No. 757,811. PATENTED APR. 19, 1904.

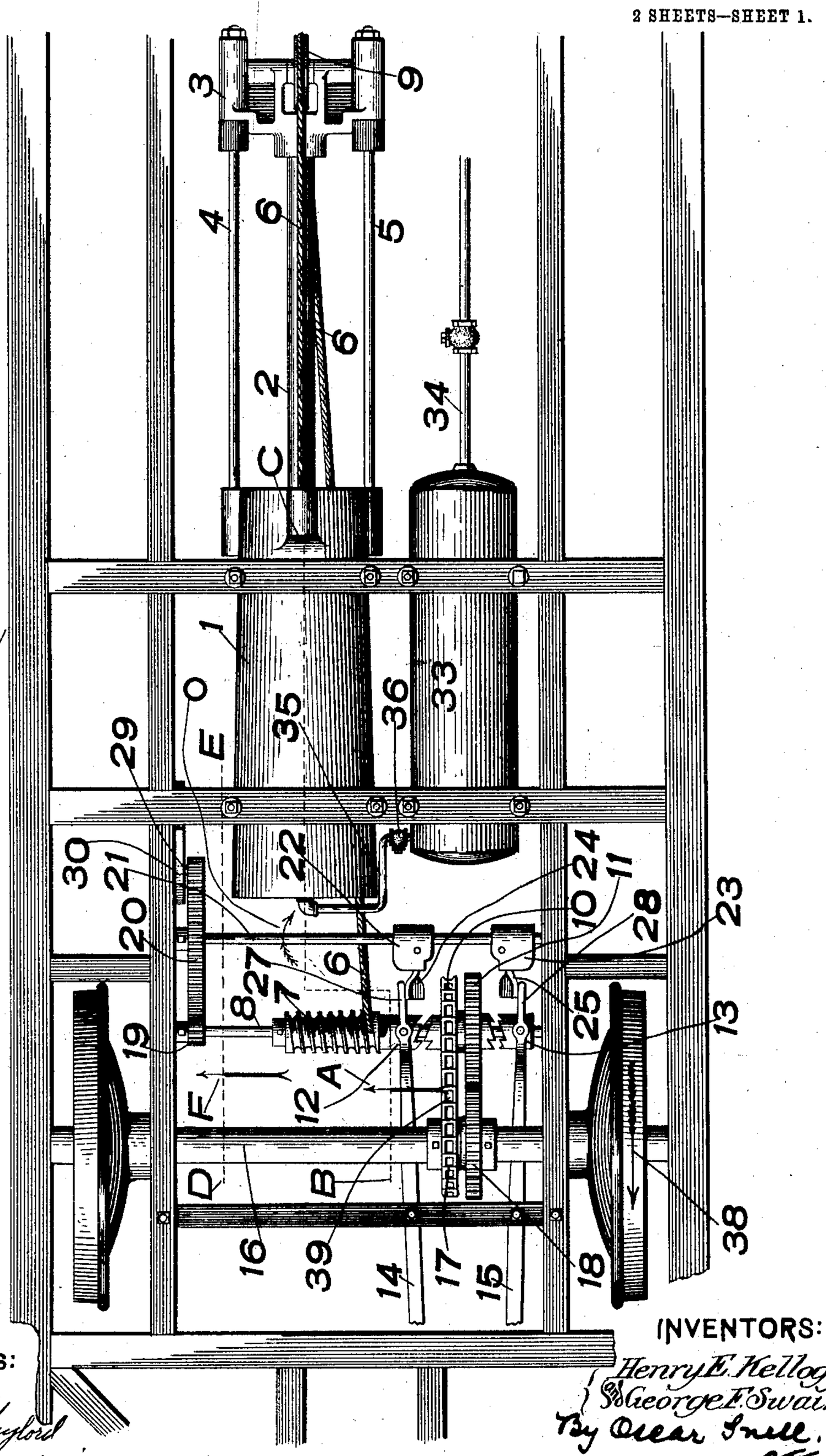
H. E. KELLOGG & G. F. SWAIN.

COMBINED CAR BRAKE AND STARTER.

APPLICATION FILED MAR. 30, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

FIG. 1.



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NO MODEL. 2 SHEETS—SHEET 2.

FIG. 2.

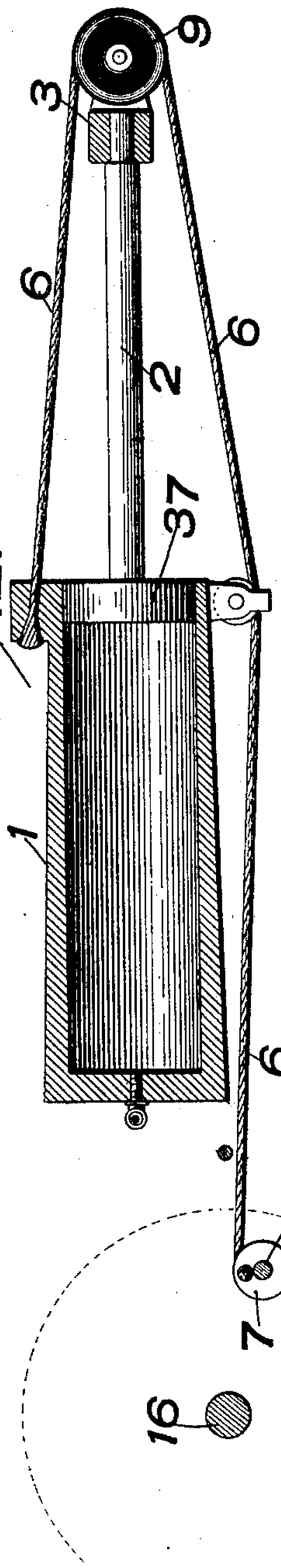


FIG. 4.

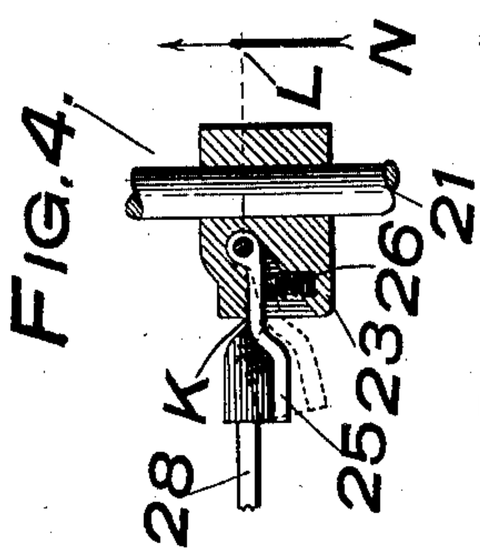


FIG. 5.

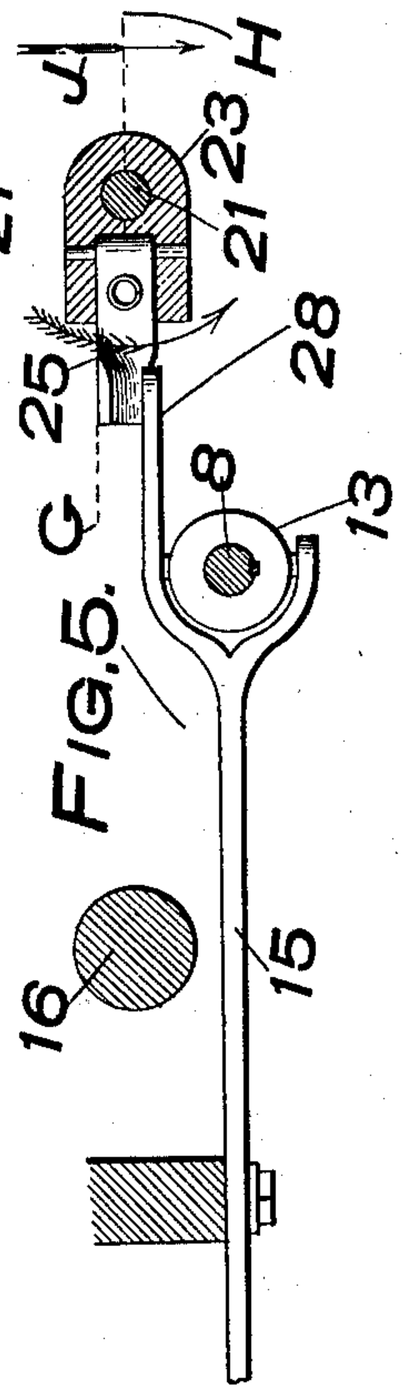
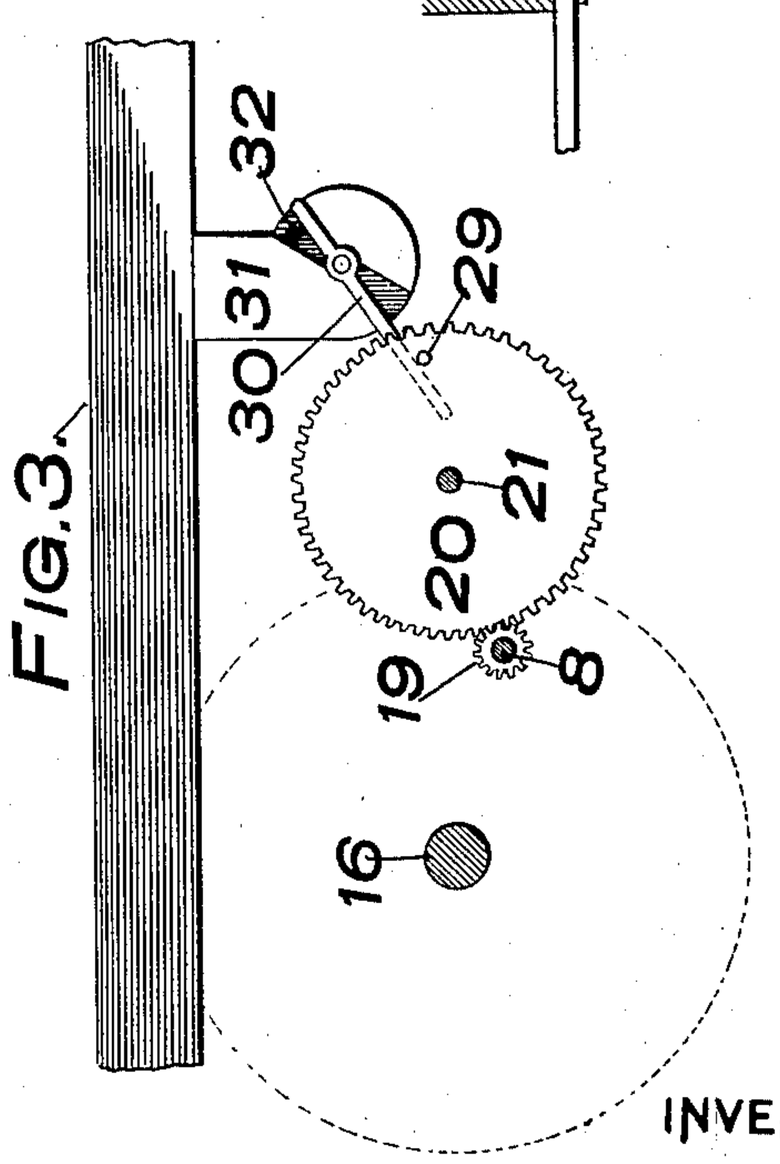


FIG. 3.



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No. 757,811. Patented April 19, 1904.

UNITED STATES PATENT OFFICE.

HENRY E. KELLOGG AND GEORGE F. SWAIN, OF HARVEY, ILLINOIS.

COMBINED CAR BRAKE AND STARTER.

SPECIFICATION forming part of Letters Patent No. 757,811, dated April 19, 1904.

Application filed March 30, 1903. Serial No. 150,130. (No model.)

To all whom it may concern:

Be it known that we, HENRY E. KELLOGG and GEORGE F. SWAIN, residing at Harvey, in the county of Cook and State of Illinois, have invented a new and useful Combined Car Brake and Starter, of which the following is a specification.

Our invention relates to brakes and car-starters; and our object is to provide a means for such a combined purpose in which is embodied greater durability, together with simplicity and efficiency, it being adapted to be easily managed under very heavy duty; and it consists of a cylinder in which a piston is fitted to slide longitudinally thereof against a comparatively high initial pressure, the air being supplied to maintain the initial pressure from a reservoir and serves as the elastic resistance for a brake and as the source of power when the apparatus is used as a car-starter. There is also combined with the above-described features an automatic double-acting release mechanism, through which accidents on account of carelessness or inefficient operatives are prevented, and the construction and manner of operation are illustrated and described hereinafter.

Figure 1 is a plan of a portion of one end of the frame of a car under which is shown suspended the principal parts embodied in our invention. Fig. 2 is a vertical axial section of the resistance and motor cylinder, with the piston therein, and the rod and several other parts, hereinafter described, for coupling with the car-axle shown in side elevation looking in the direction indicated by arrow A, but with the axle and coupling-shaft in cross-section, all these sections being on broken line B C. Fig. 3 is a cross-section of the axle, coupling-shaft, and safety release-shaft on broken line D E, with several of the axle connections in elevation, looking in the direction indicated by arrow F, to illustrate an automatic means for preventing the apparatus from operating more than a certain desired limit. Fig. 4 is a section on broken line G H of Fig. 5 looking in the direction indicated by arrow J of a boss on the automatic release-shaft, of which latter a plan of a portion thereof is shown, together with a release-arm pivotally mounted in the boss and a helical spring for yieldingly holding the arm in the normal position. Fig. 5 is a vertical section of the boss for supporting the release-arm on broken line K L of Fig. 4, with the arm and a clutch-lever in side elevation, looking in the direction indicated by arrow N, Fig. 4, and a cross-section of one of the car-axles, the coupling-shaft, and the automatic release-shaft upon which the boss is mounted.

Similar numerals indicate like parts throughout the several views.

The combined resistance and motor cylinder 1 is disposed and secured under the car in this instance in a horizontal position, and the piston-rod 2 is held at the outer end central with the cylinder by means of the cross-head 3, which is mounted at the side ends on rods 4 and 5, Fig. 1. A cable 6 is attached at one end to cylinder 1 and at the other end to a rope-pulley 7, which is secured to the power-transmission shaft 8, the intermediate of length portion of the cable being disposed over a pulley 9, which is pivotally mounted in cross-head 3, Figs. 1 and 2.

The power-transmission shaft is pivotally mounted under the car-frame, and besides the rope-pulley 7 there is revolubly mounted on this shaft a chain-wheel at 10 and a spur cog-wheel 11, the wheels being separated by an abutment-collar between them, which is fixed to the shaft, and each of these wheels has at the outer end of the hub portion in this instance clutch-teeth, as plainly shown in Fig. 1. Also mounted on splines on this shaft 8 are two sliding clutch-collars 12 and 13, each with teeth to register with the teeth of the closely-adjacent wheel-hubs of the wheels 10 and 11, and each of these collars is provided with the usual peripheral groove for the engagement of a ring or segment of a ring pivotally attached to its operating-lever, such as 14 and 15. Firmly mounted on the car-axle 16 is a chain-wheel at 17 and a spur cog-wheel 18.

At one end of the transmission-shaft 8 is a spur cog-pinion 19, which is in engagement with a large spur cog-wheel 20, mounted upon the automatic safety release-shaft 21, which latter is pivotally mounted under the car-frame. Firmly mounted on release-shaft 21

are two bosses 22 and 23, of which boss 23 is shown on an enlarged scale in Figs. 4 and 5. In each of the bosses is pivotally mounted an arm, such as 24 and 25. The outer end portion of each of these arms is twisted at an angle to its plane of revolution with shaft 21, and each arm is held yieldingly against a shoulder of the boss in the plane of its revolution by means of a helical spring, as seen at 26, Fig. 4, and each arm may be moved so as to subtend an angle to the normal plane of revolution, as indicated by the broken lines in Fig. 4.

Each of the levers 14 and 15 is provided with a projecting end portion, such as 27 and 28, and each of these projections is disposed so as to be contacted by the beveled end portion of the adjacent release-arm 24 or 25.

In Figs. 1 and 3 is shown, in combination with the automatic release-shaft 21 and the large cog-wheel 20, mounted thereon, a pin 29 in wheel 20 and a stop-lever 30, pivotally mounted on a hanger 31, the lever being yieldingly held in the normal position shown by means of a helical spring 32, Fig. 3, these parts being for the purpose of holding the automatic release-shaft 21, the power-transmission shaft 8, and the piston 37, through cable 6, in their respective normal positions, as in Fig. 1.

In order that the initial pressure in cylinder 1 shall remain the same should small leaks develop, a supply-reservoir 33 is provided, which is connected with some source of high-pressure supply through pipe 34, and the air in cylinder 1 as fast as it falls below the desired initial pressure is automatically supplied through pipe 35, a valve at 36 being provided to automatically prevent the air from returning to the reservoir when at an abnormally high pressure in the cylinder, caused by the inward movement of piston 37.

In operation we will suppose that the air-reservoir 33 and cylinder 1 contain air at a normal pressure of about sixty-five pounds to the square inch and that the axle 16 is revolving in the direction indicated by arrow 38, which is also the direction in which the car is moving. If now it is desired to stop the car, lever 14 is operated to engage clutch-collar 12 with the hub of chain-wheel at 10, which would cause transmission-shaft 8 to revolve in the same direction as axle 16 by virtue of its connection to the axle through chain 39, causing cable 6 to wind onto cable-pulley 7, thereby forcing the piston 37 into cylinder 1 against the contained air until the pressure thereof is sufficient to stop the car, when lever 15 is operated to move clutch-collar 13 into engagement with the hub of spur cog-wheel 11, in which position of the parts the car is prevented from movement in either direction. When the car is to be started, lever 14 is moved from the position when the clutch-collar 12 is in engagement with the hub of the chain-wheel at 10 to the disengaged or normal position shown in Fig. 1, thereby releasing the chain-wheel 10 when power is transmitted from piston 39, by virtue of the air-pressure in cylinder 1, through cable 6, pulley 7, and spur cog-wheels 11 and 18 to the axle 16 on account of the clutch-collar 13 being in engagement with the hub of spur cog-wheel 11. In the meantime automatic release-shaft 21 is revolved a part of a revolution in the direction indicated by arrow O by the action of pinion 19 on wheel 20 when the cable is being wound up on rope-pulley 7, which causes bosses 22 and 23 to revolve and move release-arms 24 and 25 around from their normal position, which is very close under the projecting end portions 27 and 28 of levers 14 and 15. Now since clutch-collar 12 has been moved into engagement with the hub of the chain-wheel at 10 the projecting end portion 27 of lever 14 is in the path of the revolution of release-arm 24, so that the outer end beveled portion of the latter contacts the projection 27, and since the latter cannot move farther toward chain-wheel at 10 the release-arm is swung outwardly from its plane of revolution against the resiliency of spring 26, Fig. 4, thereby passing the projection 27, and continues its partial revolution with shaft 21 until the car is stopped. Also in the meantime when the car is started and the cable is being unwound from rope-pulley 7 shaft 21 is revolved in a direction the reverse of that indicated by arrow O, which causes the arms 24 and 25 to revolve back to the normal position shown in Fig. 1; but in this movement, on account of clutch-collar 13 being in engagement with the hub of spur-wheel 11, the projection 28 of lever 15 is in the path of revolution of release-arm 25, and since the latter is against its abutment in boss 23 and cannot be moved out of its plane of revolution in the direction of the abutment the beveled end thereof serves to contact with and move end projection 28 on lever 15 outwardly, Fig. 5, and with it the clutch-collar 13 out of engagement with the hub of spur-wheel 11; but power-transmission shaft 8 and automatic release-shaft 21 continue to revolve until pin 29 on wheel 20 is revolved into contact with stop-lever 30, when the parts have all assumed the normal positions shown in Figs. 1 and 3.

If it is desired to move the car and axle 16 in a direction the opposite to that indicated by arrow 38, in applying the brake to stop the car lever 15 instead of 14 is first operated, so as to move clutch-collar 13 into engagement with the hub of spur cog-wheel 11, when the power-transmission shaft 8 and automatic release-shaft 21 are both revolved in the same direction, as described, when the car is moving in the direction indicated by arrow 38; but when the car has been brought to a standstill lever 14 is operated to move clutch-collar 12 into engagement with the hub of chain-

wheel at 10, when the operative parts are again in a locked position, which prevents the car from moving in either direction, but may be released to move in the direction opposite to that indicated by arrow 38 by operating lever 15 to disengage clutch-collar 13 from the hub of spur cog-wheel 11, the release-arm 24 serving to move clutch-collar 12 out of engagement with the hub of the chain-wheel at 10 by the beveled end of the arm being brought into contact with the projecting end 27 of lever 14 at the end of a complete cycle of movements, when the parts are again all in the normal or initial position shown in Fig. 1.

It is obvious that when the cable 6 is wound up on pulley 7 and both of the clutch-collars 12 and 13 are in engagement with the hubs of their respective wheels 10 and 11 and the car thereby locked from movement in either direction the car may be started to run in either direction in accordance with which lever 14 or 15 is first operated to move the clutch-collars 12 or 13 out of engagement with the hubs of the wheels 10 or 11.

We claim as our invention—

1. A combined car brake and starter, comprising the combination with a car-axle, of a power-transmission shaft connected thereto and adapted to be rotated in one direction thereby, means providing an elastic resistance, means connecting said shaft with the resisting means, whereby said shaft is adapted to rotate in the opposite direction, means for locking the car-axle against movement in either direction, and means for disconnecting the axle and the power-shaft alternately operated by said axle and elastic resistance, substantially as described.

2. In a combined car brake and starter, a car-axle, and elastic resistance, a power-transmission shaft, means operatively connecting said power-shaft with the elastic resistance, means for connecting said shaft with the axle, and means for disconnecting the axle from the power-transmission shaft, said means being alternately operated by the car-axle and the elastic resistance, substantially as described.

3. In a combined car brake and starter, a car-axle, an elastic resistance and a power-transmission shaft, and operative means adapted to be manipulated to hold the transmission-shaft from revolving in one direction, and the car-axle from revolving in either direction, and to release the said shaft and thereby the car-axle so that the latter may revolve in either one of both directions, at the will of the operator.

4. In a combined car brake and starter, a car-axle and an elastic resistance, a power-transmission shaft, the latter connected to the elastic resistance and adapted to be revolved thereby in one direction, and adapted to be connected to the axle and be revolved thereby in either the same or the opposite direction thereof, in combination with means operated alternately by the elastic resistance and the car-axle, and adapted to disengage the car-axle from the transmission-shaft, when the latter has revolved to a desired limit.

5. An apparatus of the character described comprising a car-axle and an elastic resistance, a power-transmission shaft, the latter connected to the elastic resistance and adapted to be revolved thereby in one direction, and adapted to be connected to the axle and be revolved thereby in either the same or the opposite direction thereof, in combination with means operated alternately by the elastic resistance and the car-axle from the transmission-shaft during the time the latter is revolving back to its initial position, adapted to disconnect the axle from the power-shaft, and a stop adapted to limit such revolving movement.

6. In a combined car brake and starter, a car-axle and an elastic resistance, and means for connecting the latter with the axle whereby power is transmitted to revolve the axle in either direction, or to transmit power from the axle to the elastic resistance when the car-axle is revolving in either one of both directions, the elastic resistance consisting of compressed air and means for maintaining the latter in a compressed state.

7. In a device of the type set forth the combination with a car-axle, a power-transmission shaft adapted to be rotated in one direction by said axle, an elastic resistance connected with said shaft and adapted to rotate the same in the opposite direction, means for locking said shaft against movement in either direction, and rotatable means adapted to unlock said last-named means, substantially as described.

8. In a device of the character described, a car-axle, an elastic resistance, a power-shaft adapted to alternately work against and be rotated by said resistance, means adapted to communicate motion from the car-axle to said shaft, locking means to hold said axle from revolution in either direction, and means connected to said power-shaft adapted to disengage said locking means to permit movement of the car-axle, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

HENRY E. KELLOGG.
GEORGE F. SWAIN.

Witnesses:
OSCAR SNELL,
ALBERT E. EBERT.