

M. P. SINGER
 STATIONARY ENGINE DEVICE.
 APPLICATION FILED OCT. 17, 1914.

1,151,908.

Patented Aug. 31, 1915.

2 SHEETS—SHEET 1.

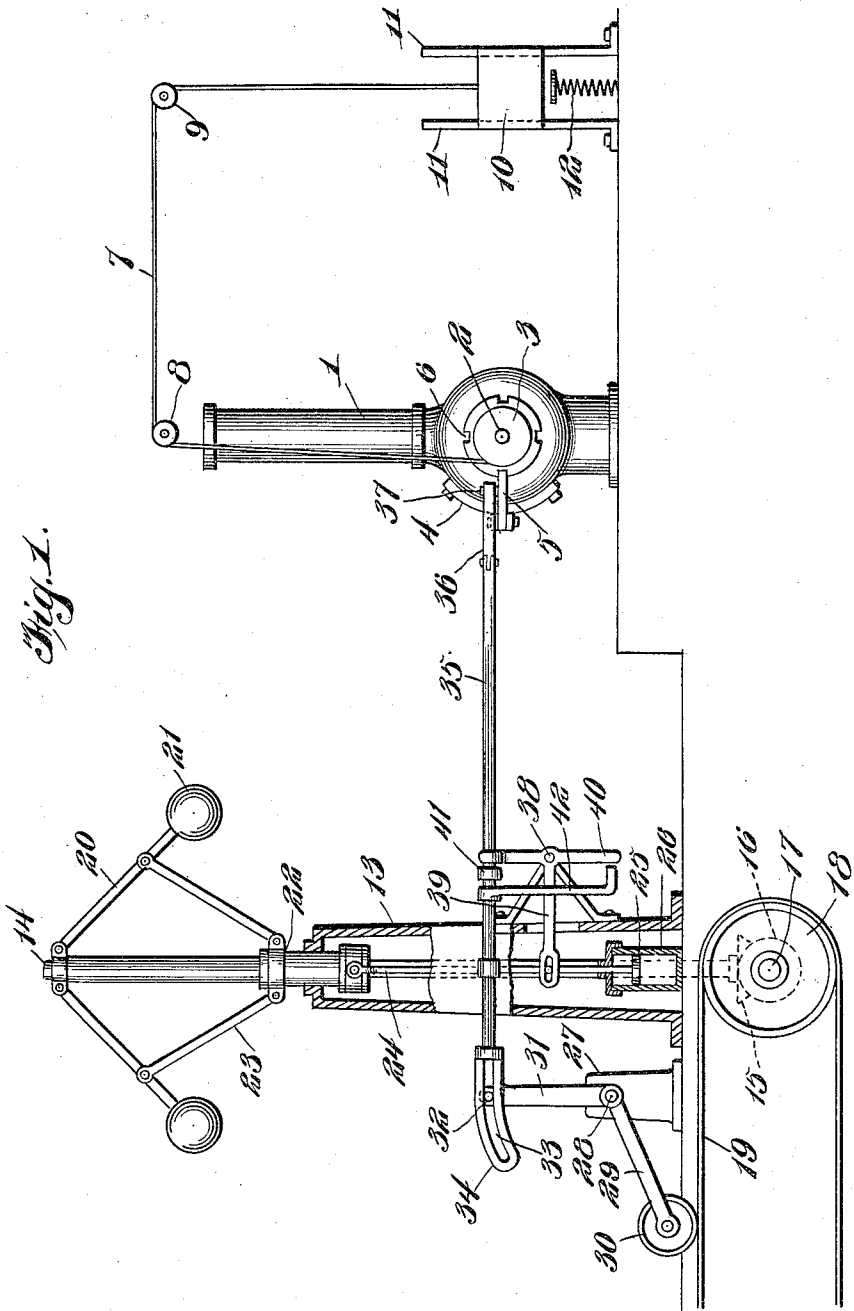


Fig. 1.

Witnesses

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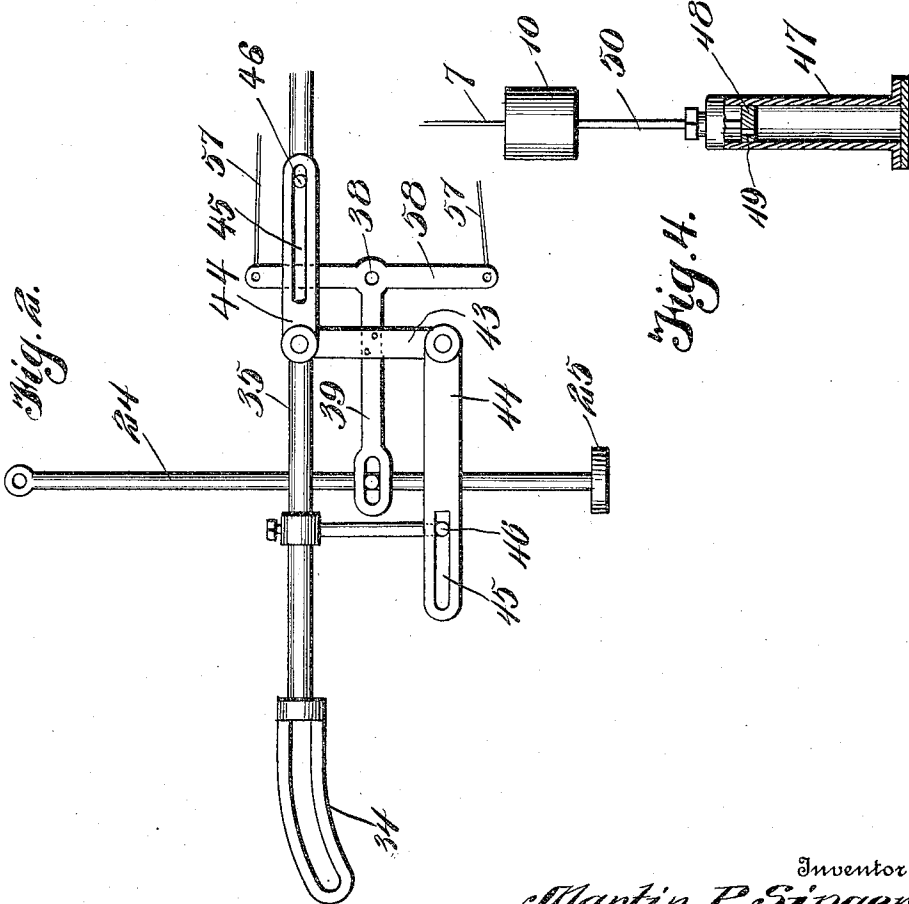
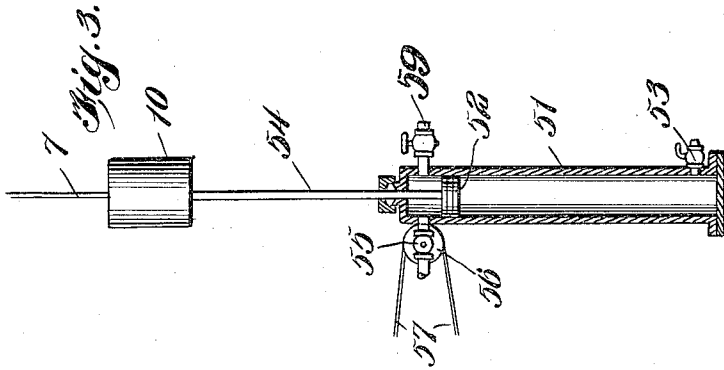
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UNITED STATES PATENT OFFICE.

MARTIN P. SINGER, OF ROCHESTER, NEW YORK.

STATIONARY-ENGINE DEVICE.

1,151,908.

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To all whom it may concern:

Be it known that I, MARTIN P. SINGER, a citizen of the United States of America, residing at Rochester, in the county of Monroe and State of New York, have invented new and useful Improvements in Stationary-Engine Devices, of which the following is a specification.

This invention relates to automatic stops for steam engines and it consists in the novel features hereinafter described and claimed.

An object of the invention is to provide in a device of the character indicated means for automatically cutting off the steam to the engine in the event that the belt which operates the governor breaks.

Another object of the invention is to provide in conjunction with a device as described means for automatically cutting off the steam to the engine in the event that the belt which operates the governor slips or in the event that the engine is subjected to an overload to such an extent as to reduce the operation of the governor.

With these objects in view the device includes a valved steam pipe adapted to be connected with the engine and having means for automatically bringing the valve to a closed position when the same is released. Means is provided for cushioning the terminal movement of the valve in order to prevent the same from being damaged by coming forcibly in contact with its seat at the end of its closing movement. Also means is provided for normally holding the valve in an open position and the last said means is engaged by a movable member which in turn is adapted to be operated in the event that the governor belt breaks or in the event that the belt slips or the engine is subjected to an overload whereby the said valve is released and is brought to a closed position.

In the accompanying drawings:—Figure 1 is a side elevation of one form of the automatic stop. Fig. 2 is a side elevation of a modified form of the governor operated mechanism of the same. Fig. 3 is a vertical sectional view of a modified form of cushioning means. Fig. 4 is a similar view of still another modified form of cushioning means.

The device is used in combination with a steam pipe 1 of any desired pattern which is connected with an engine in the usual man-

ner. A valve is located in the pipe 1 and is provided with a journaled stem 2 upon which is mounted a drum 3.

A bracket 4 is fixed to the bonnet of the valve in any appropriate manner and is provided with a spring pressed pawl 5 adapted to engage in any one of the notches 6 provided upon the drum 3. A cable 7 is arranged to wind at one end upon the drum 3 and the intermediate portion of the said cable is trained over pulleys 8 and 9 and the said cable carries at its other end a weight 10 which is slidably mounted between guides 11. A spring 12 is located in the path of movement of the weight 10 and is adapted to be encountered by the weight 10 when the weight descends whereby the terminal downward movement of the said weight is cushioned.

When the engine to which the steam is supplied through the pipe 1 is running the pawl 5 engages one of the notches 6 whereby the valve of which the stem 2 is a part is held in an open position and the cable 7 is partially wound upon the drum 3. At this time the weight 10 is held at an elevated position between the guides 11. However when it is desired to automatically stop the engine the pawl 5 is swung by means hereinafter to be described whereby it disengages the said notch 6 and the drum 3 rotates in response to the downward movement of the weight 10 and the valve of which the stem 2 is a part is moved to a closed position. As the said valve arrives at the end or terminal of its closing movement it is cushioned so that the valve is prevented from coming in forcible contact with its seat and resulting in injury or wedging of the parts. This is due to the fact that the spring 12 is provided in the path of movement of the weight 10 and checks the terminal downward movement of the weight.

A governor standard 13 is mounted on any suitable stationary support and a shaft 14 is journaled therein. The shaft 14 is provided at its lower end with a beveled gear wheel 15 which meshes with a beveled gear wheel 16 fixed to a shaft 17 journaled at a suitable point upon the frame of the engine. A belt pulley 18 is mounted upon the shaft 17 and a belt 19 is trained around the said pulley and also a pulley mounted upon the engine crank shaft (not shown).

Governor arms 20 are pivotally connected at their upper ends with the upper portion of the shaft 14 and carry at their lower outer ends balls 21 of usual pattern. A sleeve 22 is slidably mounted upon the standard 13 and is operatively connected with the arms 20 by means of links 23. The said sleeve is also connected with a rod 24 which at its lower end is provided with a valve 25 adapted to operate in a valve casing 26 mounted upon the pipe which supplies the steam to the engine. When the valve 25 is at its lowermost position in the valve casing 26 the supply of steam to the engine is cut off or substantially so but when the valve 25 is moved to an elevated position in the valve casing 26 the passage way for the steam through the pipe is enlarged whereby a full supply of steam may be permitted to pass through the engine cylinder. Therefore when the outer ends of the arms 20 swing in an upward direction the rod 24 is moved vertically in an upward direction and when the arms 20 swing in a downward direction the rod 24 is moved downwardly. A standard 27 is mounted upon a fixed support and a shaft 28 is journaled in the said standard. The shaft 28 carries an arm 29 in the lower end of which is journaled a roller 30. The roller 30 rests upon the upper run of the belt 19 and in the event that the belt 19 breaks the arm 29 swings in a downward direction whereby the shaft 28 is turned in the standard 27. An arm 31 is carried by the shaft 28 and is provided at its upper end with a pin 32 which is received in an elongated opening 33 provided in the curved link 34 mounted at the end of a bar 35. The said bar is slidably mounted and is provided at its end opposite that end at which the link 34 is mounted with a link 36 which receives a pin 37 mounted upon the spring pressed pawl 5. Consequently when the shaft 28 turns as hereinbefore described the arm 31 is turned whereby the pin 32 is brought in contact with the end of the link 34 and the bar 35 is moved longitudinally whereby the spring pressed pawl is withdrawn from one of the notches 6 of the valve and the valve stem is permitted to turn as hereinbefore described. Thus in the event that the belt 19 breaks means is provided for automatically cutting off the steam to the engine.

A shaft 38 is mounted for turning movement adjacent the rod 24 and is provided with an arm 39 which is operatively connected with the said rod 24. The shaft 38 is further provided with arms 40 which are disposed at the opposite sides of the said shaft 38 one above and one below the same. The uppermost arm 40 is adapted to encounter a stop 41 mounted on the bar 35 when the rod 24 moves suddenly in a downward direction as for instance when the belt

19 slips and thus the bar 35 is moved longitudinally whereby the spring pressed pawl 5 is disengaged from the notch 6 hereinbefore described. When however the rod 24 moves suddenly in an upward direction the lower arm 40 strikes an arm 42 which is connected at its upper end with the bar 35 and thus the bar 35 is moved longitudinally and the pawl 5 is disengaged from the notch; this takes place in the event that the engine is subjected to an overload or excessive steam pressure. Also in the event that the working load of the engine is suddenly removed from the same.

In the modified arrangement shown in Fig. 2 of the drawings the same operation of the parts as that hereinbefore described is accomplished, however an arm 43 is mounted on the arm 39 and links 44 are pivotally connected with the arm 43 and are provided with slots 45 which receive the end portions of pins 46 adjustably mounted upon the bar 35.

Other means than the spring 12 as hereinbefore described may be provided for cushioning the terminal movement of the weight 10. Another means is shown in Fig. 4 of the drawings wherein a cylinder 47 is mounted below the weight 10 and a piston 48 is slidably mounted in the said cylinder. The piston 48 is provided with a vent 49 which passes transversely through the same and the cylinder 47 is filled with oil. A rod 50 operatively connects the weight 10 with the piston 48 and fits closely in the upper portion of the cylinder 7. Consequently when the weight 10 descends the piston 48 is moved in a downward direction along the cylinder 47 and the oil in the lower part of the cylinder flows up through the vent 49 into the upper portion of the cylinder as the said piston descends. When the weight 10 is moved to its uppermost position the oil in the upper part of the cylinder 47 moves down through the vent 49 into the lower portion of the cylinder 47 and below the piston 48. Consequently it will be seen that the movement of the oil from the lower portion to the upper portion of the cylinder and vice-versa is comparatively slow and for this reason the weight 10 cannot move suddenly and the valve cannot be closed forcibly.

In the form of the cushioning device shown in Fig. 3 a cylinder 51 is suitably positioned and a weight 10 may be used in conjunction with this cylinder as desired. However in this form of the device the weight 10 might be dispensed with. A piston 52 is slidably mounted in the cylinder 51 and the said cylinder 51 is provided at its lower end with an air outlet vent 53. A rod 54 operatively connects the piston 52 with the weight 10. A water pipe 55 leads into the upper portion of the cylinder 51 above the

piston 52 and is provided with a valve 56 which is operatively connected by means of cables 57 with an arm 58 mounted upon the shaft 38. A valved water outlet pipe 59 is also connected with the upper portion of the cylinder 51. In this form of the device when the shaft 38 is turned as hereinbefore described one of the cables 57 becomes taut while the other becomes slack. The cable which is tightened turns the valve 56 so that water is permitted to flow through the pipe 55 into the upper portion of the cylinder 51 and the pressure of this water against the piston 52 causes the said piston to descend. At the same time the air in the lower portion of the cylinder 51 escapes therefrom through the outlet vent 53. In view of the fact that this vent is small it causes the piston 52 to move comparatively slow and consequently the movement of the cable 7 and the valve to which it is connected is cushioned. When it is desired to elevate the piston 52 in the cylinder 51 the valve 56 is closed and the valve in the pipe 59 is opened and the rod 54 is moved in an upward direction as the cable 7 is wound upon the drum 3. During the upward movement of the piston 52 in the cylinder 51 the water in the upper portion of the cylinder 51 is forced out of the same through the pipe 59 and the parts are brought to their normal operating positions.

The forms of the device as shown in Figs. 2 and 3 of the drawing are adapted to be used in conjunction with each other. When the rod 24 is moved longitudinally the arm 39 is swung whereby the arms 58 are turned upon the shaft 38 consequently the cables 57 are moved longitudinally as hereinbefore described and the valve 56 is operated.

Therefore it will be seen that an engine controlling device of simple and durable structural arrangement is provided and that the parts mutually cooperate with each other to promptly bring the engine to a stop in the event that the belt which operates the governor breaks or slips or in the event that the engine is subjected to sudden load to cause a slipping of the belt or is relieved of

load to such an extent and suddenly as to cause the engine to race.

Having described the invention what is claimed is:—

1. In combination with an engine having a governor and a throttle valve, means for holding the valve in open position, means for closing the valve when the said holding means is released, a bar movably mounted and operatively connected with said holding means, a rod connected with the governor and adapted to be moved by the same, an arm mounted for turning movement, other arms fixed to the first mentioned arm and adapted to move the rod as the first mentioned arm is turned, and means normally supported by the governor belt and adapted to move the bar longitudinally in the event that the support of the belt is removed.

2. In combination with an engine having a governor and a throttle valve, means for holding the throttle valve in an open position, means for closing the throttle valve when the holding means is released, a bar movably mounted and engaging the said holding means, a slotted link carried at the end of the bar, a shaft journaled in a standard upon the engine and having an arm provided with a pin which enters the slot of the link, another arm mounted upon the shaft and having a roller adapted to rest upon the run of the governor belt, a rod operatively connected with the governor for longitudinal movement, a shaft journaled adjacent said rod and having an arm operatively connected with the same, other arms connected with the last mentioned arm and adapted when the last mentioned arm is turned to move the bar whereby the said bar is moved longitudinally when the governor is brought to the extremes of its movement and the said bar is caused to release the holding device for the valve.

In testimony whereof I affix my signature in presence of two witnesses.

MARTIN P. SINGER.

Witnesses:

GEORGE PETER,
F. E. COIT.