

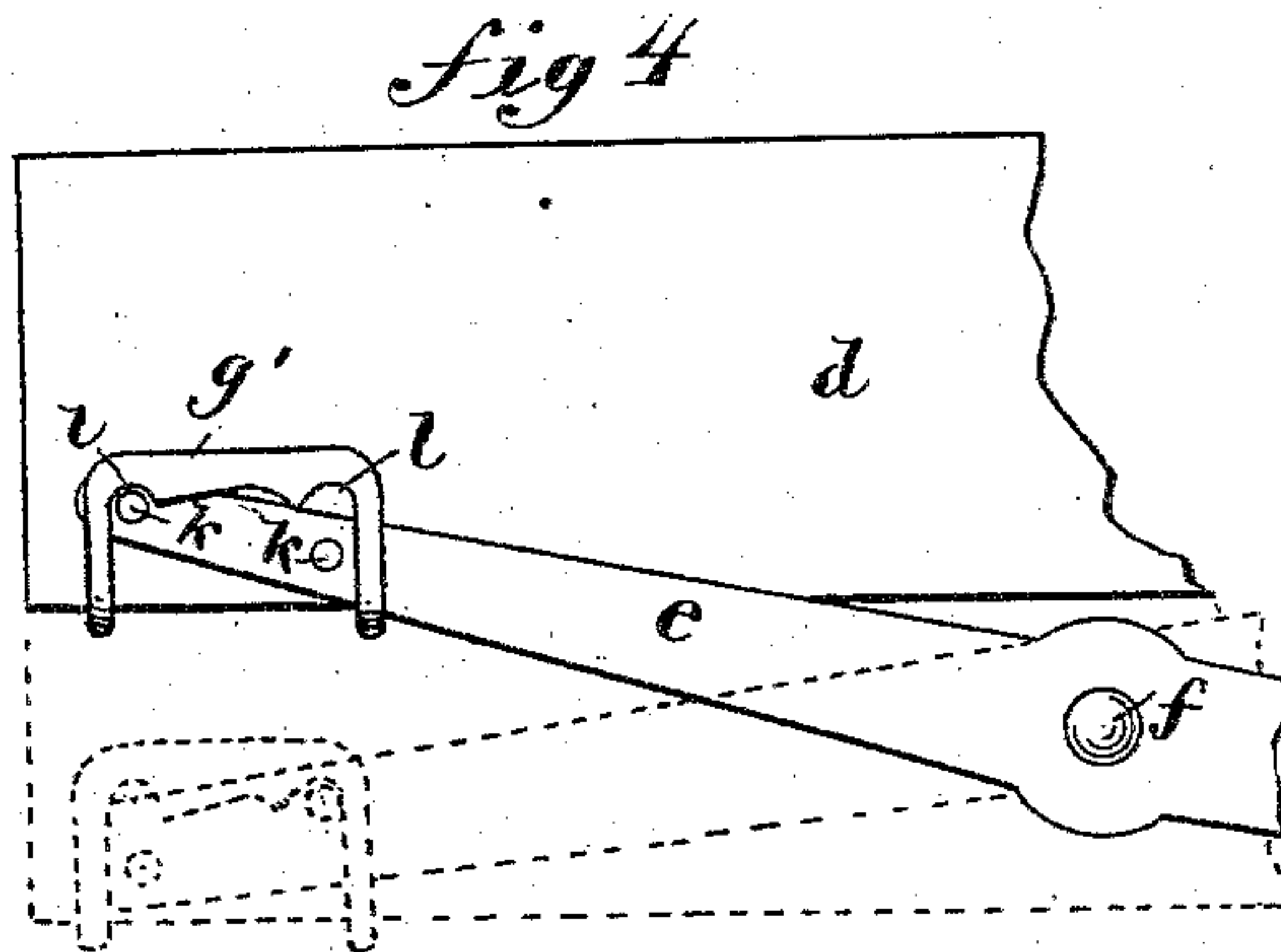
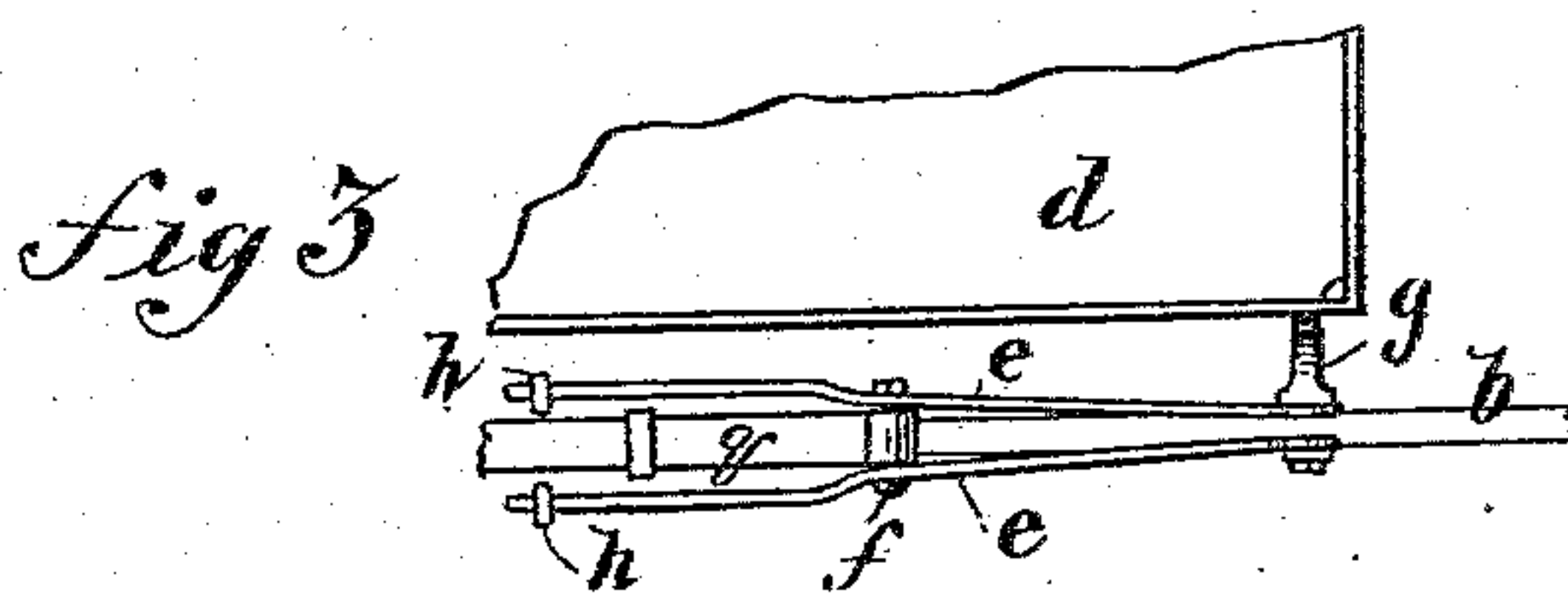
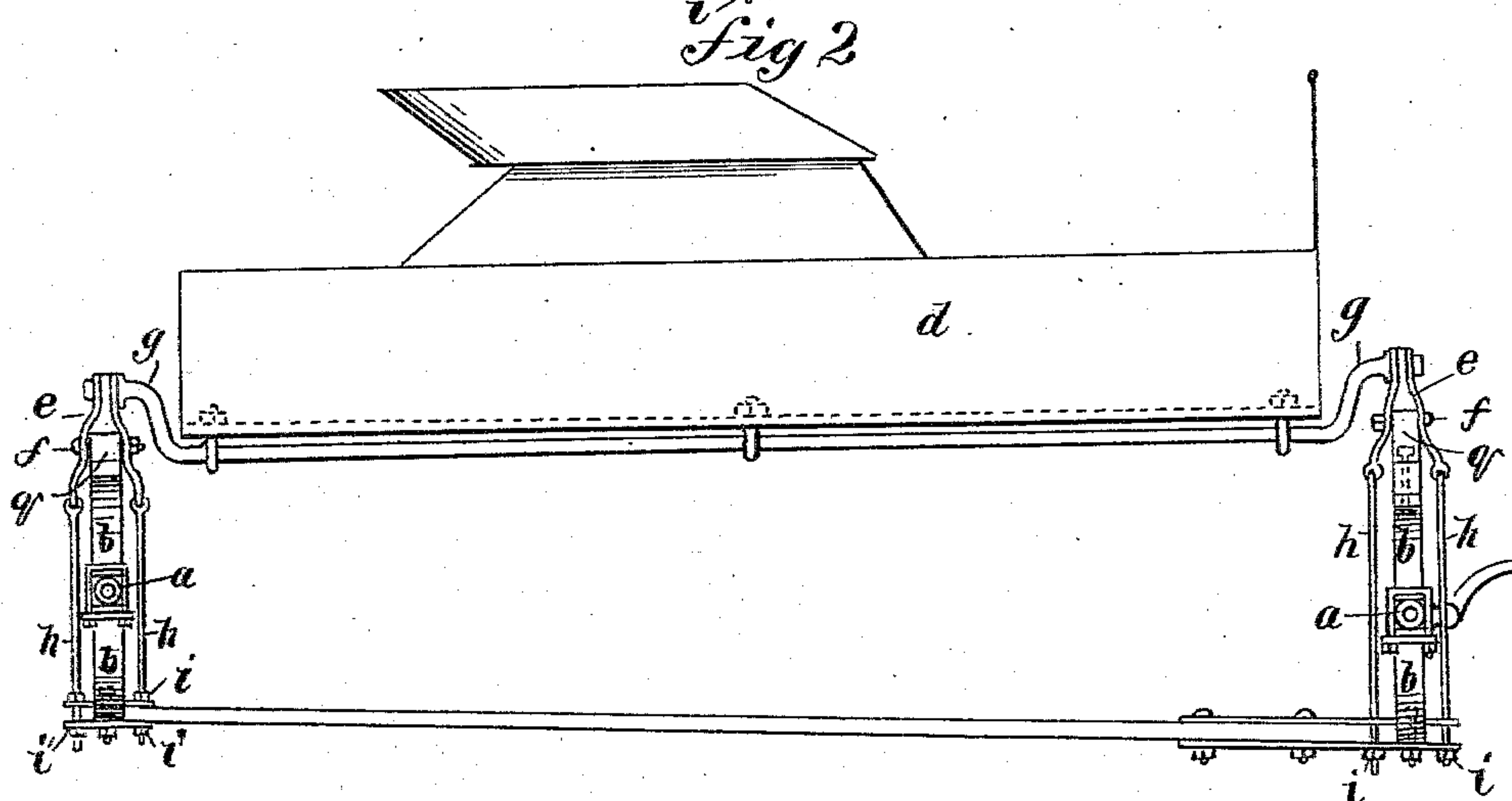
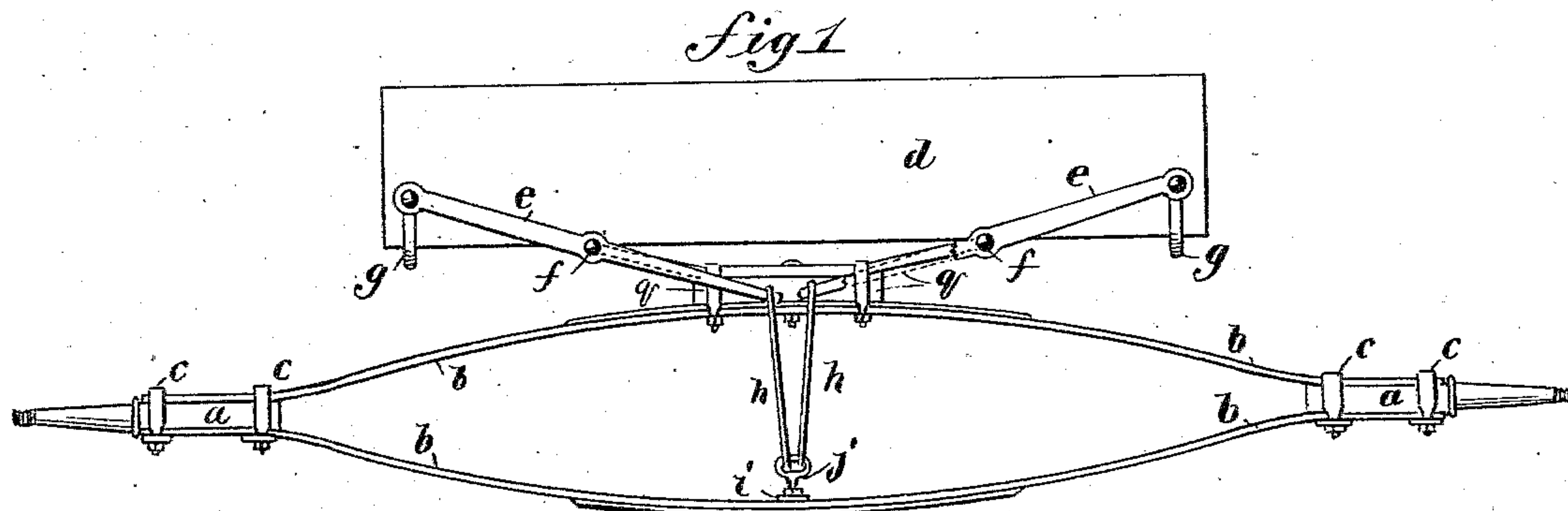
(No Model.)

2 Sheets—Sheet 1.

T. P. YATES.  
SPRING WAGON.

No. 296,500.

Patented Apr. 8, 1884.



WITNESSES:

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BY

ATTORNEYS.

(No Model.)

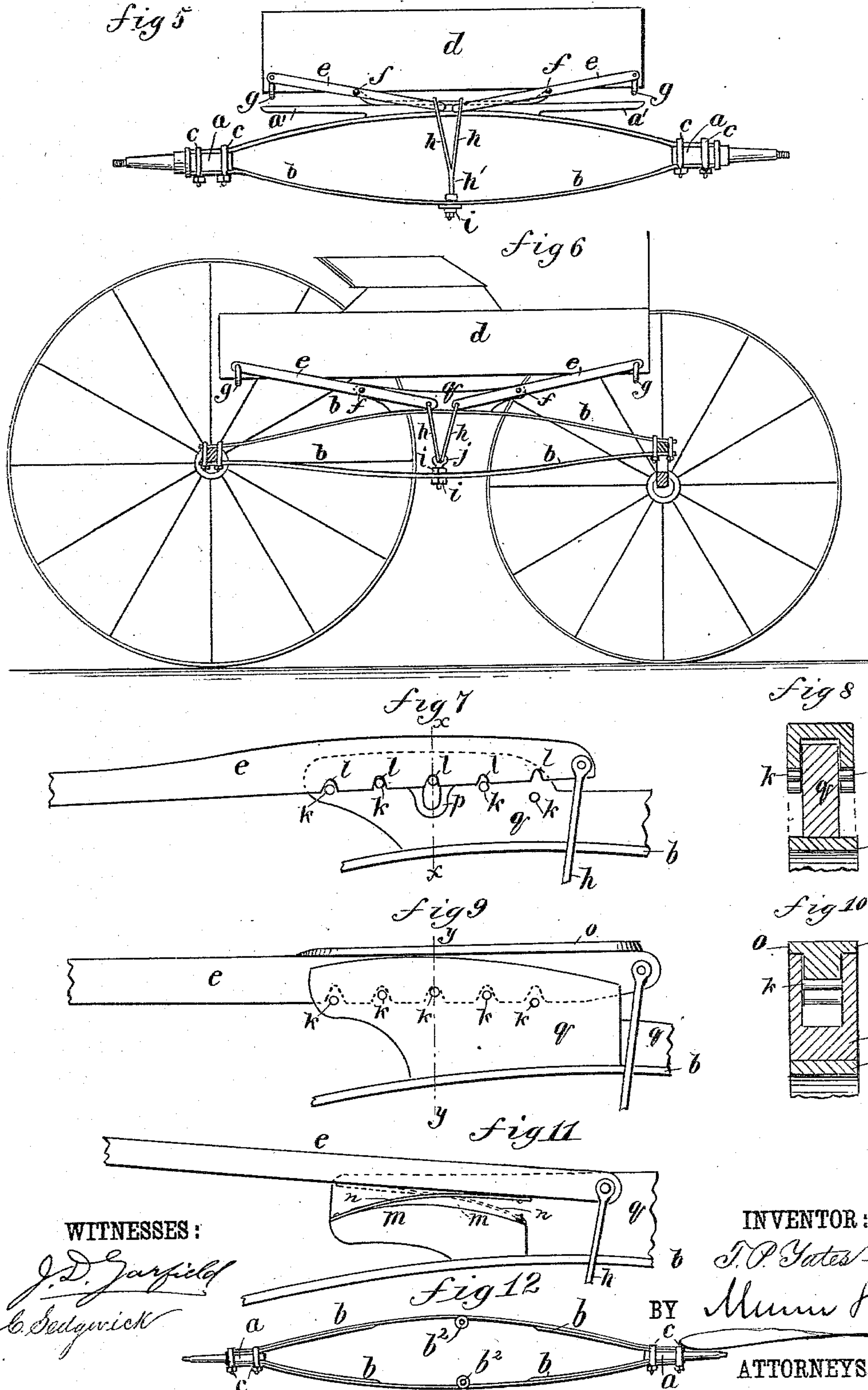
2 Sheets—Sheet 2.

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# UNITED STATES PATENT OFFICE.

THOMAS P. YATES, OF FACTORYVILLE, NEW YORK.

## SPRING-WAGON.

SPECIFICATION forming part of Letters Patent No. 296,500, dated April 8, 1884.

Application filed September 14, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS P. YATES, of Factoryville, in the county of Tioga and State of New York, have invented certain new and useful Improvements in Spring-Wagons, of which the following is a full, clear, and exact description.

My invention consists of a novel contrivance whereby a spring and axle are combined in one device, calculated to simplify the construction and improve the operation of spring-wagons.

It also consists in the peculiar construction and arrangement of parts, as hereinafter described, and pointed out in the claims.

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.

Figure 1 is an end elevation of wagon-body and side elevation of the axle and lever device connecting the body to the axle. Fig. 2 is a side elevation of a wagon, showing a side arrangement of my improved spring-axle and lever device for connecting the body to the springs. Fig. 3 is a detail of Figs. 1 and 2 in plan view. Fig. 4 is a side elevation of an arrangement for varying the leverage of the body-support on the springs as the load varies. Fig. 5 is an end elevation of the wagon, showing a stop contrivance for limiting the range of the springs. Fig. 6 is a side elevation, showing the spring and bar arrangement employed in lieu of the side-bar arrangement of common use. Fig. 7 is a side elevation of a modified form of apparatus for varying the leverage, as in Fig. 4. Fig. 8 is a transverse section of Fig. 7 on line *x x*. Fig. 9 represents another modified form of the variable-lever arrangement. Fig. 10 is a transverse section of Fig. 9 on line *y y*, and Fig. 11 represents another modification of the variable-lever arrangement. Fig. 12 represents the combined axle and spring constructed with a joint.

For the combined axle and spring I employ stubs *a* and spring-plates *b*, connecting them together, substantially in the manner shown, by clips *c* or other approved means, so that the stubs form the ends of the spring, and serve as the means of connecting the spring to the vehicle, and the spring-plates form the intermediate portion of the axle, which economizes in material for the axle

and also in the connection of the spring to the vehicle. It also lessens the weight of the vehicle and diminishes the number of wearing parts. The spring thus made may be divided transversely at the middle, top, and bottom, and connected by articulating joints *b*<sup>2</sup>, Fig. 12, which will probably give an easier action, the leaves of the spring-sections serving to brace and relieve the joints, and I propose to make them in this way in some cases.

I do not limit myself to any particular method of connecting the spring-plates to the stubs, although I prefer the clips, because of the facility of taking them apart for repairs which the clips afford; but they may be welded together.

For connecting the carriage-body *d* to these or other springs, I propose to employ levers *e*, substantially as shown in Figs. 1 to 6, inclusive, or in any equivalent way, said levers being pivoted to fulcrums *f* of any suitable block or bar, *g*, attached to the top or upper member of the spring, and connected at one end to the bottom or lower member of the spring, and having the body *d* supported on the other end. By the use of these levers part of the weight is sustained on the lower member of the spring in an upward direction, instead of being wholly delivered on the upper member, by which I expect to obtain better action by the compression of the springs both ways. The levers will be pivoted in the center, or thereabout, and yet the body will have longer range and easier movement than are due to the swing of the lever, merely because of the depression of the upper member of the spring on which the levers are pivoted, and thus the body will have longer range of movement than the springs have, which makes the action correspondingly easier.

I prefer to connect the body to the levers by cranked rods *g*, which I call "jacks," said jacks being attached to the under side of the body, and, if desired, extending from end to end, or from side to side, according as the springs are arranged crosswise or lengthwise of the body, for connection at each end with a lever and spring. The said jacks are to be so connected that they will turn a little to compensate for the circular sweep of the ends of the levers to which they are connected. These jacks have the effect of easing side jolts by allowing the



body to swing. Any approved mode of connecting the jacks to the body may be employed.

For attaching the levers to the lower members of the springs, I prefer to employ the connecting-rods *h* and eye-screw *j* with adjusting-nuts *i*; but any other approved method of connecting them may be employed. For instance, the rods *h* may merge in one rod, *h'*, Fig. 5, and have the nuts *i* screw on it. The eye studs or rods may go through springs or be connected by clips. (See Fig. 2.) To equalize the connection of said levers with the springs, they will be arranged with the rods *h* of the respective levers on both sides of the springs, (see Figs. 2 and 3,) or one rod may be employed to each lever, said rods being on opposite sides of the upper member of the spring.

The lever arrangement is alike applicable to the end or side spring, as represented in Figs. 1 and 6, and in the latter arrangement it takes the place of the common side-bar arrangement, and when the springs are connected to the axle and bolster, as shown, a reach will not be required to keep the axles from rolling.

In order to render the leverage of this mode of connecting the body to the springs variable automatically to receive the load-sustaining power of the springs as the load increases, and vice versa, I propose to make the fulcrums variable according as the levers are more or less depressed by the load, which may be done by the use of a series of pivots, *k*, on the levers, and notched jacks *g'* on the body, Fig. 4; or said pivots *k* may be arranged in a circle along the block *q*, with corresponding notches, *l*, in the levers, along which the bearing-point will shift from one to another of the pivots, as the levers swing up and down under the load; or the levers may rock on curved bearings *m*, to which they may be secured by the reversely-arranged spring-plates *n*. In either of these arrangements the levers may be grooved, as in Figs. 7, 8, and 11, to overlap the top and sides of the block *q*, or the block itself may be grooved, as in Figs. 9 and 10, the lever being arranged to work in the groove. In the latter case the lever will be provided with flanges *o* to cover the groove to keep out the dirt.

I propose in practice to arrange stops *a'* un-

der or in connection with these levers, in any approved way, to limit their descent at any point that may be required, as a safeguard against any possibility of overstraining the springs in case of unusually violent thrusts or shocks. Stops may also be provided to prevent the outer end of the levers from throwing up too far, which may be placed over the said outer ends or under the inner ends to have the same effect by preventing them from going down too far.

In case it may be required, I will arrange yokes *p* in connection with levers *e* and middle pivots, *l*, to prevent the levers from being thrust off from their seats, the said yokes being arranged to allow the levers to work as designed without interference by them.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. As an improved article of manufacture, an elliptical spring having journal-bearings at its ends, as set forth.

2. A combined spring and axle for road-wagons and other vehicles, the same being constructed with a joint in the spring, substantially as herein shown and described.

3. A combined spring and axle for wagons and other vehicles, consisting of stub-axles secured between the ends of spring-plates, substantially as herein shown and described.

4. Levers *e*, pivoted to a block, *q*, attached to one member of a vehicle-spring, and connected by one arm to the other member of said spring, and also connected by the other arm to the body of the vehicle, substantially as described.

5. The levers *e*, pivoted to block *q* on the upper member of spring *b*, connected to the body by the jacks *g*, and connected to the lower member of the spring by the link *h*, with or without eye-screw *j*, substantially as described.

6. A carriage having side springs and also having the body connected to said side springs by levers *e*, blocks *q*, and rods *h*, or equivalent means, substantially as described.

THOMAS P. YATES.

Witnesses:

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AMASA FINCH.