M. W. BALDWIN.

Locomotive.

No. 4,530. Patented May 16, 1846.

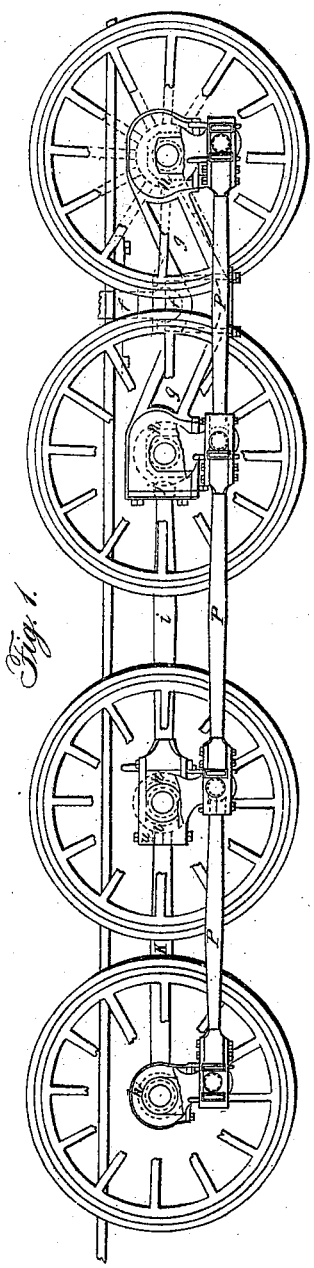

Fig. 1.

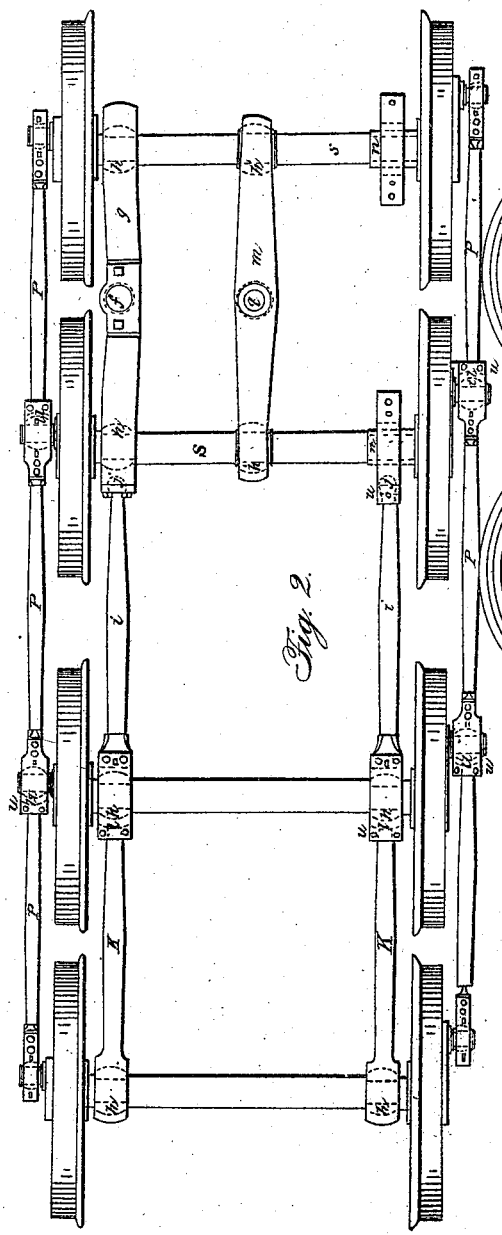

Fig. 2.

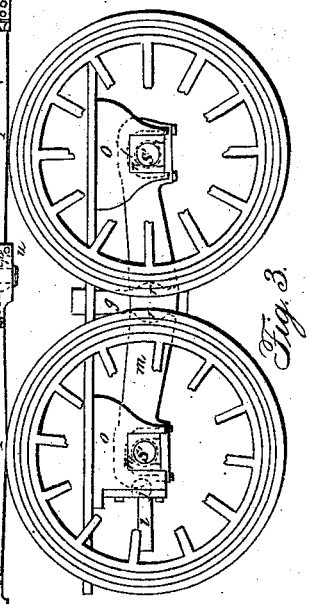

Fig. 3.

UNITED STATES PATENT OFFICE.

MATTHIAS W. BALDWIN, OF PHILADELPHIA, PENNSYLVANIA.

LOCOMOTIVE-CARRIAGE.

Specification of Letters Patent No. 4,530, dated May 16, 1846.

To all whom it may concern:

Be it known that I, MATTHIAS W. BALDWIN, engineer and machinist, of the city of Philadelphia, in the State of Pennsylvania, have made certain Improvements in the Manner of Constructing Locomotive Steam-Engines; and I do hereby declare that the following is a full and exact description thereof.

My first improvement consists in the manner in which I arrange and combine the truck beam, or beams, in connection with the side pins which operate on the springs, there being a ball and socket joint on the lower end of the pin at the center of the beam, giving thereby, at the same time that the beam is allowed to vibrate freely on its lower bearing, a vertical motion to the pins which act on the springs through the frame. The connections of the respective parts of the engine, so far as it is necessary to describe them, are shown in Figures 1 and 2; the former being a side elevation, and the latter, a top view thereof; *g*, *g*, is a beam, of which there is one on each side of the engine, which is allowed to vibrate on its center, as described in the specification of a patent granted to me on the 25th day of August, 1842; by which vibration, and by making the boxes, *h*, *h*, of the wheels cylindrical, vertically, on their exteriors, in a manner for which I formerly obtained Letters Patent, the wheels are enabled to adapt themselves to the curves and undulations of the road, as fully set forth in said Letters Patent; but in my improved manner of constructing this part, I connect the lower end of the pin, *f*, to the beam *g*, by a ball and socket joint, as shown by the dotted lines at *f'*; thus leaving the beam free to move on said joint in all directions, while the pin *f*, slides vertically through the side frame 1, which has a hole through it for that purpose; in the patent above referred to, said pins were described as stationary.

What is claimed as new under this arrangement is—

The connecting of the pins, *f*, which pins are allowed to slide through the frame, with the beams, *g*, *g*, by a ball and socket joint, for the purpose, and in the manner set forth.

A like end may be attained when the front axles are attached to the frame by means of pedestals; by using a single beam in the center of the carriage, instead of the two beams, *g*, *g*, as shown at *m*, Fig. 2, and in a side elevation at Fig. 3. The beam *m*, like the beams *g*, *g*, vibrates on a ball and socket joint, formed on a strong center pin *q*, attached firmly to the bottom of the boiler, or to the frame; the ball and socket are shown by the dotted lines at *r*, *r*, Fig. 3; by this connection the beam is allowed to move with perfect freedom in all directions. The axles *s*, *s*, run, at their middles, in boxes, *h'*, *h'*, which are fitted into the ends of the beam, *m*, ball and socket fashion, so that the bearings of said axles will adapt themselves to every motion of the beam; *o*, *o*, are the pedestals, which are, in this case, attached to the frame of the engine; *n*, *n*, are boxes fitted into these pedestals, and made with the faces of their sides and bottoms plain and straight, so that they may slide endwise within the pedestals; thus giving end play to the axles of the wheels, while said axles preserve their whole bearings in the sliding boxes. The pedestals, *o*, *o*, and the sliding boxes, *n*, *n*, are shown on one side, only, in Fig. 2; the opposite side representing the arrangement with two beams, as above described; by means of these sliding boxes, in combination with the vibrating beam, *m*, connected to the frame, and to the middles of the axles of the fore wheels, the action of said wheels will be so controlled as to bring the two wheels that are toward the outer rail, in turning a curve, in contact therewith, and that with much greater certainty and regularity than is done by allowing the axles themselves to have end play in their boxes. The springs above the frame, and the pins by which they are acted upon, it was not deemed necessary to show in the drawings, these being the same as usual.

I have likewise made an improvement in the forming and arranging of the working joints of the rods which I use as a frame for connecting the axles of the wheels together; and those, also, which embrace the crank pins, or wrists, on the wheels, and communicate the power from one of them to the other.

Under the arrangement described in my patent above referred to, the back pair of the wheels of a six-wheeled car were secured to the frame by a pair of pedestals; the objection to this manner of construction, is that the vertical motion of the wheels causes the distance between the hind and middle pair of wheels to vary as the springs yield; and by so doing act disadvanta-

geously upon the connecting rods, producing strain and cramping. To obviate the above named difficulty, I now connect the middle wheels of a six-wheeled engine by means of rods, *i*, *i*, attached to the truck beam, using therefor the kind of joint to be presently described, by which I, also, connect the rods, *p*, *p*, that embrace the crank pins, or wrists, upon the wheels. When an eight-wheeled car is used, this same arrangement may be continued so as to connect another pair of wheels, as shown in the drawing; under this arrangement, a free motion is given to all the wheels, whatever may be their number, while their relative distances will remain unchanged; *k*, *k*, Figs. 1, and 2, represent such rods connecting the hind wheels of an eight-wheeled car.

The part marked *l*, on the ends of the rods, *i*, *i*, *k*, *k*, and *p*, *p*, are segments of a spherical shell, which are adapted to the spherical boxes, or spherical swells, *h*, *h*, *t*, *t*, on the axles, or crank pins, on which they are confined by caps, *u*, *u*, the inner sides of which are segments of hollow spheres, and the caps, *u*, *u*, allowing play to said rods where they pass through them. The making of the crank pins and boxes spherical, is not a new device, but the connecting of the rods to them by means of the spherical shell, *l*, is new, and of much importance, as it not only secures a perfect freedom of motion, but allows all the connecting rods to stand in the same line, or plane, and not side by side, as when two rods are attached to the same wrists, in the ordinary way; this will be seen by looking at the rods *p*, *p*, in the drawing.

What I claim as new in the last described arrangement, is—

The connecting of the rods which are used as constituting a part of the frame of a six, or an eight-wheeled locomotive, as described and represented; and also the connecting rods which embrace the crank pins upon the wheels, by forming a spherical, segmental shell *l*, on one end of said rods, and attaching them together in the manner set forth, so that such rods shall not only have perfect freedom of motion, but shall also stand in a line with, or directly behind, each other, at their junctures.

I do not intend to make any claim, under either of the foregoing heads, to either of the parts of the respective devices claimed, when taken individually, but I restrict the said claims to the respective combinations described; not intending, however, by this disclaimer to limit myself to the precise form of the respective parts, but to vary these as I may think proper, while I adhere, substantially, to the principle, or manner of arrangement, herein fully made known.

M. W. BALDWIN.

Witnesses:
JOHN THOMPSON,
D. MILLER.