(No Model.) 4 Sheets—Sheet 1.

G. B. HAINES.

CAR STARTER.

No. 393,827. Patented Dec. 4, 1888.

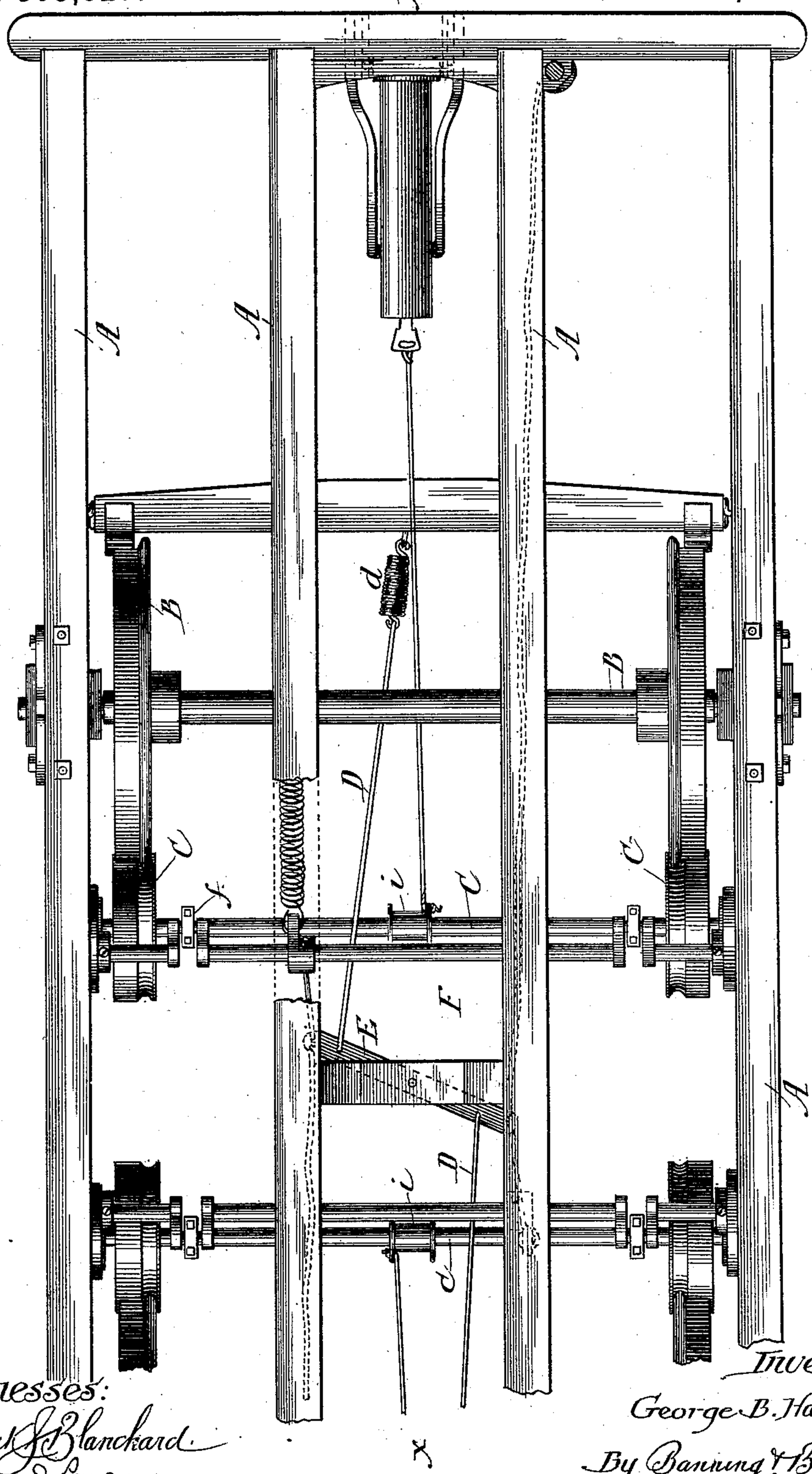

Fig. 1.

Witnesses:
Frank L. Blanchard.
George S. Payson.

Inventor:
George B. Haines.
By Banning & Banning,
Attorneys.

(No Model.) 4 Sheets—Sheet 2.

G. B. HAINES.

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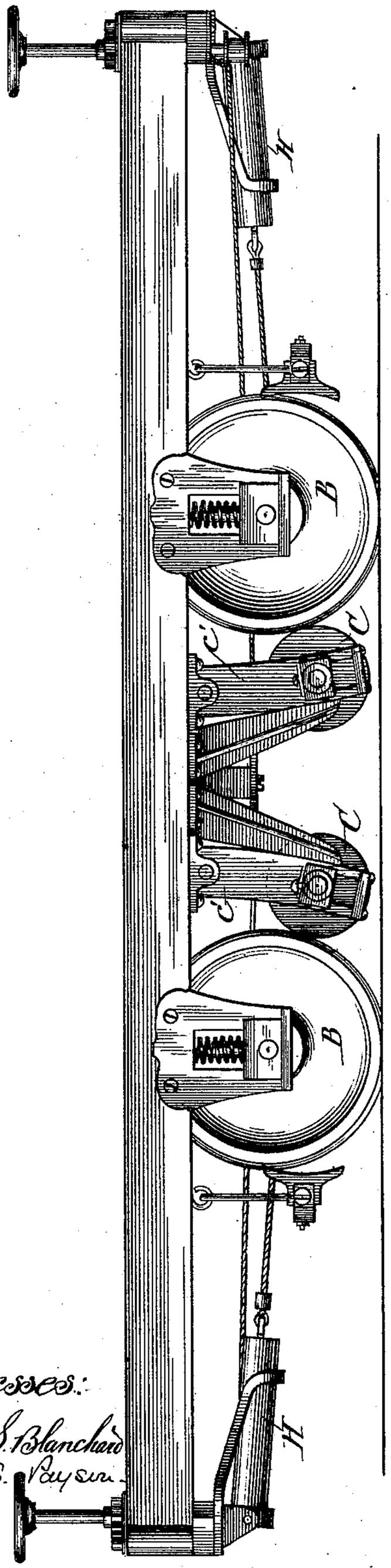

Fig. 2.

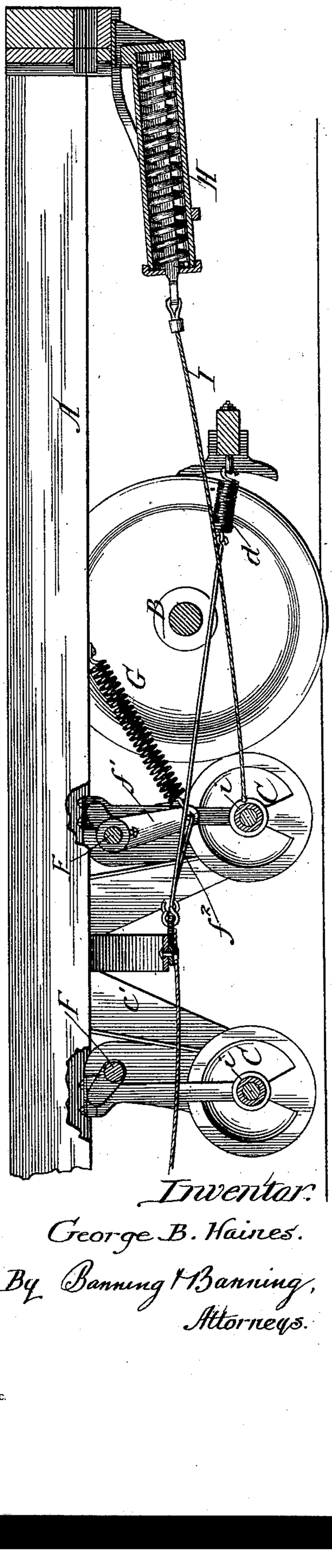

Fig. 3.

Witnesses:
Frank S. Blanchard
George S. Payson

Inventor:
George B. Haines.
By Banning & Banning,
Attorneys.

(No Model.)

4 Sheets—Sheet 3.

G. B. HAINES.

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Fig. 4.

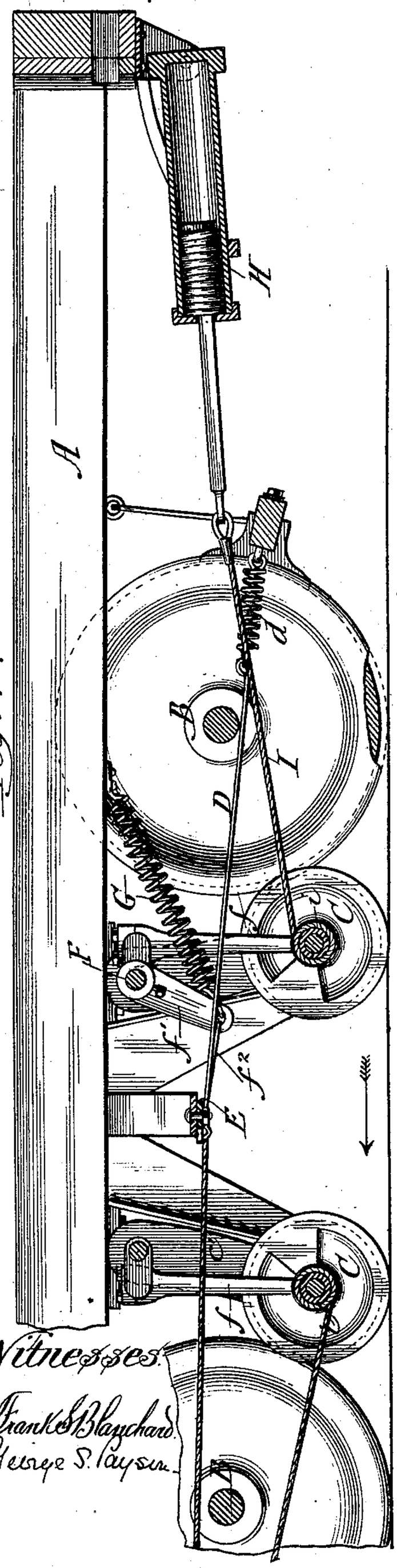
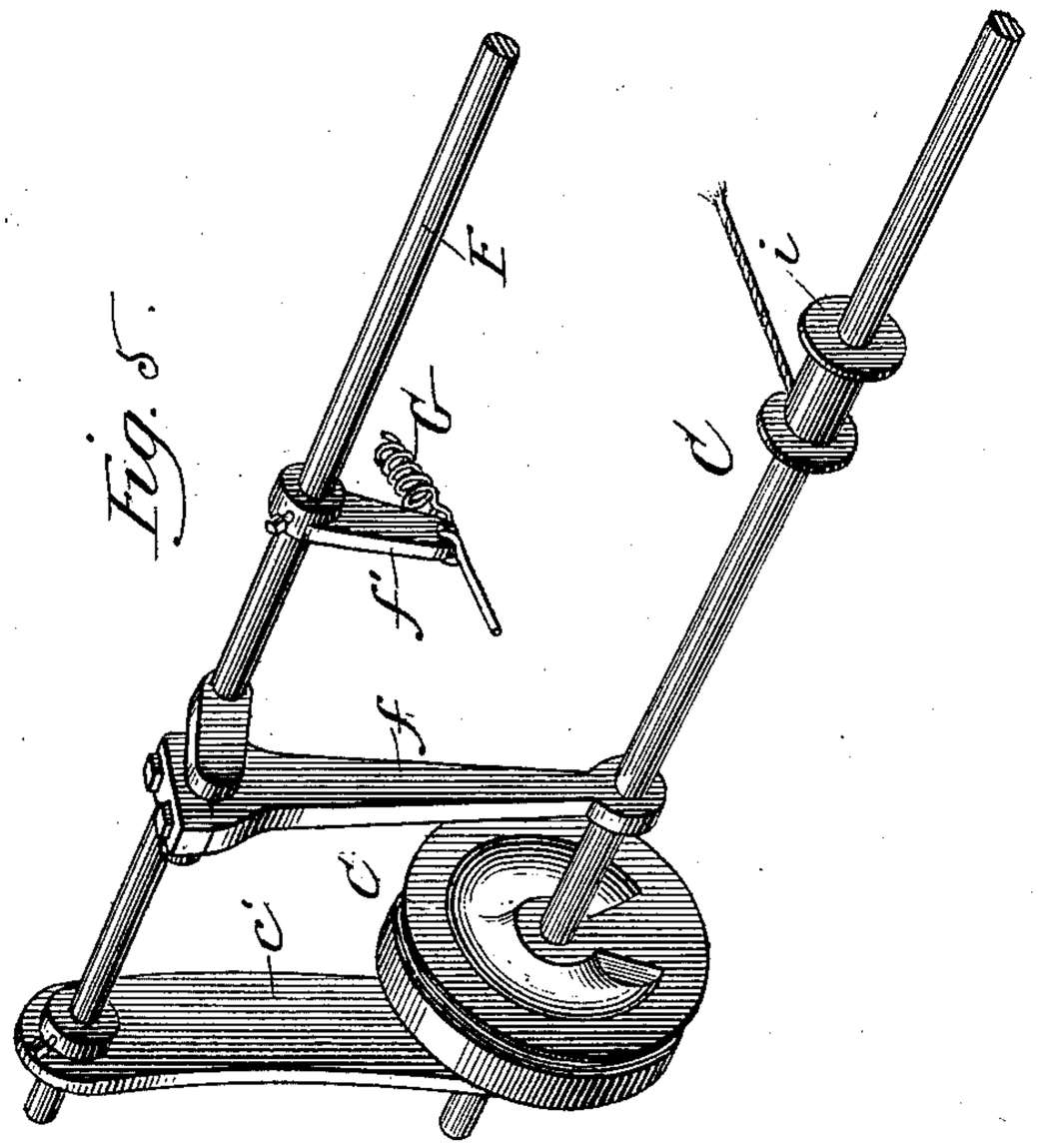


Fig. 5.



Witnesses:

Frank S. Blanchard

George S. Payson

Inventor:

George B. Haines.

By Banning & Banning.

Attorneys.

(No Model.)

4 Sheets—Sheet 4.

G. B. HAINES.

CAR STARTER.

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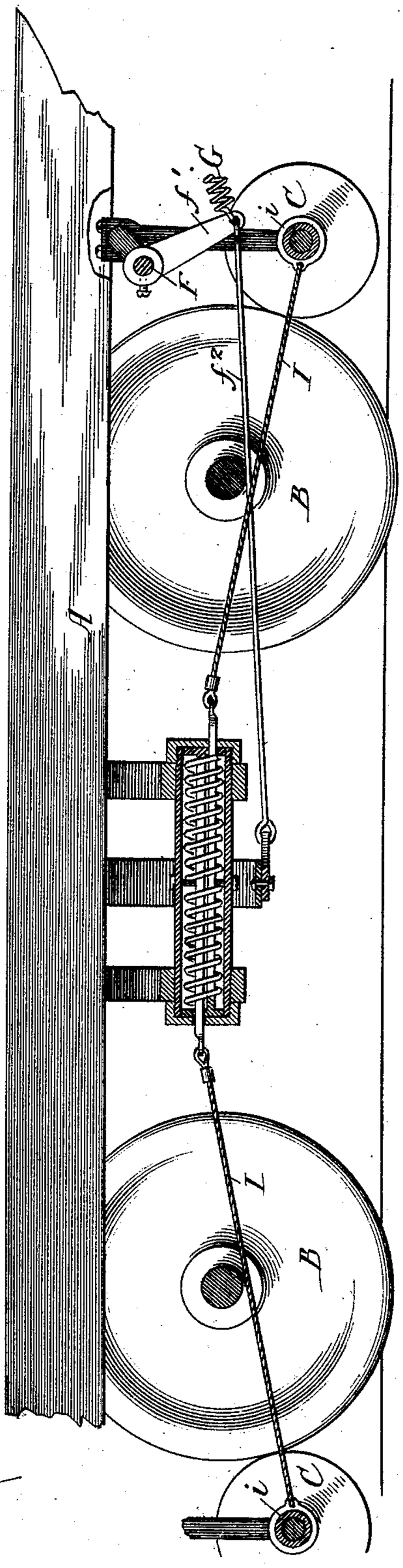

Fig. 6.

Witnesses:
Frank L. Blanchard.
George S. Payson.

Inventor:
George B. Haines.
By Banning & Banning.
Attorneys

UNITED STATES PATENT OFFICE.

GEORGE B. HAINES, OF CHICAGO, ILLINOIS.

CAR-STARTER.

SPECIFICATION forming part of Letters Patent No. 393,827, dated December 4, 1888.

Application filed January 3, 1888. Serial No. 259,566. (No model.)

To all whom it may concern:

Be it known that I, GEORGE B. HAINES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Car-Starters, of which the following is a specification.

The object of my invention is to make a car-starter which will automatically start or aid in starting the car whenever the brakes are loosened; and the invention consists in the features and combinations hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a plan view of the lower part or running-gear of a car; Fig. 2, a side elevation of the same; Fig. 3, a longitudinal section taken in line *x x* of Fig. 1, showing the position of the brake and starter when the car is in motion; Fig. 4, the same as Fig. 3, except that it shows the position of the brake and starter when the car is standing still; Fig. 5, a perspective view of parts of the starter and brake, and Fig. 6 a side elevation showing the cylinder-spring located centrally and the starter-wheels outside the car-wheels.

A is the frame-work of the bottom of the car; B, the main axles and wheels; C, the starter-wheels, which also help to form the brake; *c*, the axles thereof, and *c'* the downwardly-projecting hangers forming guides for the outer ends of the starter-axles; D, the brake-rods, and *d* little springs therein; E, the brake-lever; F, crank-shafts extending crosswise above the starter-axles; *f*, crank-bars projecting downwardly therefrom and connecting the same to the starter-axles; *f'* levers also projecting downwardly therefrom, and f^2 a rod, rope, or chain connecting the lower end of each of such levers to the brake-lever; G, springs secured to the levers *f'* and to frame-timbers of the bottom of the car; H, cylinder-springs secured near the ends of the car, respectively; I, cables or ropes connecting the starter to the cylinder-springs, and *i* drums on the starter-axles in which the cables or ropes wind and unwind.

In constructing a car-starter according to my invention I employ, in addition to the ordinary frame, axles, wheels, brakes, and brake-connections, suitable wheels and attachments to cause the car to start automatically or to aid in its starting whenever the brakes are loosened. These starter-wheels are comparatively small in diameter, preferably about one-half as large as the car-wheels in connection with which they are used. They are of course adapted to the track, so that when the brakes are set to stop the car they will come down upon the rails and practically support the weight of the car and its contents, and at the same time they may be made to press against the periphery of the car-wheels, so as to retard their motion. As shown in the drawings, one pair of these starter-wheels is placed behind and one in front of each pair of the car-wheels; but it will of course be understood that they may be placed at each side or both sides of each pair of the car-wheels, or of any one or more pairs, as desired. Each pair of these starter-wheels is secured by a suitable axle extending across under the car, and above this axle and under the frame-work I provide a suitable shaft, which also extends across from side to side of the car, and which is adapted to be connected to the axle of the starter-wheels by suitable crank-bars. The form of this crank-shaft or its connections is immaterial, provided the construction be such that when the shaft is turned, as hereinafter described, the crank-bars will operate to force the wheels down or raise them up, as may be needed in stopping or starting the car.

Projecting downwardly from each of the crank-shafts is a lever placed at a suitable angle with reference to the crank-bar to give the necessary leverage for turning the crank-shaft to force the starter-wheels up or down, and at the lower end of each of these levers is attached a spring, which at its other end is secured to any suitable part of the frame-work of the car. Running in the opposite direction from these springs is a rod, chain, or other suitable connection securing the lower end of the crank-levers to the brake-lever.

At the outside of each of the starter-wheels is a hanger or portion which projects downwardly from the crank-shaft, and which is so constructed as to form a guide for the ends of the axle projecting outwardly from the starter-wheels. This hanger is slotted a sufficient distance up and down to permit the starter axle and wheels to be moved vertically to any

extent desired in stopping or starting the car.

Suitably connected near each end or the center of the car is a spring, which is preferably provided with a cylindrical cover to protect it from dust, dirt, &c., and a rope, cable, or chain forms the connection between the end of this spring and the starter-axle, which is provided with a suitable drum to receive and retain the rope or cable when it is coiled in stopping the car.

In operation, when, it is desired to stop a car the brakes are set, and of course the ends of the brake-lever made to change their respective positions. This changing in the position of the brake-lever causes the lower ends of the levers of the crank-shaft to be slightly turned upwardly, and this has the opposite effect on the bars connecting the crank-shaft to the starter-axle—that is, it forces such bars downwardly, and thus causes the starter-axle to lower and the starter-wheels to be forced or pressed upon the track-rails. The power applied by the operation of the brakes in this respect is such that the starter-wheels may be forced down to an extent that causes them to practically lift and sustain the weight of the car, so that the ordinary car-wheels may at times be almost lifted up from the track or rails. The starter-wheels, thus coming down into contact with the rails, are of course caused to revolve with their axles, and this revolving of their axles causes the rope or cable to wind up in its drum to such an extent that the starter-wheels will be almost instantly caused to rub or press against the car-wheels, so as to retard their motion and stop the car. When it is desired to start the car, the brakes are loosened, and the relaxing or recoil of the springs secured to the levers of the crank-shaft causes the parts to immediately resume their normal position, so as to loosen and raise the starter-wheels or remove the weight therefrom. As they are doing this, however, the relaxing or recoil of the spring at or near the end of the car causes the cable to unwind from its drum in the starter-axle, and this of course causes the starter axle and wheels to revolve, and thus to automatically start the car before or as the weight is being removed from the starter-wheels. Briefly stated, then, the starter-wheels are forced down and required to sustain or partly sustain the weight of the car in stopping, and afterward allowed to resume their normal position in starting, the weight being then thrown on the ordinary car-wheels, and of course while the weight is being thrown on the starter-wheels for the purpose of stopping they revolve in the same direction as the car-wheels; but when the operation is reversed, for the purpose of starting, they revolve in an opposite direction, thus causing the car-wheels to revolve and the car to start in the same direction they were moving before being stopped.

In some cases it may be found advisable to dispense with the ordinary brakes entirely, and to use the starter-wheels in place thereof; and the construction and position of the starter are such that its wheels may be used either for this purpose or as auxiliary to the brakes, as desired.

It will of course be understood that various parts of my invention may be modified or different elements used in their places without changing their effect or operation. For instance, any other suitable form of spring may be used to operate the cable, and through it the starter-wheels; or any other form of spring may be attached to the levers of the crank-shaft, or any suitable device used to draw such levers, and therewith the crank-shaft, into their normal position when the car is started, or any other form of crank-shafts or crank-levers may be employed which will cause the starter axle and wheels to move up and down for the purpose above mentioned, or a cam or eccentric may be used for this purpose; or springs may be used under the starter-axle—say in the slots of the hangers—to force the starter wheels and axle upward when the weight of the car is transferred to the car-wheels.

In this view, and the main object of my invention being to transfer the weight to the starter-wheels when it is desired to stop the car, and back to the car-wheels when it is desired to start the car, I do not wish to be understood as limiting myself to special features or details of construction; but I intend to cover all proper forms, modifications, or equivalents by which this object may be accomplished.

I claim—

1. In a car-starter, the combination of a pair of starter-wheels adapted to be applied first to the track and then to the car-wheels, to aid in stopping and starting the car, an axle connecting such wheels together, a crank-shaft, and a rod or bar connecting such crank-shaft with the axle, whereby the latter is depressed and raised, substantially as described.

2. In a car-starter, the combination of a pair of starter-wheels adapted both to the track-rails and to the car-wheels, a starter-axle connecting said wheels together, a crank-shaft above the starter-axle, a lever projecting downwardly from the crank-shaft and connected indirectly to the car and its brake mechanism, and a rod or bar connecting the crank-shaft with the starter-axle, substantially as described.

3. In a car-starter, the combination of a pair of starter-wheels, a starter-axle connecting said wheels together, downwardly-projecting hangers slotted to form guides for the starter-axle, a crank-shaft above the starter-axle, and a rod or bar connecting the crank-shaft and starter-axle, substantially as described.

4. In a car-starter, the combination of a pair of starter-wheels, a starter-axle connecting said wheels together, downwardly-projecting hangers forming guides for the ends of the starter-axle, a crank-shaft above the starter-

axle, a lever projecting downwardly from the crank-shaft connected to the brake mechanism from one side and to the car from the other, and a rod or bar connecting the crank-shaft with the starter-axle, substantially as described.

5. In a car-starter, the combination of a pair of starter-wheels, a starter-axle connecting said wheels together, a crank-shaft above the starter-axle, a lever projecting downwardly from the crank-shaft, connecting mechanism securing said lever to the brake-lever from one side, a spring securing said lever to the car from the other side, and a rod or bar connecting the crank-shaft to the starter-axle, said lever and bar projecting downwardly from the crank-shaft at somewhat different angles, substantially as described.

6. In a car-starter, the combination of a pair of starter-wheels, a starter-axle connecting said wheels together, guides for the ends of the starter-axle, a crank-shaft above the starter-axle, a rod or bar connecting the crank-shaft with the starter-axle, a lever projecting downwardly from the crank-shaft connected indirectly to the brake-lever from one side and to the car from the other, a spring connected to the car near one end, and a rope or cable connecting said spring with the starter-axle, substantially as described.

GEORGE B. HAINES.

Witnesses:
EPHRAIM BANNING,
GEORGE S. PAYSON.