

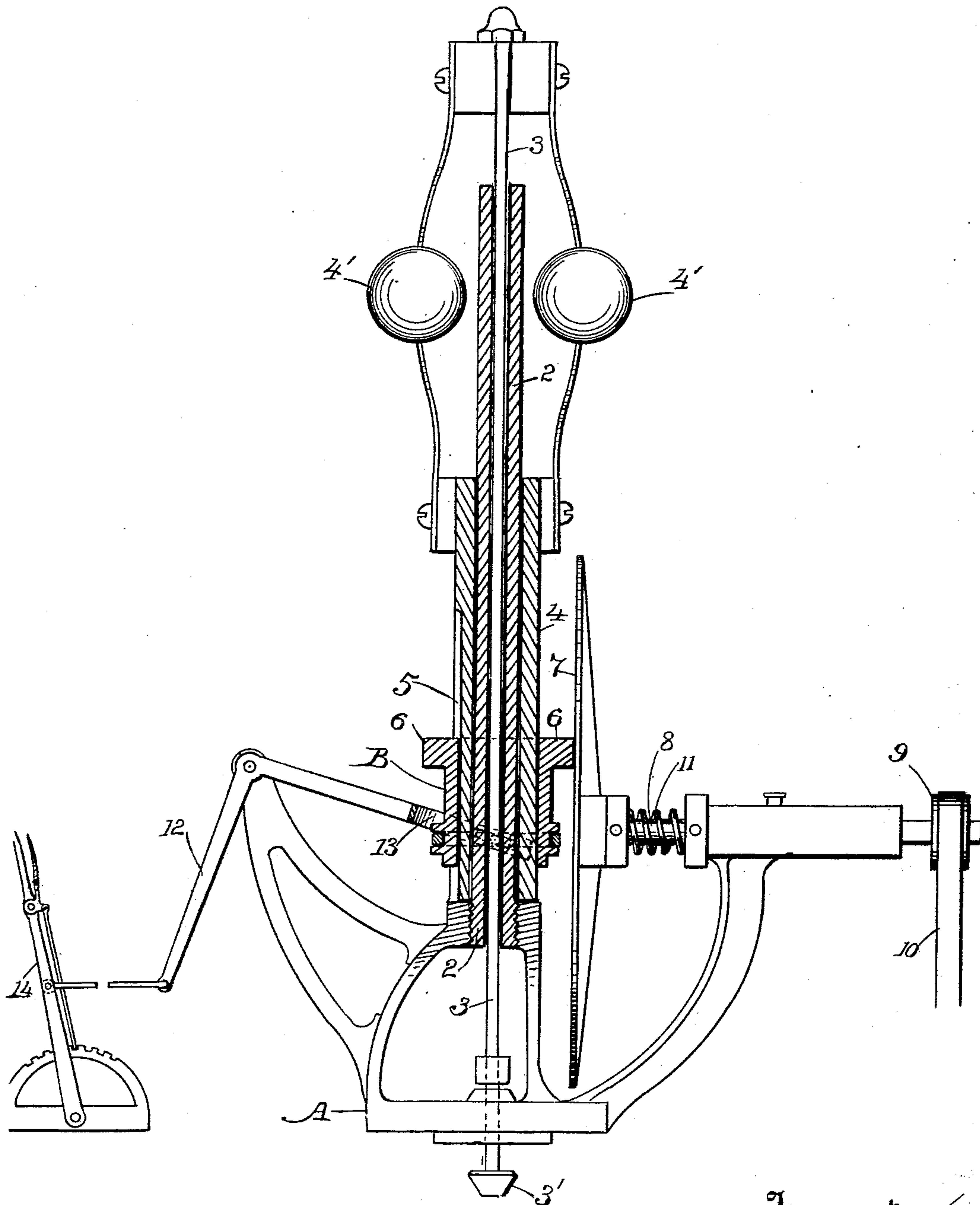
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Patented Oct. 8, 1901.

C. A. HUFFMASTER.  
VARIABLE SPEED GOVERNOR.

(Application filed Nov. 30, 1900.)

(No Model.)



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# UNITED STATES PATENT OFFICE.

CHARLES A. HUFFMASTER, OF SAN LEANDRO, CALIFORNIA.

## VARIABLE-SPEED GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 684,254, dated October 8, 1901.

Application filed November 30, 1900. Serial No. 38,166. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES A. HUFFMASTER, a citizen of the United States, residing at San Leandro, county of Alameda, State of California, have invented an Improvement in Variable-Speed Governors; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to improvements in governor devices by which the speed of the engine is controlled to any desired degree.

It consists, essentially, of a hub upon the sleeve of a governor, having a friction-roller engaging the face of a driver or disk, which latter is connected with the engine-shaft, said hub and roller slidable lengthwise of the sleeve and radially of the disk, whereby the speed of the engine is varied inversely as the speed of the governor.

It also consists of details more fully to be set forth in the following specification and accompanying drawing, in which the figure is a vertical section through the governor.

My invention is designed particularly for use where there is a constant variation in the speed or in the amount of power necessary to be applied for a particular form of work or wherever the ordinary governor would fail to give the desired control of the speed of the engine. Such instances of variation are continually seen in the operation of traction-engines, stationary engines, &c. In the former it may be an unevenness in the road, as a rock or depression, or the engine may be traveling in a hilly locality. In either case it is essential that the speed of the engine be under immediate control and capable of immediate adaptation to the work or obstacle to be met, whether it is suddenly to slow down to a speed of one-fourth of a mile an hour or to greatly increase the speed. It is my object to effect this change by controlling directly the speed of the governor and applying the power just when it is most needed and not having to depend on the slow means of the throttle to gradually speed up the governor and engine. I am able to exert this power or to cause it to cease its operation instantly or to vary it at will, as will be hereinafter seen. Furthermore, by the governor, such as is commonly in use upon traction-engines and the like, a variation in the speed

of the engine is possible only up to, say, twenty-five revolutions.

Ordinarily a governor does not allow of any great variation of speed in relation to the speed of an engine, and these changes of governor and engine speeds generally, if not always, take place in direct relation to each other—i. e., if the engine speed increases the governor speed increases, and vice versa.

In my device, as previously indicated, the changes of speed of the governor and engine are inverse or opposite to each other—i. e., an increase in the speed of the governor causes a slowing down of the engine, and vice versa. This reciprocal relation permits me to vary the engine speeds indefinitely. Though my governor may not vary over fifty revolutions above or below its normal speed, yet by decreasing the number of revolutions I may run an engine normally running, say, at four hundred up to five hundred revolutions or decrease the speed of the engine by proportionately increasing the speed of my governor. This will be clearly understood by reference to the drawings, in which A represents the stand or base of a governor of the ordinary centrifugal type.

2 is a tube secured in the base, through which the governor-stem 3 operates. On the lower end of this governor-stem is a governor-valve 3', controlling the steam-inlet. Upon the tube 2 is a sleeve 4, to which the governor-balls 4' are attached. A hub B is slidable lengthwise upon this sleeve, as in a feather 5. Upon this hub is a friction-roller 6, adapted to engage the face of the disk or driver 7, which latter is secured upon a short shaft 8, journaled in an arm of this base. Upon this shaft is a pulley 9, to which power is transmitted from the engine-shaft, as by means of a belt 10. The disk is retained in close contact with the pulley by means of a spring 11.

The hub B and its roller 6 are moved radially of the disk 7 and lengthwise of the sleeve 4 by means of a bell-crank lever 12, one end of which is forked, as at 13, and adapted to engage the hub by which the latter is raised or lowered. The other end of this lever may be connected with a lever 14, situated in the cab or other place where the engine is controlled. Thus it is seen that by means of the lever 12 I have the speeding



of the governor under direct control and through the governor am able to vary the speed of the engine at will, for the movement of the roller 6 toward the periphery of the driver 7 will cause this roller to revolve more rapidly, carrying with it the sleeve 4. This increased speed will cause the balls to fly outwardly and depress the governor-stem, shutting off the steam, which will cause the engine to slow down. A movement of the roller 6 toward the center of the driver will cause a slower movement of the hub and sleeve, and consequent lifting of the valve-stem opening of the steam-passage and accordingly increasing the speed of the engine. It is this feature of inverse variation and the means of controlling at will the governor and engine through the crank-lever and hub that I wish particularly to emphasize.

20 Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a friction-roller upon the sleeve of a governor, a driver engaging this roller and operating the governor, said roller slidable lengthwise of the sleeve and radially of the driver, a spring by which this driver is kept automatically in contact with said roller, means by which this roller is moved at will upon the sleeve, and connections of the driver with the engine.

2. The combination in a variable-speed

governor of a driver connecting with the driving-shaft of the engine or like machine, a friction-roller engaging the face of the driver and movable radially thereon, said roller having a hub slidable lengthwise upon the sleeve, a spring by which the driver and roller are automatically retained in contact, a bell-crank lever engaging the hub by which the roller is moved to or from the center of the driver and whereby the engine is controlled at will and the speed of the governor is varied inversely as the speed of the engine.

3. In a variable-speed governor, the combination of a friction-roller slidable longitudinally upon the sleeve of the governor, said governor having a valve-stem movable in planes parallel with the sliding movements of the roller, and means whereby this roller is revolved by the movement of the roller upwardly on the sleeve causing an increased speed and a consequent downward movement of the valve-stem, and a movement of the roller downwardly on the sleeve causing a slackening of the speed, and an upward movement of the valve-stem.

In witness whereof I have hereunto set my hand.

CHARLES A. HUFFMASTER.

Witnesses:

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