

D. WINDER.

Locomotive.

No. 9,716.

Patented May 10, 1853.

Fig: 1.

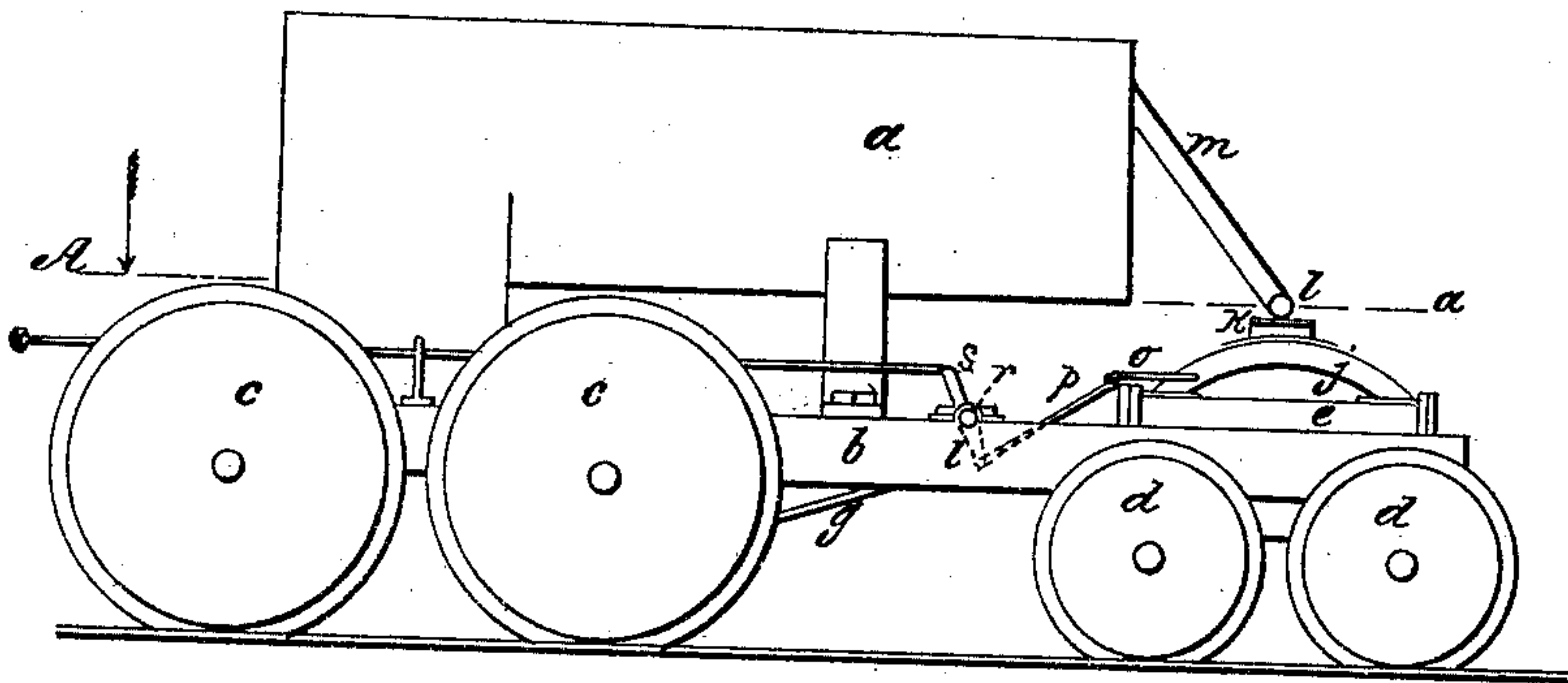


Fig: 2.

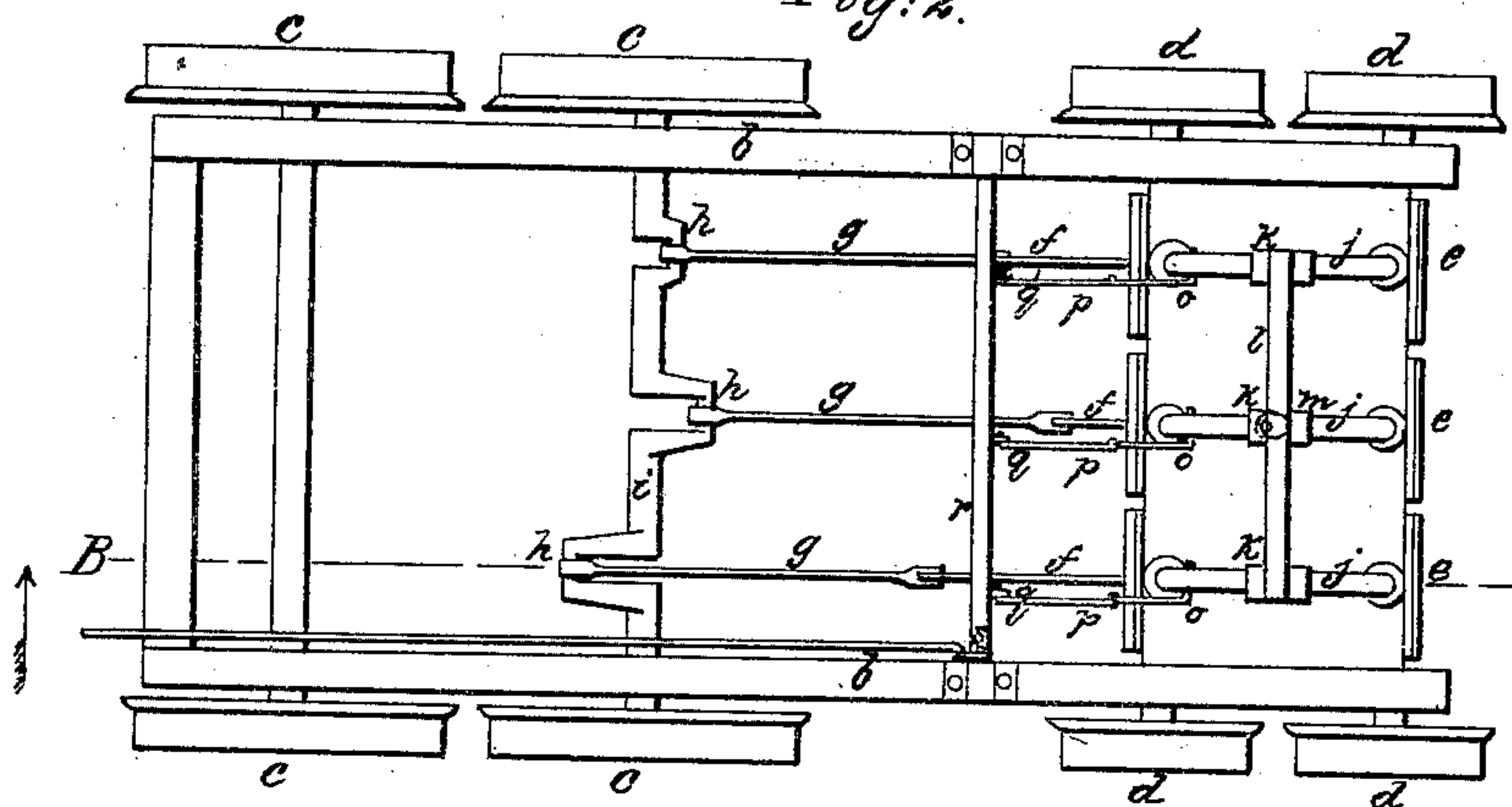
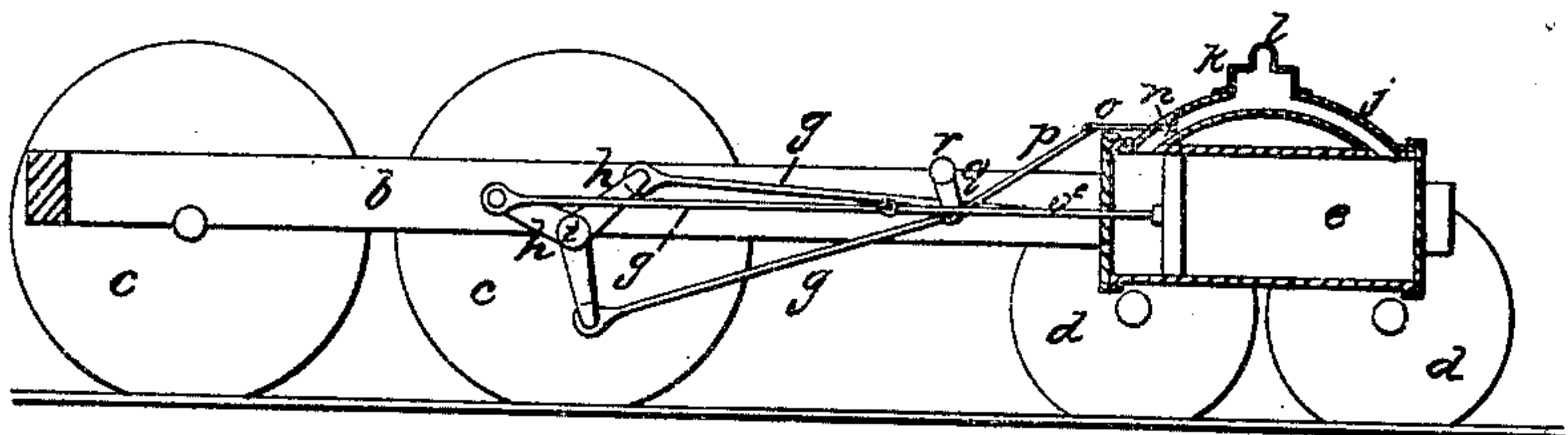


Fig: 3.



UNITED STATES PATENT OFFICE.

D. WINDER, OF XENIA, OHIO.

LOCOMOTIVE-ENGINE.

Specification of Letters Patent No. 9,716, dated May 10, 1853.

To all whom it may concern:

Be it known that I, D. WINDER, of Xenia, Ohio, have invented a certain new and useful Improvement in Locomotive Steam-Engines, and that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1, is a side elevation of a locomotive steam engine on my improved plan; Fig. 2, a horizontal section taken at the line A *a* of Fig. 1; and Fig. 3, a longitudinal vertical section taken at the line B *b* of Fig. 2.

The same letters indicate like parts in all the figures.

The power required to propel a train of cars on a rail road varies with the condition of the road, requiring on descending grades the least and on ascending grades the most power. As locomotive steam engines have heretofore been constructed the propelling power can only be varied to meet these changes within the range of the cut off, which is not sufficient to meet the varying circumstances, and therefore the engine must be proportioned to the maximum power required, leaving a surplus and hence a waste when the train presents the minimum resistance.

The object of my invention is to adapt the power of the engine to the varying resistance presented by the train, with the view to economize fuel, and at the same time to equalize the power applied to the crank or driving shaft.

To this end the nature of my invention consists in the employment of three steam cylinders with their appendages, the three pistons being connected with a three throw crank arranged at equal distances apart, so as to divide the circle into three equal parts and have the power applied on the three in regular succession, when this is combined with the employment of stop cocks, valves or their equivalents, for the purpose of letting on or shutting off the steam from one end of each of the cylinders, so that the three can be at the will of the engineer employed as double or single acting engines, and thus increase or decrease the power to suit the condition of the road, the succession of the action of the three pistons on the crank or driving shaft being such as to admit of working the engines with single or double action.

In the accompanying drawings *a* represents the boiler which may be of any appropriate construction, mounted in the usual manner on a frame *b* provided with driving and truck wheels *c c* and *d d* in the usual manner. Just over the truck are arranged three cylinders *e, e, e*, of any desirable construction provided with pistons and rods *f, f, f*. The three connecting rods *g, g, g*, take hold of three cranks *h, h, h*, on the driving shaft *i* of the main driving wheels, the said three cranks being at equal distances apart, and therefore dividing the circle in three equal parts. The steam cylinders are provided with steam ways *j j j*, connecting with both ends in the usual manner and with the usual steam chests *k, k, k*, to be provided with valves, which latter are not represented as they make no part of my present invention. The three steam chests are all connected together by a pipe *l* with a branch *m*, extending to the steam chamber of the boiler, as is well known to engineers. The three steam ways *j, j, j*, are each provided with a turning valve or stop cock *n*, with a handle or arm *o*, connected by a link *p*, with an arm *q* of a rock shaft *r*, which rock shaft has another arm *s* provided with a hand rod extending so as to be conveniently in reach of the engineer, so that by the pushing or pulling of the said rod the three stop cocks can be turned either to admit the steam to both ends of the cylinder or to shut it off from one end, and thus make the three engines either double or single acting.

It is deemed unnecessary to describe or represent the valves and the valve gear and all the other usual appendages of a locomotive steam engine, as these make no part of my invention and are well known to engineers.

From the foregoing it will be seen that when the three engines are worked double acting—that is, with the steam admitted to both ends of the cylinders with the same pressure of steam—the locomotive will have double the power it has when they are worked single acting or with the steam admitted to only one end, and that therefore such a locomotive will have a much greater range of power than locomotives of the usual construction, while at the same time it will have the same range of capacity due to the employment of cut-off valves as other locomotives. It is true that if such an engine were required to be worked for any great

length of time, double acting, the boiler would be either insufficient to supply the steam required or else it would be of too great a capacity when worked for any length
5 of time on the single acting principle; but as the full capacity is only required at intervals and for short periods of time while ascending grades a boiler of the capacity required for running at the required speed on
10 levels will furnish the steam required for ascending grades. And finally it will be seen that although it would be impracticable to work two engines with the cranks at right angles on the single acting principle because
15 of the location of the cranks, still when three engines are employed with three cranks at equal distances apart this difficulty is avoided, because one crank always begins to act before the other passes the dead point.
20 I do not wish to limit myself to the precise construction and arrangement of parts herein above described, as these may be varied at pleasure, so long as the three engines are connected with the three throw cranks on

the driving shaft and this is combined with 25 a valve or stop-cock arrangement or the equivalent thereof for shutting off the steam from one end of the cylinder or letting it on both ends to work the said engines on the single or double acting principle. 30

What I claim as my invention in locomotive steam engines, and desire to secure by Letters Patent, is—

The employment of three engines connected with a three throw crank on the driving 35 shaft with the cranks arranged at equal distances apart on the circle, substantially as specified, when this is combined with the employment of valves, stop cocks or their equivalents for letting the steam on both 40 ends, or cutting it off from one end to work the engines on the single or double acting principle, substantially in the manner and for the purpose specified.

D. WINDER.

Witnesses:

LINDSEY HAGUE,
JOHN C. HARRIS.