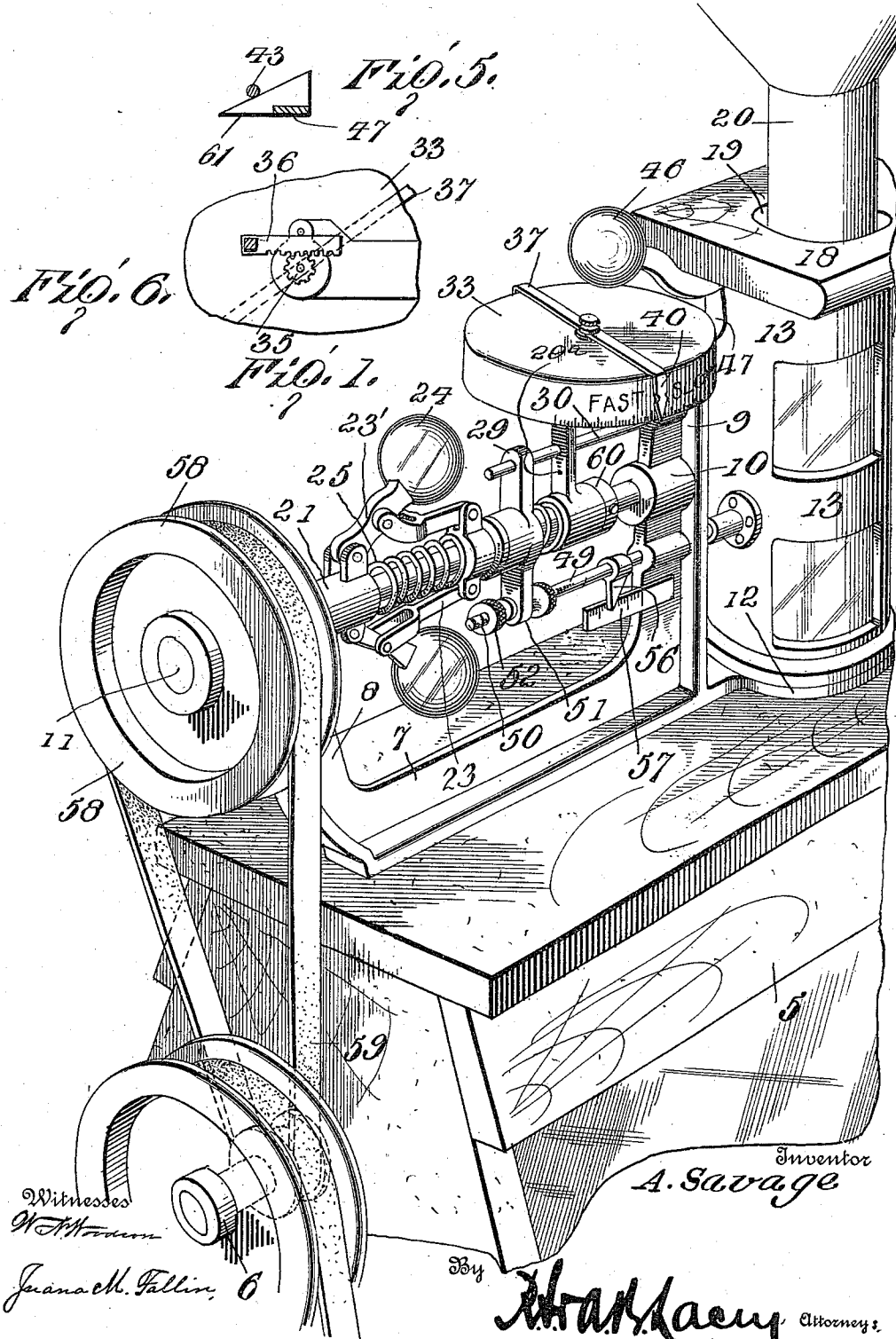


984,780.

Patented Feb. 21, 1911.

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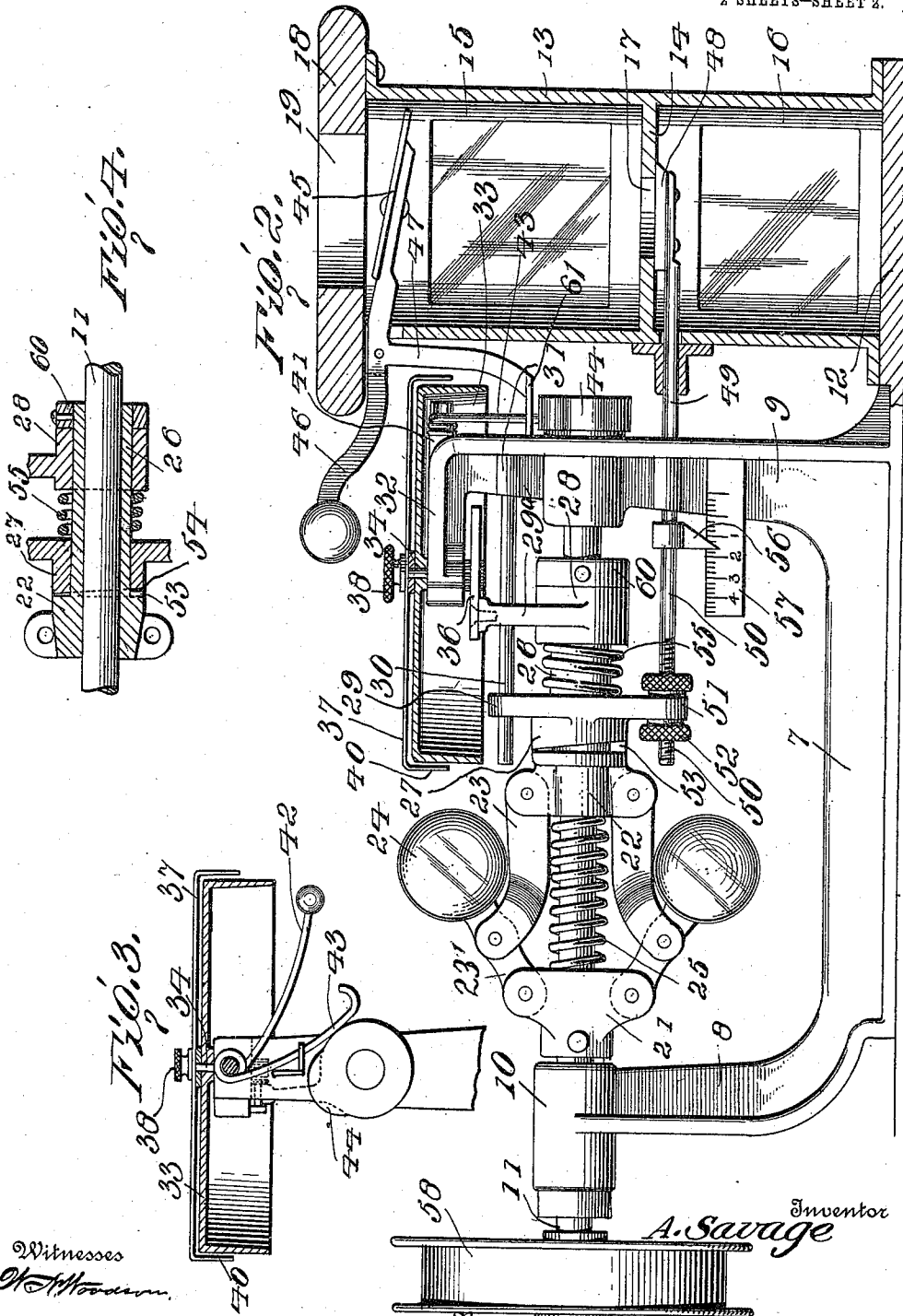
A. SAVAGE.
ALARM FEED REGULATOR AND SPEED INDICATOR.

APPLICATION FILED FEB. 17, 1910.

Patented Feb. 21, 1911.

2 SHEETS-SHEET 2.

984,780.



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ALARM FEED-REGULATOR AND SPEED-INDICATOR.

984,780.

Specification of Letters Patent.

Patented Feb. 21, 1911.

Application filed February 17, 1910. Serial No. 544,372.

To all whom it may concern:

Be it known that I, ARTHUR SAVAGE, a citizen of the United States, residing at Knoxville, in the county of Knox and State of Tennessee, have invented certain new and useful Improvements in Alarm Feed-Regulators and Speed-Indicators, of which the following is a specification.

This invention relates to feed regulators and more particularly to a combined feed regulator and alarm especially designed for attachment to flour mills and similar machinery for controlling the flow of grain to the mill.

The object of the invention is to provide a regulator including means for indicating the speed of the mill, means for controlling the flow of grain to said mill, and means for sounding an alarm when the flow of grain is cut off or otherwise interrupted.

A further object is to provide a gate valve mounted for reciprocation beneath the discharge opening in the grain receiving chamber and so constructed as to insure a uniform flow of grain through said opening to the mill.

A further object is to provide means for adjusting the gate operating rod longitudinally of the spindle so as to vary the size of the discharge opening.

A still further object of the invention is generally to improve this class of devices so as to increase their utility, durability and efficiency.

Further objects and advantages will appear in the following description, it being understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claims.

For a full understanding of the invention and the merits thereof and also to acquire a knowledge of the details of construction and the means for effecting the result, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a perspective view of a combined feed regulator and alarm constructed in accordance with my invention; Fig. 2 is a vertical sectional view partly in elevation of Fig. 1; Fig. 3 is a transverse sectional view of the gong and its associated parts;

Fig. 4 is a longitudinal sectional view of the spindle showing the collars in position thereon; Fig. 5 is a detail transverse sectional view of the lower end of the valve arm; Fig. 6 is a detail transverse sectional view showing the connection between the rack and pinion.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The feed regulator forming the subject matter of the present invention is principally designed for attachment to flour roller mills and by way of illustration is shown in connection with such a mill in which 5 designates the casing or housing, and 6 the driving spindle.

The device comprises a supporting frame 7 adapted to rest on the upper portion of the casing 5 and provided with spaced vertically disposed arms 8 and 9 having terminal bearings 10 for the reception of a spindle 11. The base of the supporting frame 7 is provided with a longitudinal extension 12 upon which is supported a hopper 13. The hopper 13 is provided with an intermediate transverse partition 14 defining upper and lower grain receiving chambers 15 and 16, there being an opening 17 formed in the partition and through which grain is delivered from the upper to the lower chamber. A cap 18 is fastened in any suitable manner to the top of the hopper and is provided with an opening 19 for the reception of a feed pipe 20.

Mounted for rotation with the spindle 11 is a centrifugal governor including spaced collars 21 and 22 connected by two pairs of laterally swinging arms 23 and 23'. To the outer ends of the arms 23' are secured terminal weights 24, there being a coil spring 25 interposed between the collars 21 and 22, as shown. The collar 22 is provided with a longitudinally disposed sleeve 26 on which are slidably mounted longitudinally movable collars 27 and 28. The collars 27 and 28 are provided with vertical extensions or ears 29 and 29^a, respectively having perforations formed therein for the reception of a guide rod 30, said guide rod passing through the perforations in both ears and having one

end thereof fastened in a bearing 31 on the arm 9.

The upper end of the arm 9 is bent inwardly to form an overhanging portion 32 which forms a support for a bell or gong 33. The spindle 34 of the gong 33 is journaled in a bearing in the end of the arm 32 and is provided with a terminal pinion 35 which meshes with a rack 36 fastened to the end of the ear 29^a on the collar 28. A needle or indicator 37 is fastened to the spindle 34 and is retained in engagement therewith by a clamping nut 38, the opposite ends of said needle being bent downwardly to form pointers 40, which latter travel over suitable graduations formed on the periphery of the gong 33 and thus serve to indicate the speed of the mill. The upper end of the arm 9 is provided with a stud or projection 41 which forms a support for the intermediate portion of a hammer 42, said hammer being provided with a depending arm 43 adapted to bear against an eccentric 44 on the adjacent end of the spindle 11, for actuating said hammer to sound an alarm.

Pivotaly mounted within the upper chamber 15 of the hopper is a gate or valve 45 having a weighted terminal 46 and provided with a depending arm 47 adapted to bear against the arm 43 of the hammer. The gate or valve 45 is disposed in the path of movement of the grain entering the chamber 15 so as to be moved to open position by the weight of the grain entering said chamber. Should the flow of grain to the chamber 15 be cut off or otherwise interrupted however, the weight 46 will automatically move the gate or valve 45 to closed position and in doing so, cause the arm 47 to engage and move the arm 43 into the path of the eccentric 44, thus to cause the latter to oscillate the hammer 42 and sound an alarm. The flow of grain through the discharge opening 17 is regulated by an oscillating valve or gate 48, to which is connected a rod or stem 49, the latter having its outer end threaded at 50 and extended through a perforation in a lug 51 depending from the collar 27. Suitable clamping nuts 52 engage the threaded end of the rod on opposite sides of the lug 51 for the purpose of adjusting the valve 48 longitudinally to either open or partially open position, thereby to vary the size of the discharge opening 17 and consequently regulate the volume of grain passing there-through. Extending laterally from the collar 23 is a lug 53 which bears against an inclined face 54 on the collar 27 and thus serves to oscillate the rod 49 and valve 48 so as to insure a free flow of grain through the opening 17 in the lower chamber 16 and thence to the mill, when the valve is in either open or partially open position. A coiled spring 55 is interposed between the collars 27 and 28 for the purpose of normally and

yieldably supporting the cam face 54 of the collar 27 in engagement with the lug 53. It will here be noted that the collar 27 serves to connect the governor and valve rod 50, and by engagement with the lug 53 also serves to oscillate the valve 48 when the latter is in either open or partially open position, thereby agitating the material and insuring a free flow of grain from the hopper to the receiving chamber.

A pointer 56 depends from the rod 49 and is movable over the surface of a graduated scale 57 carried by the arm 9, the scale 57 being graduated to indicate the number of bushels fed per hour to the mill. The words "Fast" and "Slow" are preferably printed, stamped or otherwise represented on the rim of the gong on opposite sides thereof so that the operator may determine the speed of the machine from either side thereof.

Secured to the end of the spindle is a belt pulley 58, the latter being connected through the medium of a driving belt 59 with the spindle 6 of the roller mill, thereby to transmit motion from one to the other.

A collar 60 is rigidly secured to the sleeve 26 so that when the governor arms are thrown outwardly by centrifugal force, the collar 60 will bear against the collar 28 and thus move said collar together with the collar 27 longitudinally of the spindle and in the direction of the governor arms. Thus it will be seen that when the spindle 11 is rotated, the weights 24 will be thrown outwardly by centrifugal force, thereby exerting a longitudinal pull on the collar 22 and through the medium of the collar 60 cause the collars 27 and 28 to move in the direction of the governor, the collars 27 and 28 being held from rotation by means of the guide rod 30.

As the collar 28 moves in the direction of the governor, the rack 36 will engage the pinion 35 and rotate the pointer 37 to indicate on the periphery of the gong the speed of the mill. The weight of the grain on the gate or valve 45 will tilt the latter on its pivotal axis so as to permit the passage of the grain into the chamber 15, while the angular terminal 61 of the arm 47 will disengage the hammer arm 43 from the cam or eccentric 44, as before stated. As the collar 22 rotates with the spindle, the lug 53 will engage the cam face 54 of the collar 27 and thus oscillate the valve 48 so as to insure a free flow of grain through the opening 17 to the lower chamber 16. Should the flow of grain to the chamber 15 be cut off or interrupted, the downward movement of the weight 46 will cause the arm 47 to move the arm 43 into the path of the eccentric 44, thus to sound an alarm and indicate to the miller or attendant that the grain has ceased to flow.

Attention is here called to the fact that

the coil spring 25 serves to normally and yieldably hold the valve 48 in closed position, the opening movement of the valve 46 being regulated by rotating the clamping nuts 52, as before stated.

Having thus described the invention, what is claimed as new is:

1. The combination with a hopper, of a valve for controlling the flow of grain from the hopper, a spindle, a governor mounted on the spindle, spaced collars carried by the spindle, one of which is provided with a perforated ear and a cam face, a rod forming a connection between the valve and perforated ear, a lug carried by the governor and adapted to engage the cam face of the collar for oscillating the valve, and means for rotating the spindle.

2. The combination with a hopper, of a valve for controlling the flow of grain from the hopper, a spindle, a governor mounted on the spindle and provided with a sleeve, spaced collars mounted on said sleeve, one of which is provided with a depending perforated ear and a cam face, a stop collar secured to the sleeve and bearing against the mating collar, a spring interposed between said collars, a rod forming a connection between the valve and perforated ear, and a lug carried by the governor and adapted to bear against the cam face of the adjacent collar for oscillating the valve.

3. The combination with a hopper, of a valve for controlling the flow of grain from the hopper, a spindle, a governor mounted on the spindle and provided with a sleeve having a terminal stop, spaced collars carried by said sleeve, one of which is provided with an inclined face and a depending ear, a rod having one end thereof threaded and connected with the valve and its other end extending through the ear, clamping nuts engaging the threaded end of the rod for adjusting said rod longitudinally, a lug carried by the governor and adapted to engage the inclined face of the adjacent collar for oscillating the valve, and means for rotating the spindle.

4. The combination with a spindle, of a hopper, a valve for controlling the flow of material from the hopper, a governor carried by the spindle, and means operatively connected with the valve for moving said valve to either open or partially open position and simultaneously oscillating the valve when the governor is rotated.

5. The combination with a spindle of a hopper, a valve for controlling the flow of material from the hopper, a governor mounted on the spindle, and means yieldably supported in engagement with the governor and operatively connected with the valve for moving the valve to either open or partially open position and simultaneously oscillating the valve when the governor is rotated.

6. The combination with a spindle, of a hopper, a valve operating within the hopper for controlling the flow of material from said hopper, a governor mounted on the spindle, and spaced collars carried by the spindle, one of which is operatively connected with the valve and governor for moving said valve to either open or partially open position and simultaneously oscillating the valve when the governor is rotated.

7. The combination with a spindle, of a hopper, a valve for controlling the flow of material from the hopper, a governor mounted on the spindle and provided with a sleeve having a terminal stop, spaced collars carried by the sleeve and provided with perforated extensions, a guide rod extending through the perforations in said extensions, a coil spring interposed between the collars, one of said collars being operatively connected with the valve for moving the latter to open position, and a lug carried by the governor and adapted to engage the last mentioned collar for oscillating the valve when in either open or partially open position.

8. The combination with a supporting frame, of a hopper, a sliding valve for controlling the flow of grain from the hopper, a pivoted valve disposed at the top of the hopper, a graduated gong mounted on the frame, a pivoted hammer, and an arm depending from the pivoted valve and adapted to engage the hammer for sounding an alarm when the pivoted valve is moved to closed position.

9. The combination with a supporting frame having bearings, of a spindle journaled in said bearings, a hopper, a sliding valve for controlling the flow of grain from the hopper, a governor mounted on the spindle and operatively connected with the sliding valve for moving the latter to open position when the spindle is rotated at a predetermined speed, an eccentric secured to one end of the spindle, a pivoted valve disposed above the sliding valve, a gong supported on the frame, a hammer having a depending arm adapted to engage the eccentric, and an arm depending from the pivoted valve for moving the hammer arm out of engagement with the eccentric when the valve is in open position and into engagement with said eccentric when the valve is moved to closed position.

10. The combination with a spindle, of a hopper, a valve for controlling the flow of material from the hopper, a governor mounted on the spindle and including spaced collars having weighted arms pivotally connected therewith, a sleeve secured to one of the collars of the governor a spring interposed between said collars, other collars mounted on the sleeve and yieldably supported in spaced relation to each other, one

of the last mentioned collars being provided with a depending perforated ear, a rod connected with the valve and having a threaded terminal extending through the depending ear, clamping nuts engaging the threads on the rod and bearing against the adjacent face of said ear, a graduated scale and pointer carried by the rod and movable over

the graduations of said scale, and means for rotating the spindle.

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

ARTHUR SAVAGE. [L. s.]

Witnesses:

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