(No Model.)

2 Sheets—Sheet 1.

S. JOHNSON.

CAR STARTER AND BRAKE.

No. 329,839. Patented Nov. 3, 1885.

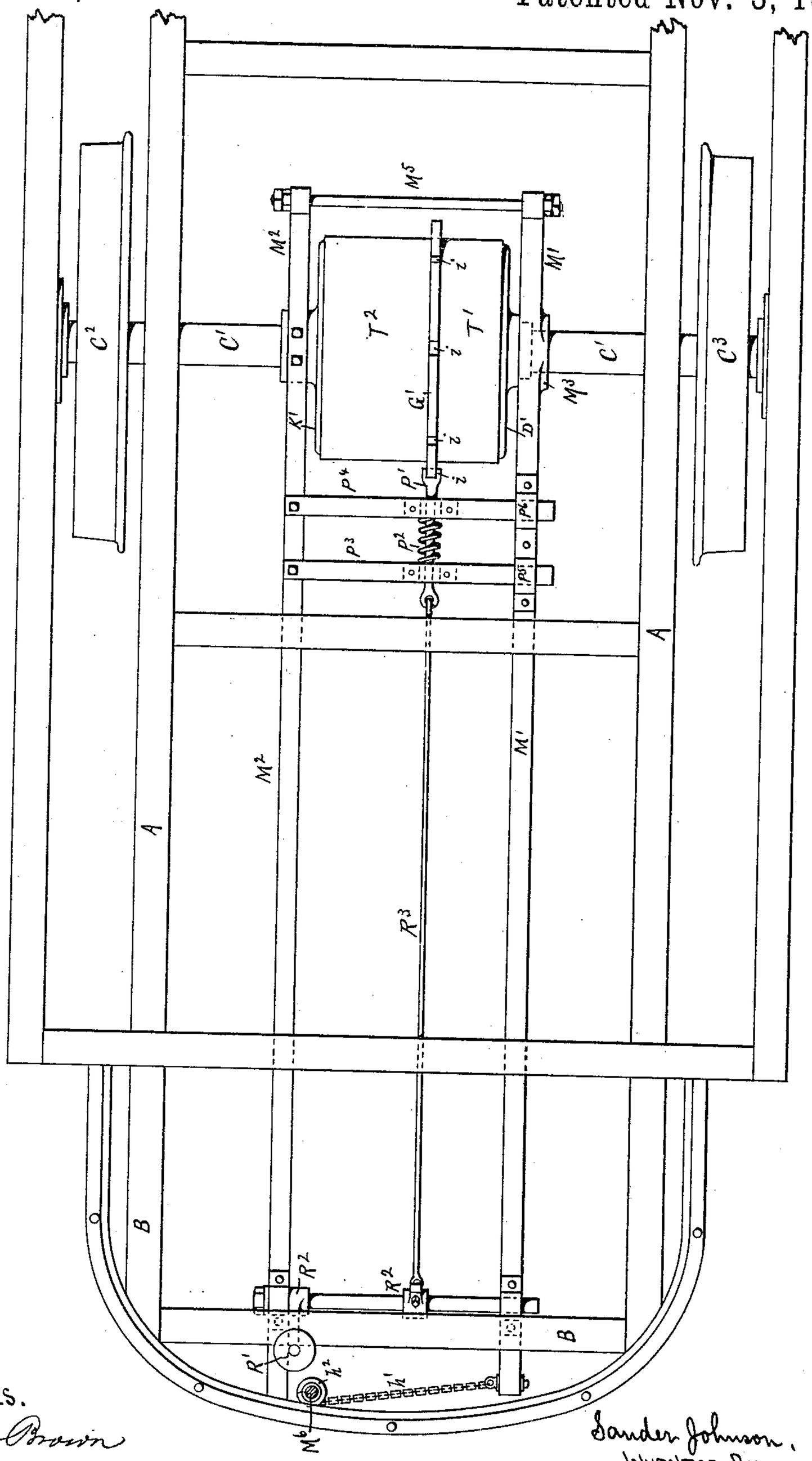

FIG. 1

WITNESSES.
Wm. C. Brown
H. S. Webster.

Sander Johnson.
INVENTOR. BY
Charles N. Woodward
Atty.

(No Model.) 2 Sheets—Sheet 2.

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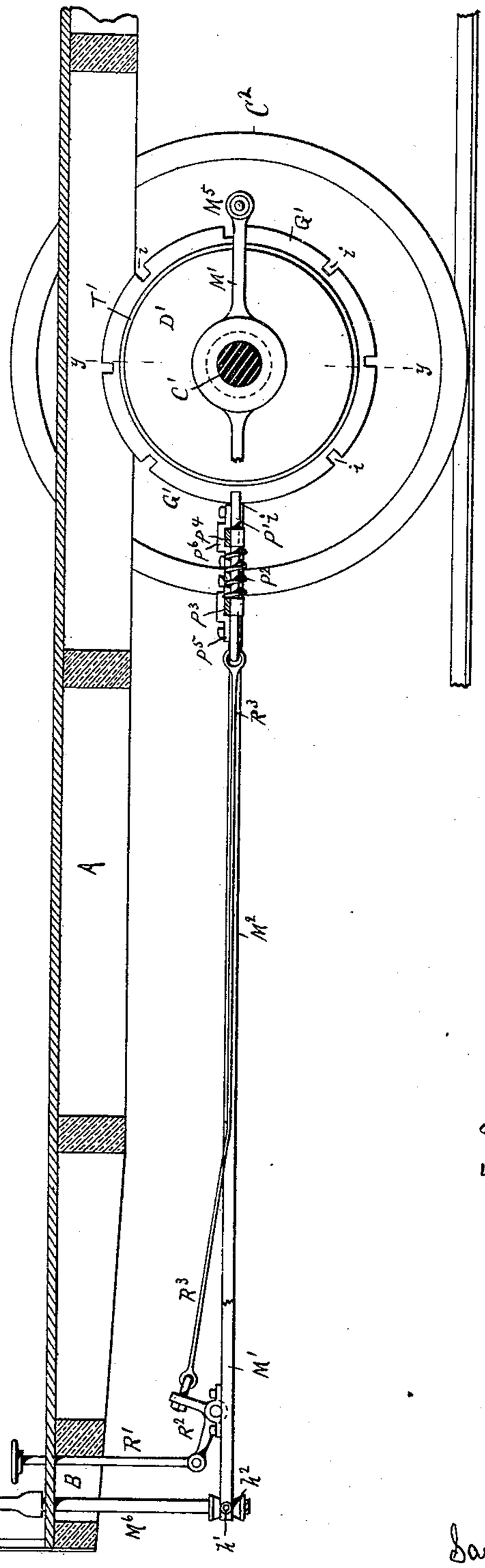

FIG. 2

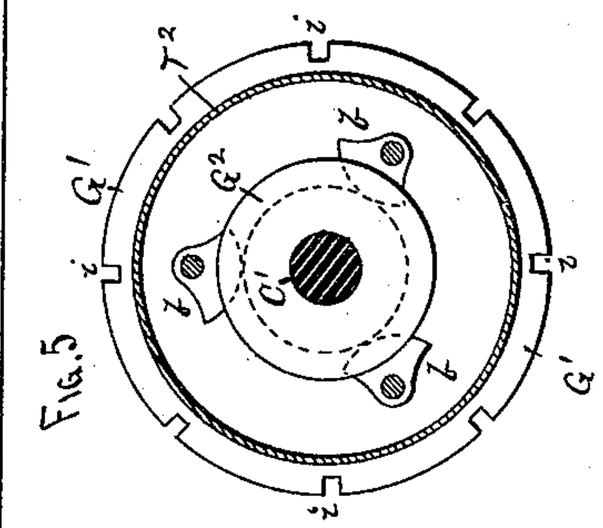

FIG. 5

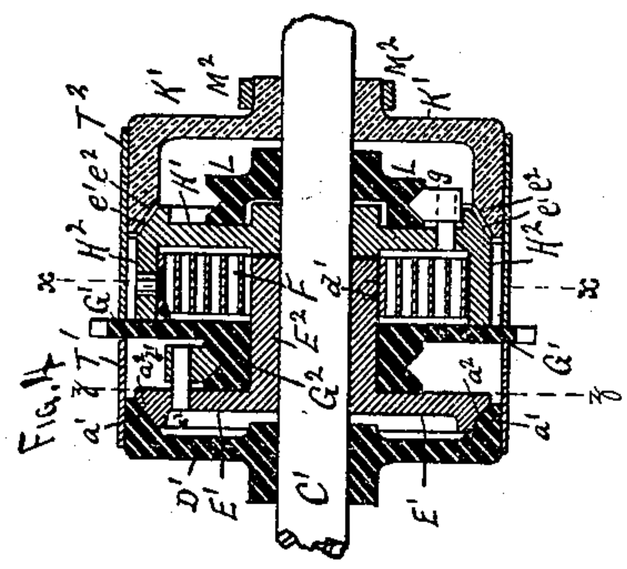

FIG. 4

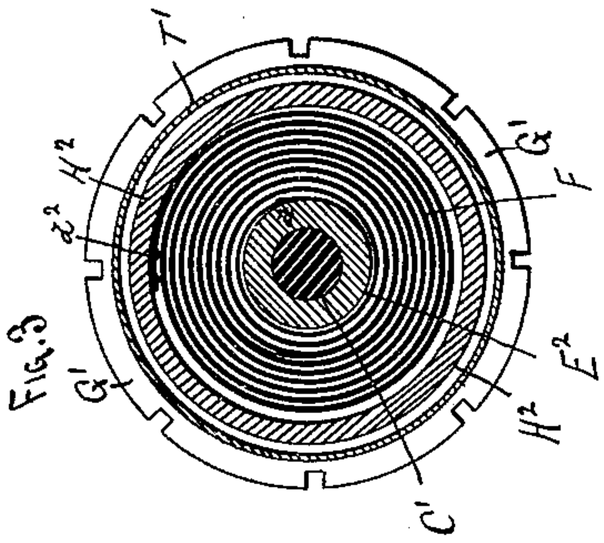

FIG. 3

WITNESSES.
Wm. C. Brown
H. S. Webster.

Sander Johnson.
INVENTOR. BY
Charles N. Woodward.
Atty.

UNITED STATES PATENT OFFICE.

SANDER JOHNSON, OF MINNEAPOLIS, MINNESOTA.

CAR STARTER AND BRAKE.

SPECIFICATION forming part of Letters Patent No. 329,839, dated November 3, 1885.

Application filed April 1, 1885. Serial No. 160,952. (No model.)

To all whom it may concern:

Be it known that I, SANDER JOHNSON, a subject of the King of Norway and Sweden, who have declared my intention of becoming a citizen of the United States, and who reside at Minneapolis, Hennepin county, Minnesota, have invented certain new and useful Improvements in Car Starters and Brakes, of which the following is a specification.

Figure 1 is a plan view, and Fig. 2 is a sectional side view, of the frame-work of a portion of one end of a street-car with my improvements attached thereto. Fig. 3 is a sectional side view through the coiled spring on the line *x x* of Fig. 4. Fig. 4 is a cross-sectional view on the line *y y* of Fig. 2. Fig. 5 is a cross-sectional view on the line *z z* of Fig. 4.

This invention relates to that class of combined starters and brakes in which the momentum of the car in stopping is utilized to wind up a coiled spring, whose reactionary power may be transmitted to the axle to revolve it forward again when the car is to be started, to relieve the horses from the strain consequent upon the necessity of overcoming the inertia of the car; and the invention consists in the construction, combination, and arrangement of parts whereby this is accomplished, as hereinafter shown and described.

In the accompanying drawings, A represents the bed frame-work, and C′ one of the axles carrying the wheels C^2 C^3 of an ordinary street-car. Attached, by a key or other suitable device, rigidly to the axle C′, between the wheels C^2 C^3, is a disk, D′, having an inclined-faced flange, *a*′, adapted to work in contact with an oppositely-inclined faced flange, a^2, on a disk, E′, this disk having a long "collar" or sleeve, E^2, surrounding the axle C′ loosely, and having the inner end of a coiled spring, F, secured to it, as shown at *d*′.

G′ is another disk, somewhat larger than the disks D′ and E′, and journaled loosely upon the sleeve E^2, and provided with a channeled hub or collar, G^2.

b′ *b*′ are "cam-dogs" pivoted to the disk E′, and with their convex rims resting in the channels in the collar G^2, as shown. Any desired number of these cam-dogs may be used, but generally three, as shown in Fig. 5, will be sufficient. Their faces are segments of circles, and their pivots are set off from their centers slightly, so that when the disk E′ is revolved in one direction the cams will run freely around in the channel in the collar G^2; but when the disk E′ is revolved in the opposite direction the cams, by the eccentric form of their faces, will "cramp" down into the channeled hub G^2 and rigidly attach the disks E′ and G′ together.

H′ is another disk, loose upon the axle and having a rim, H^2, projecting over the end of the hub or sleeve E^2, and having the outer end of the spring F attached to its inner face, as shown at d^2. On the opposite side of the disk H′ from the rim H^2 is a bevel-faced flange, *e*′, adapted to fit beneath a corresponding bevel-faced flange, e^2, on the rim of a disk, K′, loose upon the axle C′, but held from turning by being bolted fast to a bar, M^2, as shown in Figs. 1 and 4.

L is a hub or collar of the same diameter as the hub G^2 on the disk G′, and having a similar channel in its edge, in which the convex edge of a number of cams, *g*, rest. These cams are pivoted to the disk H′, and are precisely similar to the cams *b*′, except that their positions are reversed, so that they act in the opposite direction to the cams *b*′, as hereinafter shown. The hub L is attached rigidly to the axle C′ by a key or other suitable device similar to the disk D′. The cams *b*′ and *g* will each be provided with a small spring to hold them down in contact with the hubs G^2 and L, and insure their certainty of action.

M′ M^2 are two long rods connected at one end, at the rear of the spring-inclosing mechanism, by a rod, M^5, and passing forward, one on each side of the disks D′ and K′, to the platform-frame B, to which the forward end of the rod M^2 is attached. The rod M^2 is bolted or otherwise rigidly fixed to the hub of the disk K′, as shown at *n* in Figs. 1 and 4, so that the disk K′, while left free to slide along the axle, will be held by the rod M^2 from revolving with it. The rod M′, where it passes the axle C′, will be provided with a collar, M^3, to form a bearing, against which the hub of the disk D′ presses, while at its forward end the rod M′ is connected by a chain, *h*′, to the drum h^2 of a brake-rod, M^6. By this arrangement, if the brake-rod be revolved in one direction

the chain h' will be wound upon the drum h^2, and draw the forward end of the rod M′ toward the rod M^2, and compress the disk D′ against the disk E′, and by reason of the rod M^5 connecting the rods M′ and M^2 at their rear ends this same movement will press the disk K′ against the disk H′, as hereinafter shown.

In the rim of the disk G′ notches i are formed, into one of which a dog, P′, is held by a spring, P^2. This dog P′ will be supported by bars P^3 P^4 on the rods M′ M^2, and adapted to be disconnected from the notches i by a foot-lever, R′, crank-arm R^2, and connecting-rod R^3 at the will of the driver. The bars P^3 P^4 are pivoted at one end to the rod M^2, and lie loosely beneath caps P^5 P^6 on the rod M′, so that the rod M′ will be free to be moved by the brake-rod, while at the same time the bars P^3 P^4 will hold the dog sufficiently rigid to perform its functions, which is to connect the disk G′ to the body of the car and prevent it being revolved. Sheet-metal rings T′ T^2 will be attached around the disks D′ and K′ to form covers to the clutches and spring to protect them. The disk G′ being held by the dog P′ in a fixed relation to the rods M′ M^2, and the latter being attached to the body of the car, as a matter of fact the disk G′ is practically fixed to the car by the dog, which is the object desired to be secured, while at the same time the disk G′ must be capable of being easily disconnected, as shown, by the foot-lever or other means when the car is to be moved backward. The disk G′ then being fixed to the body of the car, when it is desired to stop the car the driver revolves the brake-lever M^3, which draws the rod M′ toward the rod M^2, and presses the disk D′ against the disk E′, and connects them together by their inclined faces a' a^2.

As before stated, the disk D′ is adapted to be revolved with the axle C′; hence when the disks D′ and E′ are thus connected the hub E^2 will wind the spring F up. The cams b' in the meantime, by reason of their short sides being toward the direction in which the disk E′ is revolving, will run loosely around the channeled hub G^2 of the disk G′ and not interfere with its revolution. The power required to thus wind up the spring will gradually stop the motion of the car, and thus act as a brake thereto. Just the instant the car stops the reaction of the spring F will cause the cams b' to grip the hub G^2, and by reason of the fixed position of the disk G′ the power of the spring will thus be "stored" and held in reserve. Then, when the car is to be started again, by merely releasing the brake-rod M^3 the reactionary power of the spring will be transferred to the axle C′ through the disk H′, (to which its outer end is attached,) the cams g, and the channeled hub L, it being borne in mind, as before stated, that the cams g are in the reserve position from the cams b'. By this means the axle will be turned forward one or more turns and relieve the horses from the severe strains consequent on the necessity for overcoming the inertia of the car. If it is found necessary to move the car backward, the driver merely presses upon the foot-lever R′ and disconnects the dog P′ from the disk G′, and thus releases the whole starting mechanism so that it revolves freely with the axle without effect. The disk G′ is shown with a number of notches, i, so that it will not be necessary to wait until the disk revolves entirely around before the "dog" catches.

I do not wish to be limited to the precise form and arrangement of the mechanism for throwing the clutches into gear, as I am aware that many similar devices may be employed; neither do I wish to be confined to the precise arrangement shown for operating the dog P′, the means shown being one of many convenient and suitable devices for the purpose.

Having thus described my invention, what I claim as new is—

In a combined car starter and brake, the combination, with the axle C′, of the disk D′, adapted to be revolved by said axle and having the angular flange a', disk E′, loose upon said axle and having angular flange a^2, hub E^2, and spring F, connected to said hub, disk G′, fitting loosely upon said hub E^2 and having channeled hub G^2, adapted to be connected in a fixed relation to the body of said car, cams b', pivoted to said disk E′ and adapted to rest in contact with said channeled hub, disk H′, having the outer end of said spring connected thereto and provided with angular flange e', disk K′, encircling said axle loosely and having angular flange e^2, corresponding to said angular flange e', channeled hub L, fast to said axle, and cams g, pivoted to said disk H′ and adapted to rest in contact with said channeled hub L, mechanism for moving said disk D′ along said axle, and mechanism for connecting and disconnecting said disk G′ with the body of said car.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

SANDER JOHNSON.

Witnesses:
C. W. WOODWARD,
H. S. WEBSTER.