

No. 611,154.

Patented Sept. 20, 1898.

H. SYMES.
BACK PEDALING BRAKE.

(Application filed Mar. 23, 1897.)

(No Model.)

2 Sheets—Sheet 1.

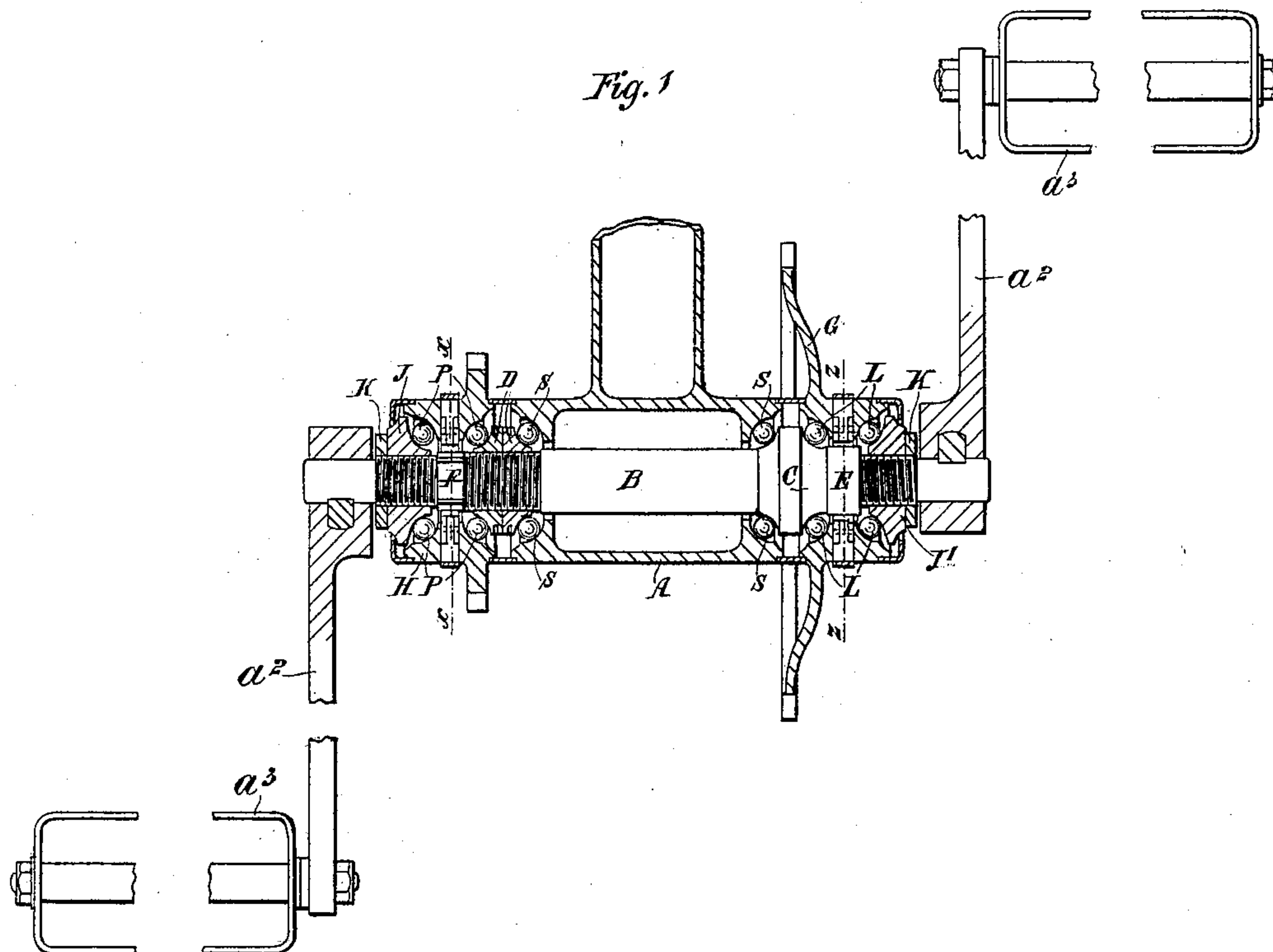


Fig. 2

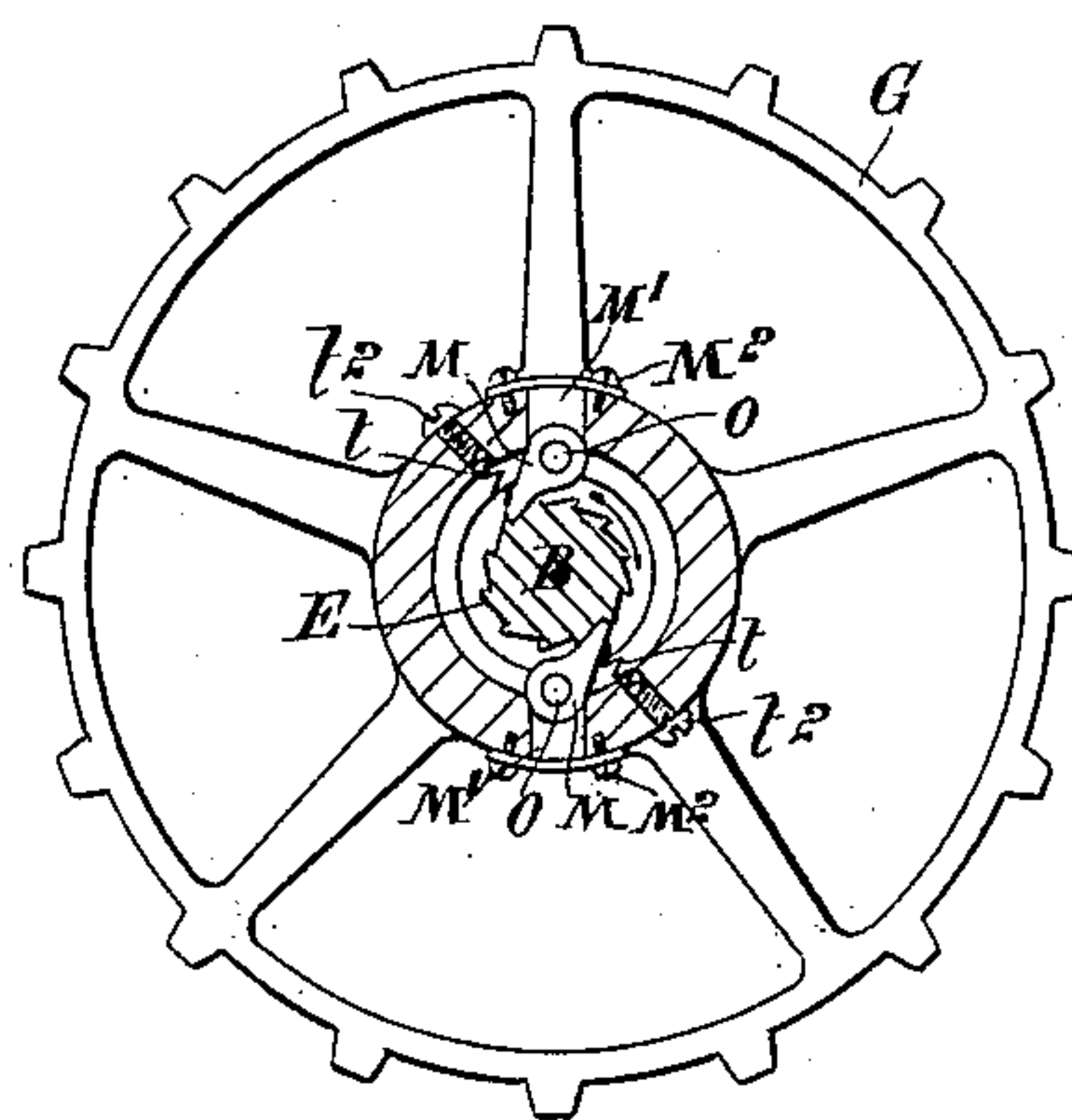
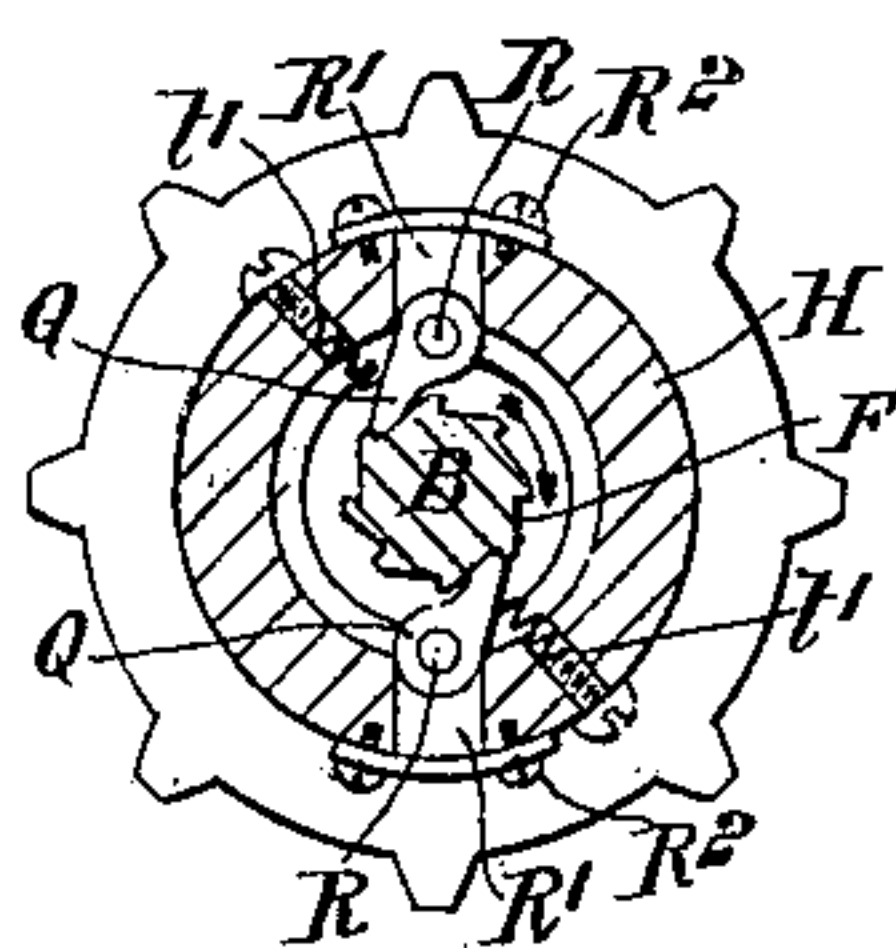


Fig. 3



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Fig. 4

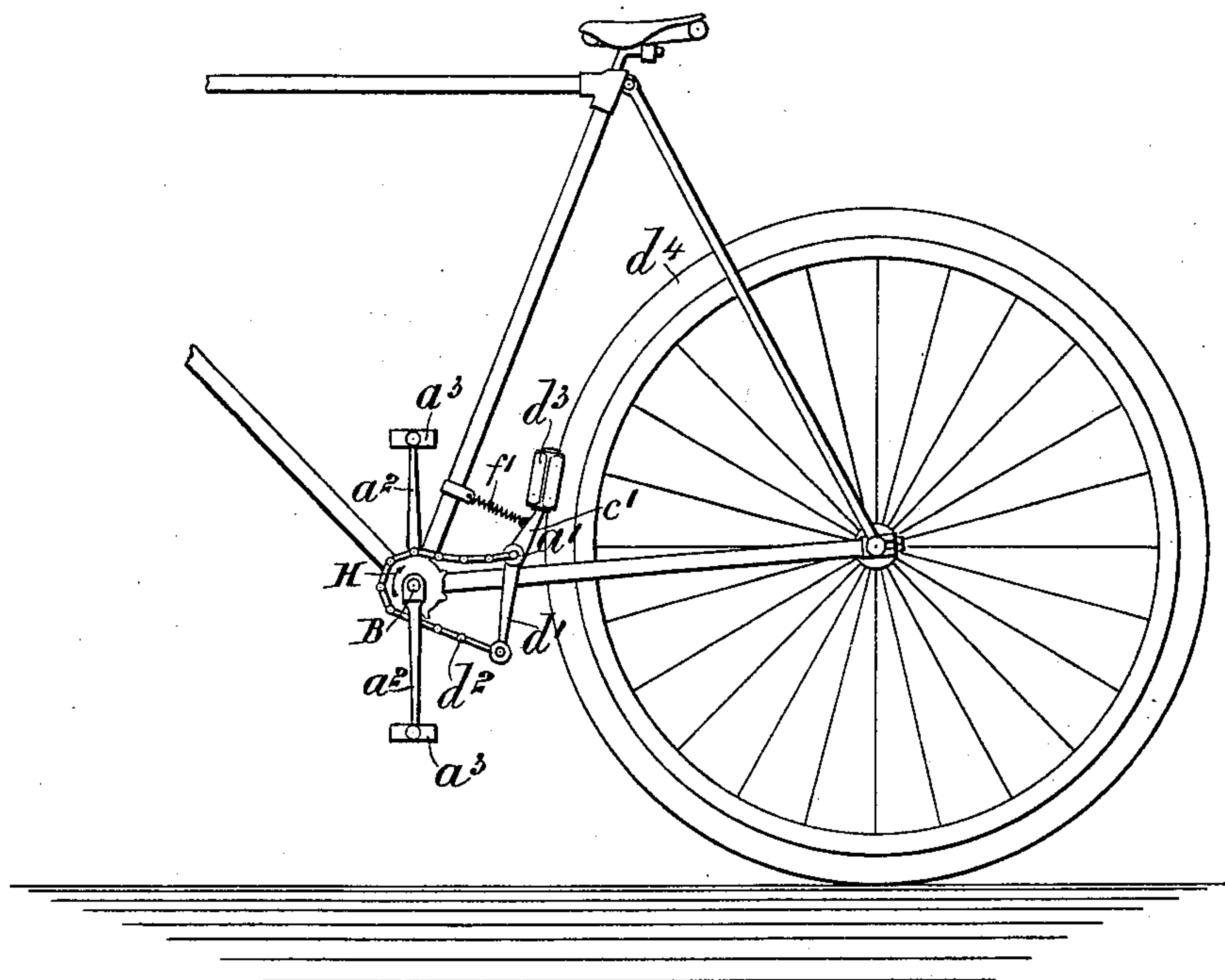
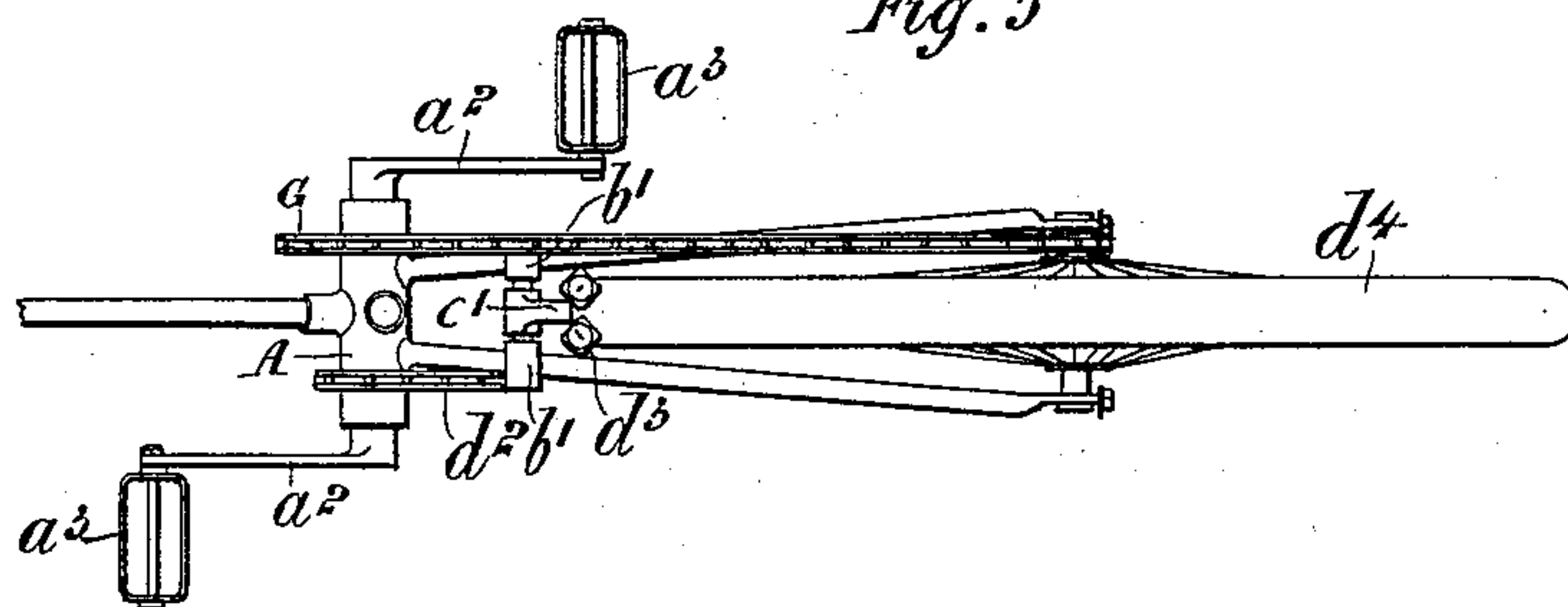


Fig. 5



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UNITED STATES PATENT OFFICE.

HENRY SYMES, OF DUNEDIN, NEW ZEALAND.

BACK-PEDALING BRAKE.

SPECIFICATION forming part of Letters Patent No. 611,154, dated September 20, 1898.

Application filed March 23, 1897. Serial No. 628,913. (No model.) Patented in New Zealand January 25, 1897, No. 9,222; in Victoria March 5, 1897, No. 13,996; in South Australia March 5, 1897, No. 3,582; in Queensland March 8, 1897, No. 3,785; in New South Wales March 9, 1897, No. 7,317; in Tasmania March 9, 1897, No. 1,846; in West Australia March 16, 1897, No. 1,569; in Canada March 22, 1897, No. 55,570; in England March 29, 1897, No. 8,084, and in France April 17, 1897, No. 266,277.

To all whom it may concern:

Be it known that I, HENRY SYMES, a subject of the Queen of Great Britain, residing at Alexandra South, Dunedin, in the Colony of New Zealand, have invented Improvements in Driving and Controlling Mechanism for Velocipedes, of which the following is a specification.

This invention has been patented to me in New Zealand, No. 9,222, dated January 25, 1897; in Victoria, No. 13,996, dated March 5, 1897; in New South Wales, No. 7,317, dated March 9, 1897; in Queensland, No. 3,785, dated March 8, 1897; in South Australia, No. 3,582, dated March 5, 1897; in Tasmania, No. 1,846, dated March 9, 1897; in West Australia, No. 1,569, dated March 16, 1897; in Great Britain, No. 8,084, dated March 29, 1897; in Canada, No. 55,570, dated March 22, 1897, and in France, No. 266,277, dated April 17, 1897.

This invention relates to mechanism designed for driving and controlling velocipedes, and has for its objects to provide means whereby a rider may keep his feet at rest while the machine pursues its course, thus obviating any material checking of speed when the momentum of the machine is so great as to cause it to outstrip the speed at which the pedals are revolving. The pedals may be used as foot-rests while the machine is moving and ordinary foot-rests dispensed with. The danger arising from a lady's dress catching upon a revolving pedal is overcome, since such an accident would merely hold the pedals at rest without perceptibly retarding the progress of the machine.

Combined with the aforesaid objects is the further object of applying a brake to one of the wheels, so that the speed of the machine may be controlled or the same may be brought to a standstill on a descending grade or elsewhere by the backward movement of the machine or by means of the feet, and the hands left free for steering the machine.

These objects of the invention are carried into effect by making the pedals in the ordinary form; but the driving sprocket-wheel is fitted revolubly upon the pedal-shaft or on a

bearing concentric therewith instead of being fixed to the shaft. The hub of this sprocket-wheel carries a pawl or pawls which may engage with a ratchet-wheel fixed upon or made solid with the shaft, so that when the shaft is revolved in one direction by the pedals the sprocket-wheel will be driven and revolved, but when the shaft is held at rest the pawls will merely glide over and up the inclined faces of the ratchet-wheel teeth with little or no check to the speed of the machine. In a modification the ratchet-wheel upon the shaft is dispensed with and an eccentric-pawl attached to the crank engages with a wheel or pulley fixed to the driving sprocket-wheel or to the hub of the same when the machine is being driven and will disengage immediately the pedals are held from revolving.

With driving mechanism constructed as just described it is obvious that a brake will be necessary to check the speed of or stop the machine. A brake made to coöperate with the before-mentioned driving mechanism and applied in a novel manner is constructed as follows: Another sprocket-wheel, and preferably one of small diameter, is fitted revolubly upon the shaft or on a convenient part of the machine, so that it is concentric with the shaft, and is fitted with a pawl or pawls to engage with a ratchet-wheel fixed upon or made solid with the shaft in a similar manner to the driving sprocket-wheel, with the exception that the pawls and teeth of the ratchet-wheel operate in a reverse direction. A chain passes around such small sprocket-wheel and has one end attached to the end of a lever fulcrumed upon the frame of the machine. The other end of the lever is formed into any ordinary spoon or other shaped brake-block and which normally is held free of the wheel by a check-spring. Thus a rider by slightly revolving the pedals in a direction reverse to that at which the machine is moving may apply the brake and control the speed of or stop the machine, or the backward movement of the machine will apply the brake.

In order that the invention may be most

easily understood by one skilled in the art to which it appertains, a description will now follow in detail, reference being had to the accompanying drawings, whereon—

5 Figure 1 is a longitudinal section through the pedal-shaft bearing-bracket and sprocket-wheels. Fig. 2 is a cross-section through line $z z$, Fig. 1, and looking toward the driving sprocket-wheel. Fig. 3 is a cross-section
10 through the line $x x$, Fig. 1, and looking toward the small sprocket-wheel. Fig. 4 is a side view of the small sprocket-wheel, chain, brake-lever, and attachments as applied to an ordinary safety-bicycle. Fig. 5 is a plan
15 of the same, but with the pedals set horizontally.

Similar letters of reference refer to similar parts.

Referring to the drawings, a^3 are the usual
20 pedals, and a^2 the cranks, attached in any ordinary manner to the shaft B, which revolves in a bracket A upon the main ball-bearings S, adjustment for wear being obtained by means of screw-collars D. The driving sprocket-
25 wheel G is provided with balls L, so that it may revolve freely around shaft B upon its bearings C and J'. Pawls M, Fig. 2, are pivoted within the hub of sprocket-wheel G and held in position with their brackets M' by
30 screws M², and the engagement of these said pawls with the teeth of ratchet-wheel E, which is fixed to or made solid with shaft B, is insured by the pressure of springs t . These
35 springs t are passed through the hub and lodge in a hole therein, where they are retained by screws t^2 . Thus when the shaft B is revolved in the direction shown by the arrow, Fig. 2, the teeth of the ratchet-wheel will engage with the pawls so long as the speed of
40 the sprocket-wheel does not exceed that at which the shaft is revolving; but the sprocket-wheel may revolve quicker than the shaft and the pawls merely glide over the inclined faces of the ratchet-wheel teeth, or the shaft E, with
45 its pedals a^3 , may be held at rest while the sprocket-wheel revolves—that is, while the machine continues its progress.

A second sprocket-wheel H is fitted upon the shaft B in a manner similar to that de-
50 scribed in the case of wheel G, being provided with balls P and bearings D and J. Its pawls R are pivoted within its hub, and are held in position, as are also their brackets R', by screws R², and operated by springs t' . The teeth of
55 the ratchet-wheel F are cut in a direction the

reverse of those upon ratchet-wheel E, and the pawls R engage with these teeth in a reverse direction. Thus when the pedals are revolved in a forward direction they will drive sprocket-wheel G only to operate the machine
60 by means of the ordinary chain and driven sprocket-wheel; but when the pedals are revolved in a backward direction sprocket-wheel H only will be revolved.

Referring now to Fig. 4, a chain d^2 is shown
65 passing around the sprocket-wheel H and having one end attached to the end of a lever d' , fulcrumed in any suitable position upon the frame of the machine and in bearings b' . The other end of the chain may be attached to any
70 convenient part of the machine and in such a manner that it will keep its position to pass onto the sprocket-wheel. The other end of the lever has any suitable shape or is formed into a brake-block d^3 for pressing upon the
75 periphery of the wheel d^4 ; but in normal conditions the brake is held free of the wheel by the tension of spring f' .

When the pedals are revolved in a backward direction, the teeth of ratchet-wheel F,
80 Figs. 1 and 3, will engage with pawls R, revolve sprocket-wheel H in the direction shown by the arrow on Figs. 3 and 4, and cause the brake to be applied to wheel d^4 to control the
85 speed of or stop the machine.

I am aware that the details of the invention may be modified and mechanical equivalents substituted for the various parts by a skilled person without departing from the
90 spirit of the invention.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

In combination in a bicycle, the pedal-shaft,
95 the sprocket-wheel having a clutch connection therewith, the supplemental sprocket also having a clutch connection with said pedal-shaft acting reversely to the first clutch connection, the rocking lever pivoted to the
100 frame of the bicycle and carrying a brake-shoe, and the chain passing around the supplemental sprocket, and having its ends connected with the rocking lever, substantially as described.

HENRY SYMES.

Witnesses:

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