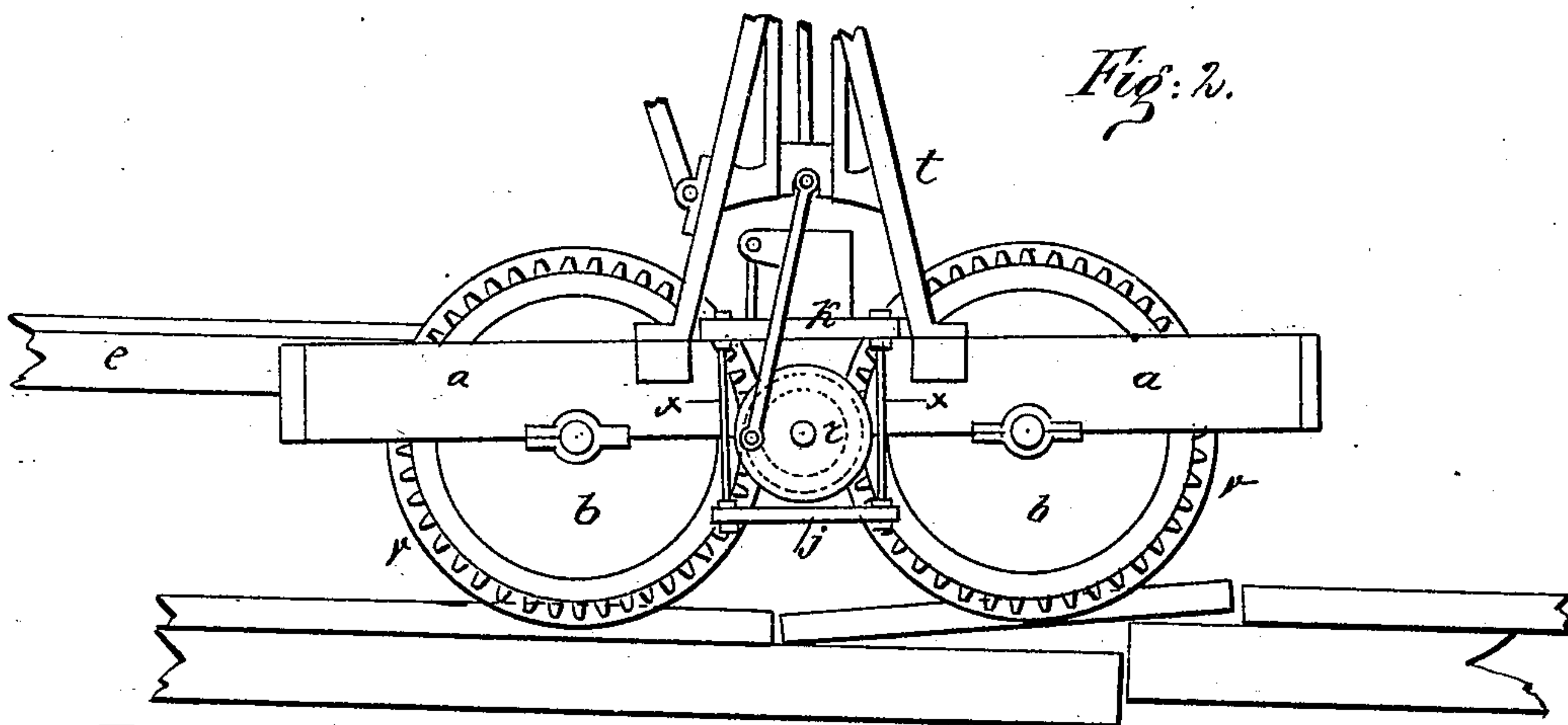
No. 272,633.

Patented Feb. 20, 1883.

*Fig: 1.*



*Fig: 2.*



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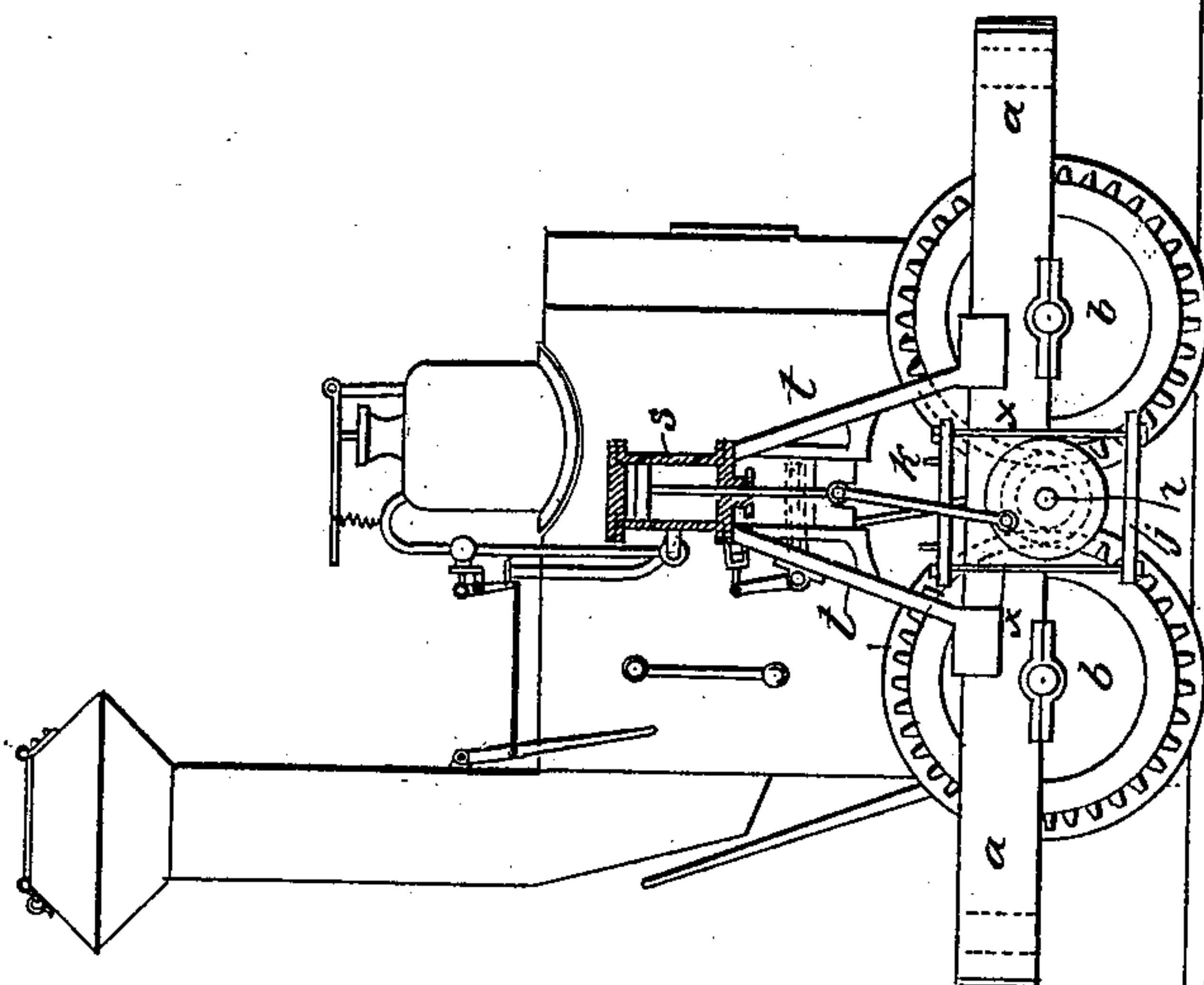


Fig. 3.

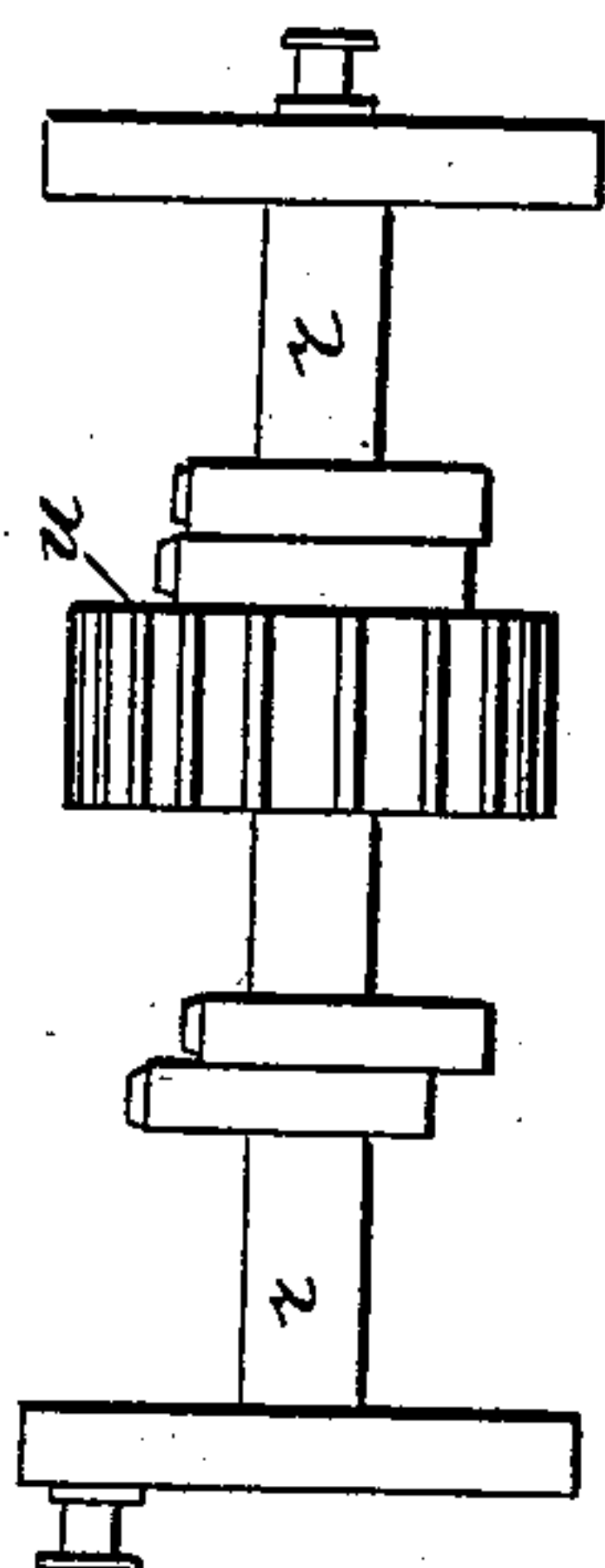
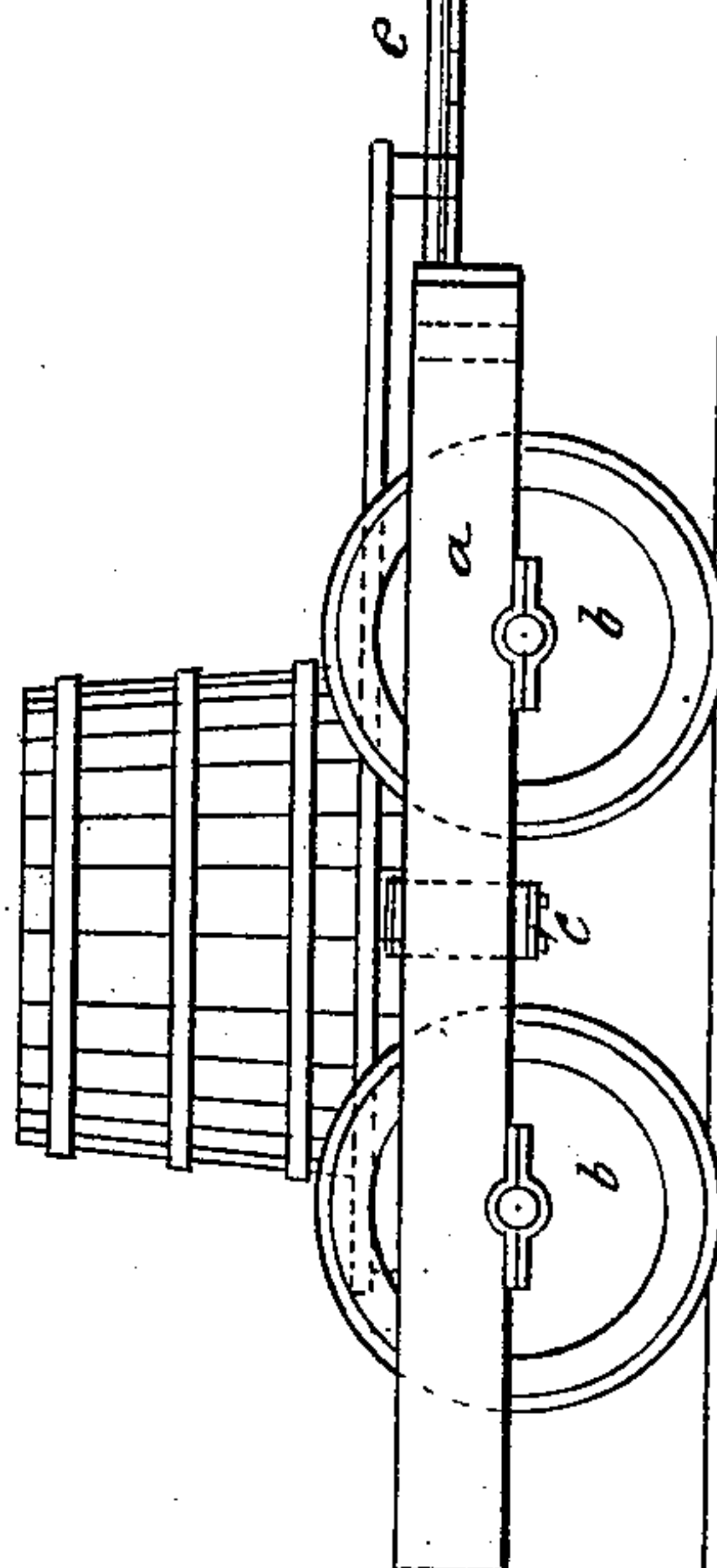


Fig. 4.



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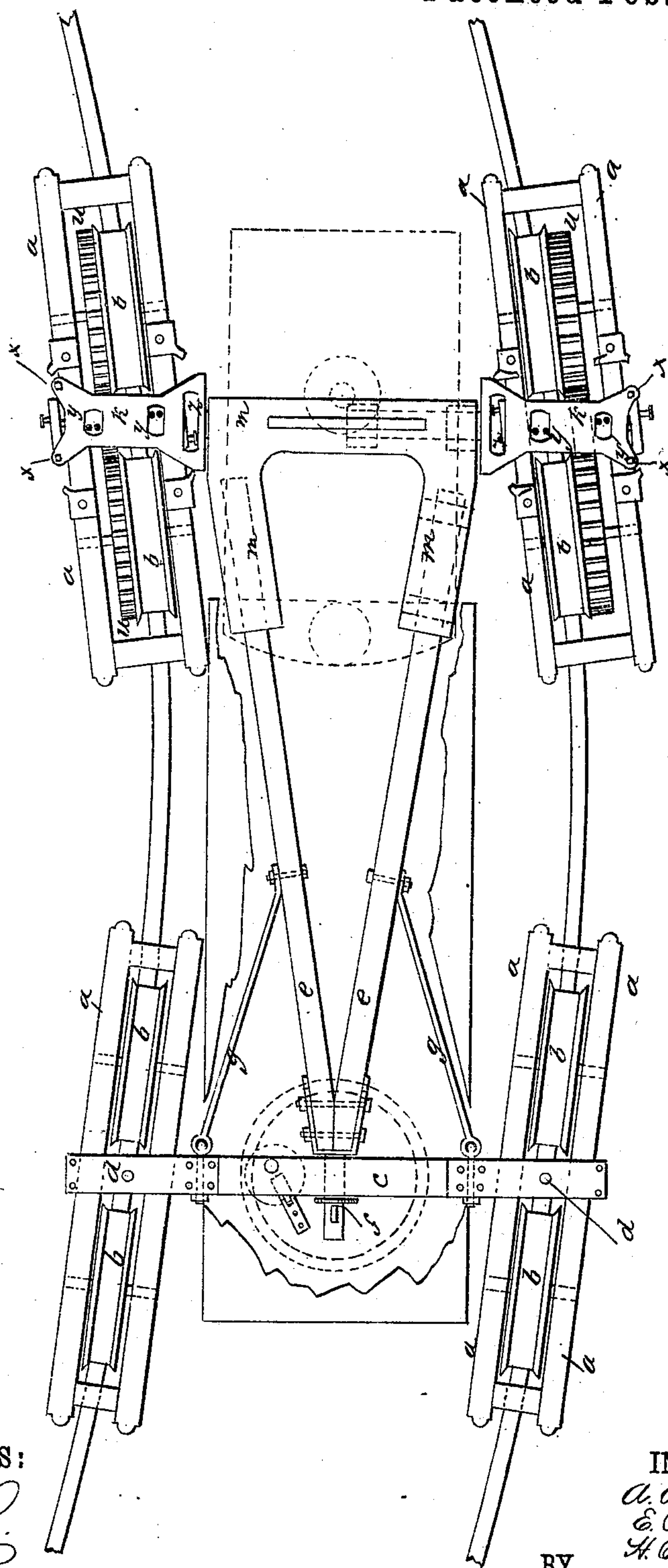
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Fig. 5.



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# UNITED STATES PATENT OFFICE.

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## LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 272,633, dated February 20, 1883.

Application filed August 31, 1882. (No model.)

*To all whom it may concern:*

Be it known that we, ALANSON A. BLACKMAN, ELHANAN BLACKMAN, and HYRCANUS BLACKMAN, all of Snohomish, in the county of Snohomish and Territory of Washington, have invented certain new and useful Improvements in Locomotive-Engines, of which the following is a full, clear, and exact description.

10 This invention consists of improvements in locomotive-engines, whereby it is intended to adapt such engines for better action upon tramways or uneven and undulating tracks than as now arranged.

15 In carrying out our invention we employ a combination of side and end trucks capable of independent vertical and lateral articulation of the connections, substantially such as described and represented in the patent granted to us March 14, 1882, No. 254,908, and apply independent steam driving-gear to each of the two side trucks of one end of the combined truck, as hereinafter fully described.

25 Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

30 Figure 1 is partly a front elevation and partly a transverse section of our improved locomotive. Fig. 2 is a side elevation of a portion of the same. Fig. 3 is a side elevation of the locomotive and tender, with one of the cylinders sectioned. Fig. 4 is a side elevation of one of the crank-shafts, and Fig. 5 is a plan view of the combined truck.

35 For the locomotive-truck we employ four primary trucks, consisting of frames *a*, each having two wheels, *b*, suitably mounted in a longitudinal line for running on one rail, said trucks being connected in pairs transversely of the road by a cross-beam, *c*, or other device, to which they are pivoted at *d*, so as to have horizontal oscillation on said pivots for going around curves freely, as represented in Fig. 5; and for the locomotive we have pivoted the beam *e* of one pair of the trucks to the connecting-frame *e* for the two pairs of trucks, as at *f*, together with jointed braces *g*, to allow free vertical oscillation of the respective pairs of trucks without interference with each other. 45 For the application of locomotive driving-gear

to trucks of this character, we make the transverse connecting device between the two trucks *a b*, on which the locomotive is to be mounted, to consist of two independent trunnions, *h*, each having what we call "trunnion-frames," consisting of head *i*, base *j*, and top *k*, the trunnions being arranged in bearings *l* of a bed-plate, *m*, to which frame *e* is attached and on which the boiler *n* is mounted. 55 60

The trunnions and their frames are to serve for the connection of the trucks *a b* that the driving-gear is applied to, so that said trucks may oscillate freely in a vertical plane by the turning of the said trunnions in their bearings, and also so that they (said trucks) may oscillate horizontally by turning on the pivots *d* in the trunnion-frames, wherein said truck-frames are arranged, by means of bearing-plates *o* and *p*, attached to them between the wheels *b*, as shown in Fig. 1, for being pivoted to the trunnion-frame; and the plate *o* is also for supporting the bearings *q* of the crank-shaft *r*, to which the power is applied by the inverted engines *s*, placed vertically over the space between the wheels *b* on supports *t*, mounted on the truck-frame *a* each side of the top *k* of the trunnion-frame, said crank-shaft gearing by a pinion, *u*, with the wheels *b*, each of which is provided with a toothed rim, *v*, for the purpose. 65 70 75 80

A pair of engines, *s*, is arranged with each truck *a b*, so as to oscillate freely with said truck independently of the other truck and its engines, and flexible steam-pipes *w* are employed for the supply of the steam to allow of such oscillations. 85

The top and bottom plates, *k* and *j*, of the housing-frames are connected outside of the truck-frames by stay-bolts *x*, to support them one by the other, the bolts being put in after the truck-frames *a* are placed in said trunnion-frames. 90

As in the truck of our former patent, we propose to employ double-flanged wheels for running upon wood or strap rails laid on stringers without ties, the double flanges being essential to the independent lateral action of the trucks of our system. 95

The engines, being of ordinary construction, need not be more particularly described. 100

It will be seen that an engine having the jointed connections of the respective trucks,



as herein shown, may run on tracks greatly varying in the level of the rails, and also having very short curves, without undue strain of any of the parts, and also without binding or cramping in the joints.

The top plate, *k*, of the housing-frames is slotted at *y* for the valve-rods of the engines, and at *z* for the connecting-rod of the inside engine. While a single pair of trucks, *a b*, may serve for the locomotive with good results, we prefer to employ two pairs, as shown, with a connecting-frame, *e*, which affords greater stability, and we use the extension for a tender, as in Fig. 3.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination, with side and end trucks having independent vertical and lateral motion, of independent steam driving-gear to each one of the side trucks, as and for the purpose described.

2. In a locomotive-engine, the combination of a pair of trucks, *a b*, each having independent driving-engines, and being connected to the bed-frame or platform by joints, enabling said trucks to oscillate both vertically and horizontally independently of said frame and of each other, and the bed-frame or plat-

form connected by a pivot-joint, *f*, and jointed braces *g* with the beam *c* of another pair of trucks similarly jointed together, substantially as described.

3. The combination, in a locomotive-engine, of a platform or bed-plate, *m*, a pair of trunnions, *h*, and trunnion-frames, *ij k*, and a pair of trucks, *a b*, said trucks being pivoted in said trunnion-frames and said trunnions being journaled on the bed-frame *a*, substantially as described.

4. The combination, in a locomotive-engine, of bed-plate *m*, a pair of trunnions and trunnion-frames, a pair of trucks *a b*, and driving-engines geared independently with said trucks, respectively, substantially as described.

5. The combination, in a locomotive-engine, of bed-plate *m*, a pair of trunnions and trunnion-frames, a pair of trucks, *a b*, and driving-engines geared independently by crank-shafts *r*, pinions *u*, and toothed rims *v*, with said trucks, respectively, substantially as described.

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Witnesses:

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