

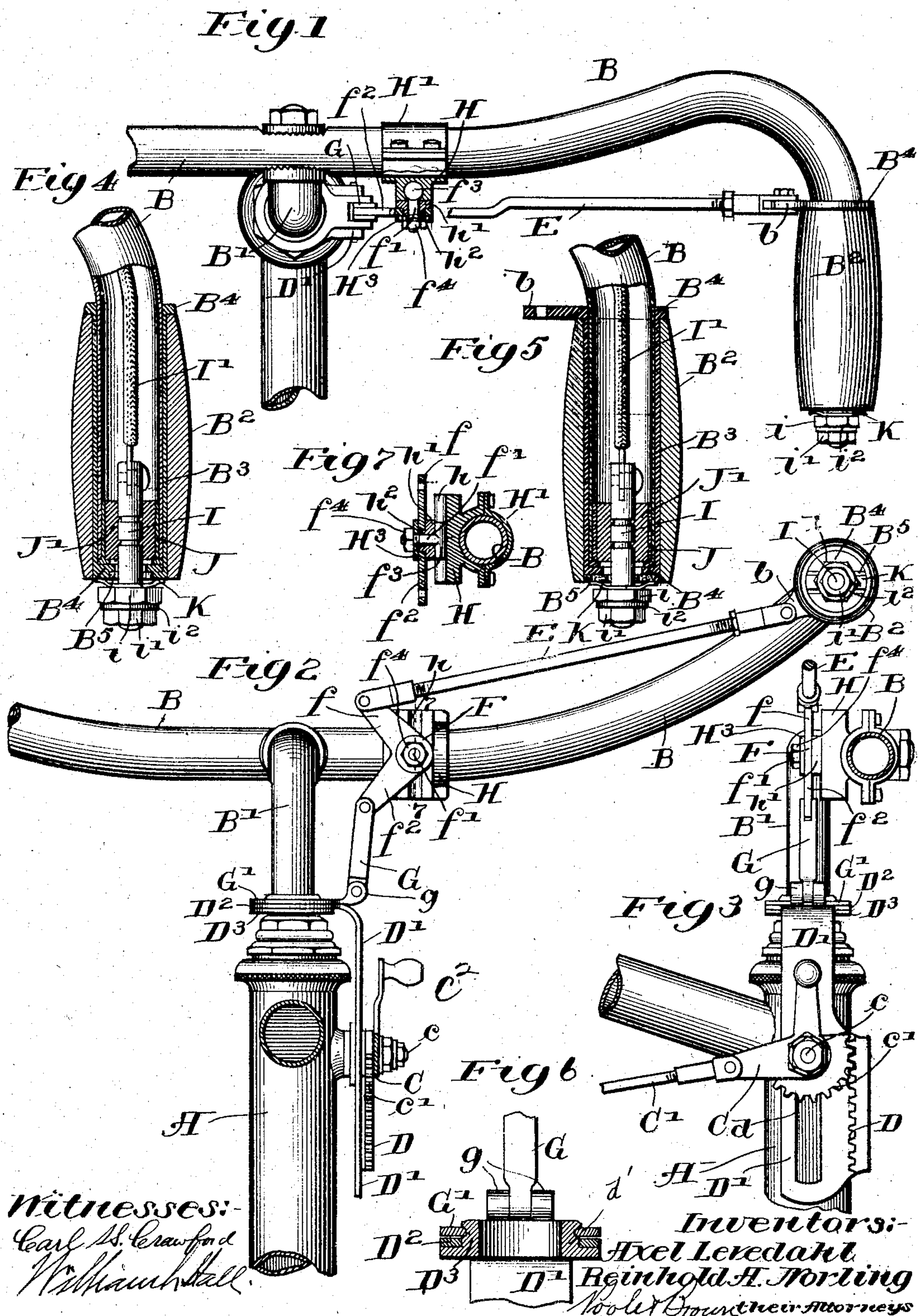
No. 789,980.

PATENTED MAY 16, 1905.

A. LEVEDAHL & R. A. NORLING.  
CONTROLLING MECHANISM FOR MOTOR CYCLES.

APPLICATION FILED SEPT. 8, 1903.

2 SHEETS—SHEET 1.



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Carl M. Crawford  
William Hall

Inventors:  
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Reinhold H. Norling  
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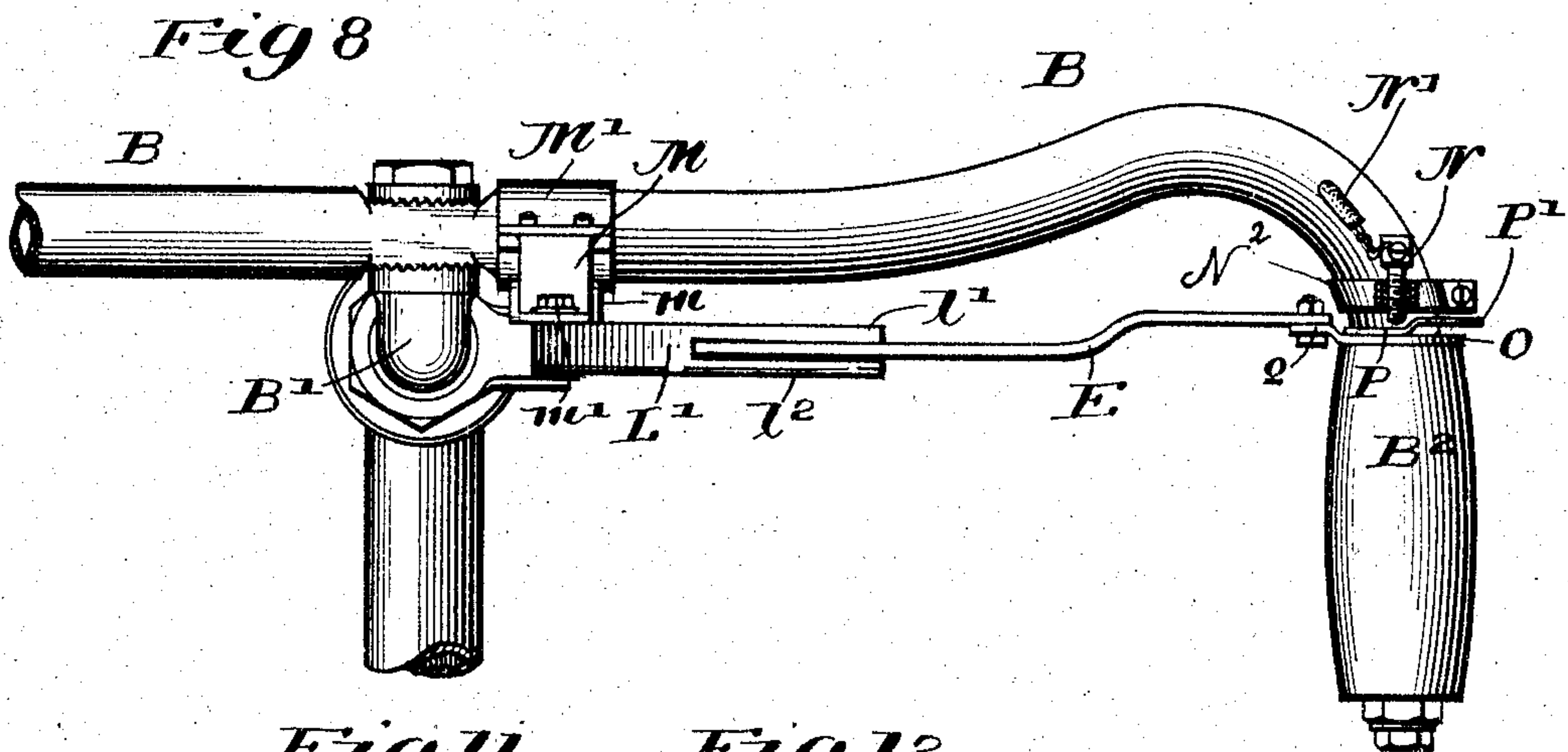
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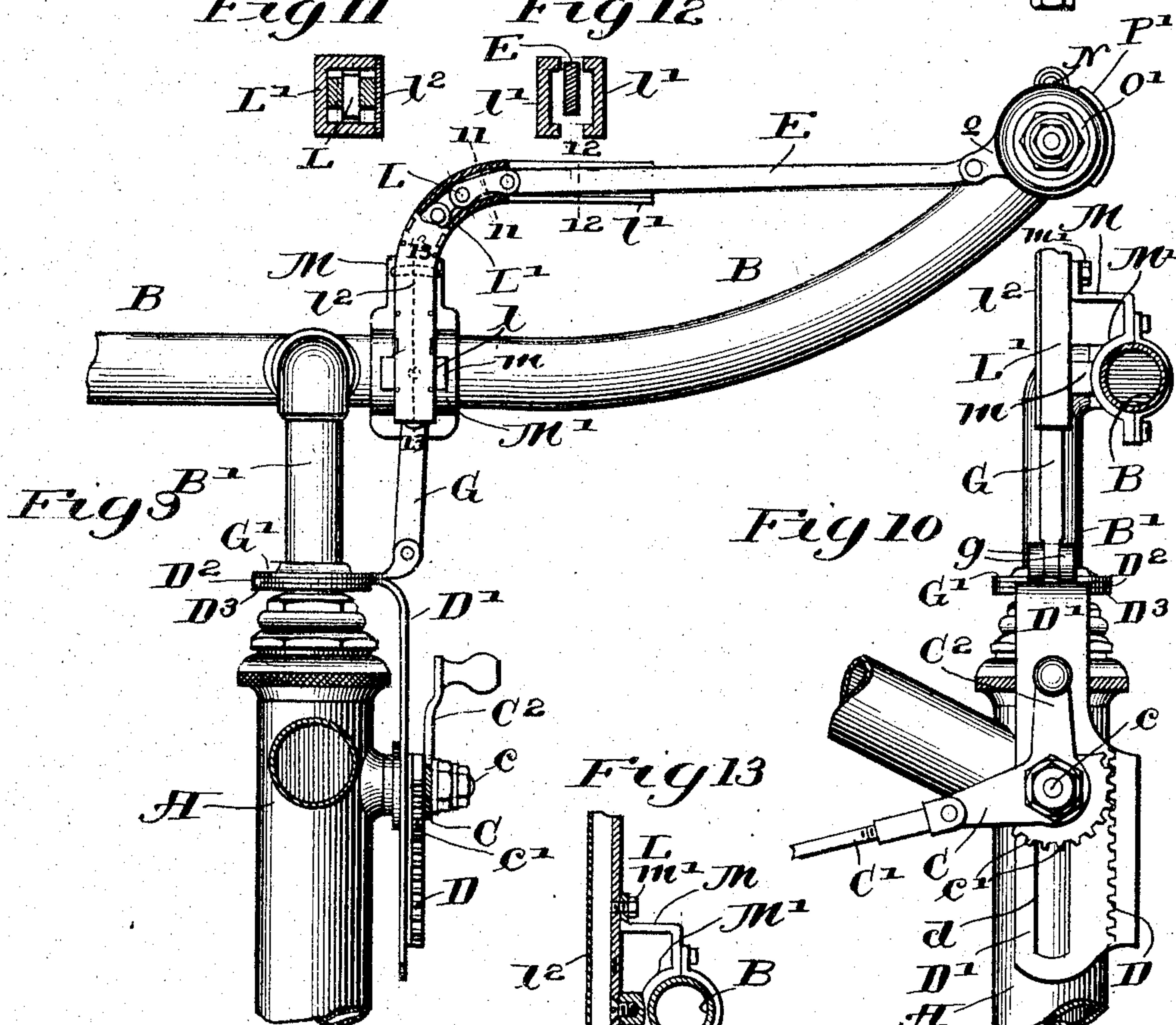
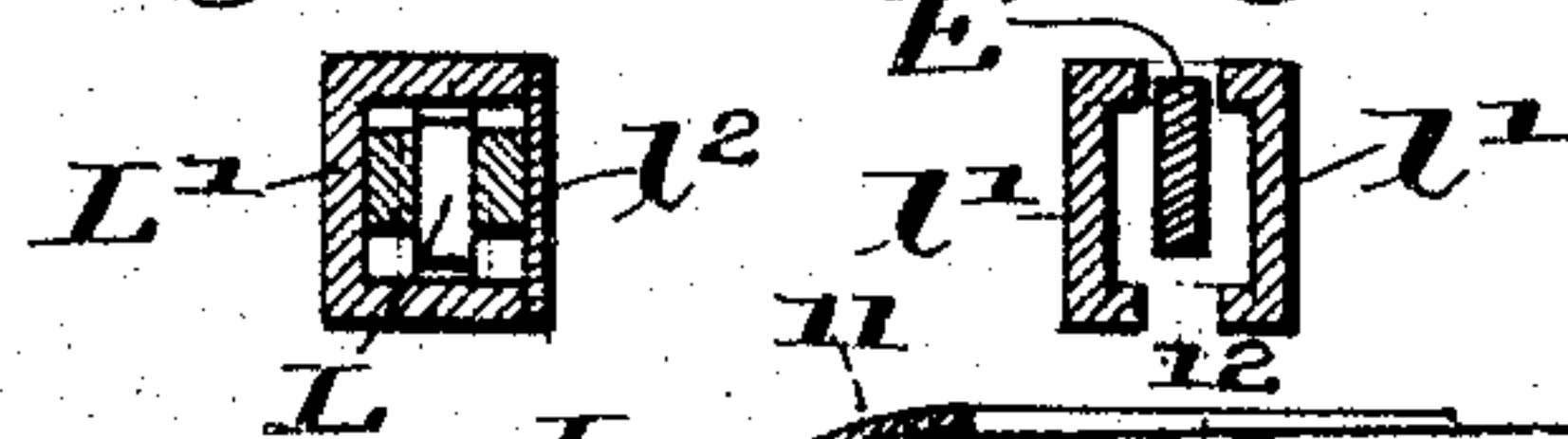
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*Fig 11*      *Fig 12*



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# UNITED STATES PATENT OFFICE.

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AURORA, ILLINOIS, A CORPORATION OF ILLINOIS.

## CONTROLLING MECHANISM FOR MOTOR-CYCLES.

SPECIFICATION forming part of Letters Patent No. 789,980, dated May 16, 1905.

Application filed September 8, 1903. Serial No. 172,227.

*To all whom it may concern:*

Be it known that we, AXEL LEVEDAHL and REINHOLD A. NORLING, of Aurora, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Controlling Mechanism for Motor-Cycles; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in motor-cycles, and refers more specifically to an improved hand-actuated mechanism for controlling the speed of the motor and for starting and stopping the same.

The invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a fragmentary top plan view of the handle-bars of a motor-cycle, the steering-post, and a part of the frame, showing the application of our invention thereto. Fig. 2 is a rear elevation of the parts shown in Fig. 1 with parts shown in section. Fig. 3 is a side elevation of the upper end of the steering-head, a part of the frame, and a portion of the handle-bar, showing the manner of attaching our improvements thereto. Fig. 4 is an axial sectional view of one of the hand-grips of the handle-bars. Fig. 5 is a sectional view thereof, taken in a plane at right angles to that of Fig. 4. Fig. 6 is an axial sectional view of the swivel between the stationary and swinging connection between the hand-grip and motor-controlling member. Fig. 7 is a transverse section taken on line 7 7 of Fig. 1. Fig. 8 is a top plan view of the handle-bars and steering-head, showing the application of a modified form of our invention thereto. Fig. 9 is a rear elevation of said parts with parts shown in section. Fig. 10 is a side elevation of the steering-head and a portion of the handle-bar, showing the application thereto of the modified construction illustrated in Figs. 8 and 9. Fig. 11 is a cross-section taken on line 11 11

of Fig. 9. Fig. 12 is a cross-section taken on line 12 12 of Fig. 9. Fig. 13 is a sectional view taken on line 13 13 of Fig. 9 with parts omitted.

First referring to the construction shown in Figs. 1 to 7, inclusive, A designates the steering-head of the motor-cycle; B B, the handle-bars, and B' the handle-bar stem, which extends downwardly into and is secured to the steering-head.

B<sup>2</sup> designates the hand-grip of one of the handle-bars.

The manually-operable motor-controlling device embodying our invention embraces, in combination with the actuating member controlling the speed of the motor or for starting and stopping the motor, or both, of operative connections between said actuating member and a part carried by the handle-bars, preferably on or embodied in the hand-grip of one of the handle-bars, whereby the motor may be stopped and started and its speed controlled by the hand of the rider without necessitating the rider to assume an unusual or inconvenient position on the machine for controlling the motor. Said operative connections embody in the preferred form of our device a swiveling connection between the part of the mechanism carried on the handle-bars and that carried on the machine-frame proper. Preferably, also, the mechanism is so constructed that the igniting-circuit of an explosive-motor is opened and closed by the same manually-operable part which controls the speed of the motor.

C designates the controlling member referred to, which is connected in any suitable or preferred manner with the controlling and stopping and starting devices of the motor and is operated from the devices carried on the handle-bars. When applying our improvements to a gasoline-motor, for which it is more especially designed, said actuating member C is operatively connected with a part which controls the sparking device and with the exhaust-valve of the motor, and inasmuch as these devices are common and well known the motor and its associated parts are not



shown. Said actuating member consists of a lever which is pivoted at its forward end on a pivot-stud  $c$ , extending laterally from the steering-head. Said lever is loosely connect-  
 5 ed at its rear end with an endwise-movable rod  $C'$ , which is connected with the motor controlling and starting and stopping devices. The lever  $C$  is provided on its forward margin with gear-teeth  $c'$ , which are formed to  
 10 constitute a segmental gear. Said segmental gear meshes with a vertical rack-bar  $D$ , which is attached to a vertically-sliding bar  $D'$ , located at one side of the lever  $C$  and provided with an elongated slot  $d$ , through which ex-  
 15 tends the pivot-stud  $c$ , said stud and slot constituting a guide for the vertically-movable bar. When the bar is moved upwardly from the position it occupies in Figs. 2 and 3, it acts to swing the inner end of the lever  $C$   
 20 downwardly and to draw the connecting-rod  $C'$  forwardly, the connection of said rod with the motor speed-controlling and stopping and starting devices being such that this move-  
 25 ment starts the motor and controls the speed of the motor from its lowest to its highest speed as the inner end of the lever is swung downwardly. The connection of said sliding  
 30 bar  $D'$  with the hand-grip, whereby said bar may be raised and lowered in the manner stated, is made as follows: The hand-grip  $B^2$ , which  
 35 may be made of cork, rubber, or like material, is mounted on the rearwardly-turned end of the handle-bar so as to have a limited rotation thereon. Said hand-grip is fixed to a  
 40 sleeve  $B^3$ , which is capable of a limited rotation on the handle-bar and extends through the grip from one end thereof to the other. Formed on or attached to the forward end of  
 45 said sleeve  $B^3$  and surrounding the handle-bar is a flange  $B^4$ , which is provided at its inner side with a lug  $b$ .  $E$  designates an endwise-reciprocatory rod or bar, which is loosely connected at its outer end with said lug  $b$  and is  
 50 loosely connected at its inner end with one arm,  $f$ , of a bell-crank lever  $F$ , which latter is pivoted at its angle on a stud  $f'$ , attached to the handle-bar near the stem  $B'$  thereof. The  
 55 other arm,  $f^2$ , of said bell-crank lever is loosely connected with a downwardly-extending link  $G$ , which latter is loosely connected at its end remote from the bell-crank lever with the  
 60 sliding rack-bar  $D'$ , hereinabove referred to. Said link is connected with the upper end of said sliding bar  $D'$  through the medium of a swivel which rotates about the central axis of  
 65 the handle-bar stem, whereby said link and bar  $D'$  maintain their proper relation throughout the entire swing of the handle-bars about the axis of said stem and the head. Said swivel  
 also embraces a guide so constructed as to maintain the proper relative vertical relation of the sliding bar and link in all positions of the handle-bar. Said swivel and guide are made as follows: The upper end of the rack-  
 bar  $D'$  is provided with a laterally-turned

horizontal part  $D^2$ , which is apertured to fit over a collar  $D^3$ , which surrounds the stem  $B'$  and slides vertically thereon.  $G'$  designates a flat horizontal ring, which also surrounds  
 70 the guide-collar  $D^3$ , above referred to, and is fixed thereto, and said ring  $G'$  is provided at its outer side with a lug  $g$ , which is loosely connected with the lower end of the link  $G$ ,  
 75 above referred to. The ring  $G'$  surrounds a reduced part of the collar  $D^3$  and is clamped between the upper upset end of the collar  $D^3$  and the upper part of a larger part  $d'$  thereof,  
 80 which is encircled by the laterally-turned part  $D^2$  of said sliding bar  $D'$ . The parts are so arranged that the ring  $G'$  is fixed to and turns with the collar  $D^3$ , and said enlarged part  $d'$   
 85 of the collar  $D^3$  is made somewhat longer than the thickness of the laterally-turned part  $D^2$  of the bar  $D'$ , so that said collar is free to rotate in said laterally-turned apertured part of  
 90 said bar, the axis of relative rotation between said parts being the central longitudinal axis of the stem  $B'$ . With this construction when the hand-grip  $B^2$  is rotated to the left from  
 95 the position shown in Fig. 2 it acts, through the connecting-rod  $E$  and bell-crank lever  $F$ , to draw the link  $G$  upwardly, and said link acts, through the ring  $G'$  and collar  $D^3$ , to  
 100 draw upwardly the rack-bar  $D$  and swing the starting-lever  $C$  on its axis in a manner to start the motor and to control its speed. When the hand-grip is turned to the right, it acts, through said connection, to depress the  
 105 said rack-bar  $D'$ , and therefore swings the lever  $C$  in a manner to slow the motor and finally to stop the same.

Means are provided for adjusting vertically the pivot-stud  $f'$  of the bell-crank lever  $F$ , so that in assembling the parts of the device said  
 110 pivot may be accurately located to impart the proper throw to the rack-bar with the extent of limited rotation provided for the hand-grip. The means for so adjusting the pivot  
 115  $f'$  are made in the present instance as follows:  $H$  designates a block which is attached to the handle-bar, near the stem thereof, through the medium of a divided collar  $H'$ , Fig. 7,  
 120 which encircles the handle-bar. Said block is provided on its rear face with a vertical groove  $h$ , which is herein shown as made partly cylindric to give it an undercut cross-section. The stud  $f'$  is provided at its forward end  
 125 with a parti-cylindric vertically-elongated head  $f^3$ , which fits within and is capable of vertical adjustment in said groove.  $h'$  designates a washer which surrounds said stud  
 130 between said head and bell-crank lever, and said washer is provided with a rearwardly-extending cylindrical flange  $h^2$ , which extends through the pivot-aperture of a lever and constitutes the pivot on which said lever is directly mounted. Said flange is made somewhat longer than the thickness of the bell-crank lever.  $H^3$  designates a washer surrounding said stud  $f'$  in rear of the lever  $H$ ,



which bears at its inner face against the outer end of the cylindrical flange  $h^2$  of the washer  $h'$ .  $f^4$  designates a nut which has screw-threaded engagement with the rear end of the pivot-stud  $f'$  and which is adapted to be turned tightly against the washer  $h^2$ . With this construction the head  $f^3$  of said pivot-stud is clamped tightly against the undercut front faces of said groove  $h$  and held fixedly in place when adjusted. Such construction also prevents clamping action on the bell-crank lever and permits it to swing freely on its pivot. By reason of the vertical movement of the head  $f^3$  of said pivot-stud in the groove of said block the said pivot-stud may be vertically shifted as required to adjust the pivot to the bell-crank lever with respect to the other operative parts of the mechanism.

The mechanism when adapted to a gasoline-motor embodies means for controlling the sparking mechanism by which the explosive charges are ignited in the cylinder, and as a further and separate improvement we have provided circuit-closing devices which are actuated by rotation of the hand-grip in the manner before described, whereby the igniting-circuit by which the explosive charge of the motor is ignited may be opened and closed as the hand-grip is rotated to start and stop the motor. It is common in motors of this character to operate the igniting mechanism to vary the period of sparking relatively to the throw of the motor-piston, the production of the spark being delayed to delay the explosion, and thereby decrease the speed of the motor, and being advanced to increase the speed of the motor. In such devices the igniting-circuit remains closed so long as the speed of the motor may be maintained under its slowest range, and thereafter the igniting-circuit is opened to prevent further ignition of the explosive charges. It is also a common expedient in these machines to lock the exhaust-valve open when it is desired to stop the motor. The mechanism herein shown is designed to operate a motor wherein such opening of the exhaust-valve occurs, and upon this occurrence the parts are arranged to open the igniting-circuit. Said circuit-closing devices are made as follows: I designates a metal stem which is located centrally of the outer end of the hand-grip and is connected at its forward end with a cable  $I'$ , containing one of the wires constituting one side of the igniting-circuit. The other side of the circuit is traced through the metal frame of the machine. J designates a thimble which is inserted into the rear open end of the handle-bar within the hand-grip, and contained in the said thimble is a bushing  $J'$ , made of insulating material, through which the stem I passes and in which it closely fits. Said stem is exteriorly roughened to prevent its slipping endwise in said insulated bushing. The end wall  $B^4$  of the sleeve  $B^3$ , which is flush with the end of the grip, is pro-

vided with a transverse slot extending thereacross, and contained in said slot is a bar  $B^5$ , made of insulating material, said bar being provided with a central aperture through which the stem I extends. K designates a metal contact-strip which is made of a length somewhat less than the diameter of the end wall of the sleeve  $B^3$  and is apertured and fits over the stem I. The contact-strip is non-rotatively mounted on said stem. The contact-strip is confined against the outer wall of said sleeve  $B^3$  and the insulating-bar by means of nuts  $i$   $i'$ , having screw-threaded engagement with the outer end of the stem, and a non-rotative washer  $i^2$  is interposed between said nuts. It is seen, therefore, that the stem I and contact-strip K are stationary, while the sleeve  $B^3$  turns with the hand-grip. When the hand-grip and stem occupy the relative positions shown in Fig. 2, the insulating-bar  $B^5$  is located in line with the contact-strip and the contact-strip bears thereon, and at this time the igniting-circuit is open. When, however, the hand-grip is turned one-quarter of a rotation in a direction to start the motor, the metal end wall of the sleeve  $B^3$  is brought into contact with the ends of the contact-strip K, thereby closing the igniting-circuit between said contact-strip and the end wall of the sleeve. Conversely, when the hand-grip is rotated in the opposite direction the igniting-circuit is opened and the motor stopped.

The construction shown in Figs. 8 and 12, inclusive, is similar to the construction just described, so far as is concerned the vertically-movable rack-bar and its connections with the motor-actuating lever C and link G. The operative connections between the rotative hand-grip and the link G and the circuit-closing devices, however, are modified, these modifications being made as follows: The connecting-rod E of the last-mentioned construction is substantially the same as that before described. Said connecting-bar is loosely connected at its outer end with a lug  $o$ , which rotates with the hand-grip, as will hereinafter more fully appear, and is loosely connected at its inner end adjacent to the handle-bar stem to a chain L, which latter is attached at its lower end to the link G. Said chain L is contained in a suitable guide  $L'$ , which is attached to the handle-bar near the stem thereof and comprises a vertical part  $l$  and a laterally-curved part  $l'$ . Said guide is attached to the handle-bar by means of a bracket M, attached to or formed on a divided collar  $M'$ , which surrounds the handle-bar. The laterally-turned part  $l'$  of the guide is slotted in its upper and lower walls to permit the connecting-bar E to swing slightly as it is moved inwardly and outwardly by reason of its connection with the rotative lug  $o$  on a flange O, formed on a sleeve  $O'$  rotative with the hand-grip, as in the prior construction. One side  $l^2$  of the guide is made removable, as shown in Fig. 9,



to facilitate the insertion of the chain in said guide. The said guide is herein shown as attached to the bracket M by means of a lug *m* on the bracket and a bolt *m'*, which extends  
 5 through the bracket and the rear wall of the guide. The upper hole in the said bracket is made horizontally elongated, whereby the guide may have sufficient swing on the stud, before the guide is finally fastened, to enable  
 10 the vertical part thereof to be properly adjusted relatively to the link G. The operation of this form of the device so far as it relates to actuation of the motor-controlling lever is the same as the first-described construction  
 15 and need not be further referred to.

The circuit-closing devices by which igniting-circuit is closed is shown in the last-mentioned construction as located at the forward end of the hand-grip instead of at the rear end  
 20 thereof. As herein shown, the said circuit-closing devices consist of a stationary contact-piece N, to which one end of the circuit-wire N' is attached, and a cam-ring P, which is attached to the forward flange O of the sleeve  
 25 O' and rotative with the hand-grip. Said rotative contact-ring is provided in one part of its circumference with a cam portion P', which extends slightly forwardly of the main part of the ring and extends into the path of the  
 30 rear end of the contact-piece N, so that when the hand-grip is turned to bring the part P' of the contact-ring opposite the contact-piece the circuit is closed between said parts. The contact-piece N extends through a bracket N<sup>2</sup>,  
 35 which is formed on a divided collar which surrounds the handle-bar, and the contact-piece is insulated from said bracket in the manner shown in Fig. 8. The operation of this feature of the device is the same as the operation  
 40 of the former-described circuit-closing devices, the parts being so constructed that the igniting-circuit is closed when the engine is started and is opened when the engine is stopped.

45 The lever C is preferably provided with a hand-crank C<sup>2</sup>, which is designed to be used in cases of emergency to control and stop and start the motor—as, for instance, in the event the principal controlling mechanism should  
 50 become impaired by reason of breakage or other casualty.

We claim as our invention—

1. In a motor-cycle, the combination with the controlling member for the motor, and a  
 55 manually-actuated device for controlling said member carried by the handle-bar, of a collar surrounding the stem of the handle-bar and sliding endwise thereof, and two ring-like members surrounding said collar, one connected with said motor member and the other  
 60 with the hand-actuated device, one of said ring members being fixed to the collar and the other rotative thereon.

2. In a motor-cycle, the combination with  
 65 the motor-controlling lever provided with a

segmental rack and a vertically-sliding rack-bar meshing with said rack, of a hand-actuated device carried by the handle-bar, and operative connections between said rack-bar and said hand-actuated device, embracing a  
 70 swivel having a rotative part which is concentric with the stem of the handle-bar.

3. In a motor-cycle, the combination with the controlling-lever for the motor provided with a segmental gear, an endwise-movable  
 75 rack-bar meshing with said gear, and a laterally-turned part on said rack-bar having a part which is apertured and surrounds the stem of the handle-bar, of a hand-actuated device carried by the handle-bar, and operative  
 80 connections between said hand-actuated device and said laterally-turned part of the rack-bar, embracing a ring-like member which is connected with said laterally-turned part of the rack-bar to move the same endwise and  
 85 is relatively rotative with respect thereto.

4. In a motor-cycle, the combination with the controlling-lever for the motor provided with a segmental gear, an endwise-movable  
 90 rack-bar meshing with said gear, a collar surrounding the stem of the handle-bar, and a laterally-turned part on said rack-bar which surrounds said collar, of a hand-actuated device carried by the handle-bar, a ring surrounding said collar and attached thereto in  
 95 a manner to give endwise movement to the rack-bar, and is relatively rotative with respect to the laterally-turned part of said rack-bar, and operative connections between said hand-actuated device and said collar.  
 100

5. In a motor-cycle, the combination with the controlling-lever for the motor provided with a segmental gear, an endwise-movable  
 105 rack-bar meshing with said gear, a collar surrounding the stem of the handle-bar and movable endwise thereof, and a laterally-turned part on the rack-bar which surrounds said collar, of a ring also surrounding said collar, said collar and laterally-turned part being relatively rotative with respect to each other,  
 110 a hand actuating device carried by the handle-bar and operative connections between said hand-actuated device and said ring, comprising a bell-crank lever pivoted on the handle-bar, one arm of which is connected with  
 115 the hand-actuated device and a link connecting the other arm of said bell-crank lever with said ring.

6. In a motor-cycle, the combination with the controlling-lever for the motor provided  
 120 with a segmental gear, an endwise-movable rack-bar meshing with said gear, a collar surrounding the stem of the handle-bar and movable endwise thereof, and a laterally-turned part on the rack-bar which surrounds said collar,  
 125 of a ring also surrounding said collar, said ring being rotative relatively to the rack-bar, a hand actuating device carried by the handle-bar and operative connections between said hand-actuated device and said ring, com-  
 130



prising a bell-crank lever pivoted on the handle-bar, one arm of which is connected with the hand-actuated device and a link connecting the other arm of said bell-crank lever with said ring.

7. In a motor-cycle, the combination with the controlling-lever for the motor, provided with a segmental gear, an endwise-movable rack-bar meshing with said gear, a collar surrounding the stem of the handle-bar and moving endwise thereof, and a laterally-turned part on the rack-bar which surrounds said collar, of a ring also surrounding said collar, said ring being rotative relatively to the rack-bar, a hand-actuated device carried by the rack-bar, a bell-crank lever pivoted on the rack-bar near the stem thereof, a rod connecting said bell-crank lever with the hand actuating device, a link connecting the other arm of said bell-crank lever with said ring and means for vertically adjusting the pivot of said bell-crank lever.

8. In a motor-cycle the combination with the controlling member for the motor, and a hand-grip which has limited rotation on the handle-bar, of operative connections between said rotative hand-grip and said member, and circuit-closing devices, one of which is carried by and rotates with the hand-grip, for opening and closing the igniting-circuit of the motor.

9. In a motor-cycle, the combination with the controlling member of the motor, and a hand-grip comprising the grip proper, a sleeve which is rotative on the handle-bar and is located within and is attached to the hand-grip proper, a lug on said sleeve, operative con-

nections between said lug and the motor-actuating member, a head closing the end of said sleeve and provided with a groove which receives an insulating-bar, a stationary stem located centrally of said sleeve and adapted to be connected with one side of the motor igniting-circuit, and a contact-strip stationary with said stem and adapted to bear upon the said head of the sleeve and upon said insulating-bar carried thereby.

10. A hand-grip for the purpose set forth comprising a sleeve rotatively surrounding the end of the handle-bar and non-rotatively connected with the grip proper, a lug on the forward end of said sleeve, a head closing the rear end of the sleeve and provided with a transverse groove, an insulating-bar seated in said groove, a stem located axially in said sleeve and connected with the handle-bar and a contact-strip non-rotative on said stem and adapted for engagement with the head of said sleeve and with said insulating-bar.

In testimony that we claim the foregoing as our invention we affix our signatures, in presence of witnesses, (LEVEDAHL) this 13th day of July, A. D. 1903, and (NORLING) this 6th day of July, A. D. 1903.

AXEL LEVEDAHL.

REINHOLD A. NORLING.

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