

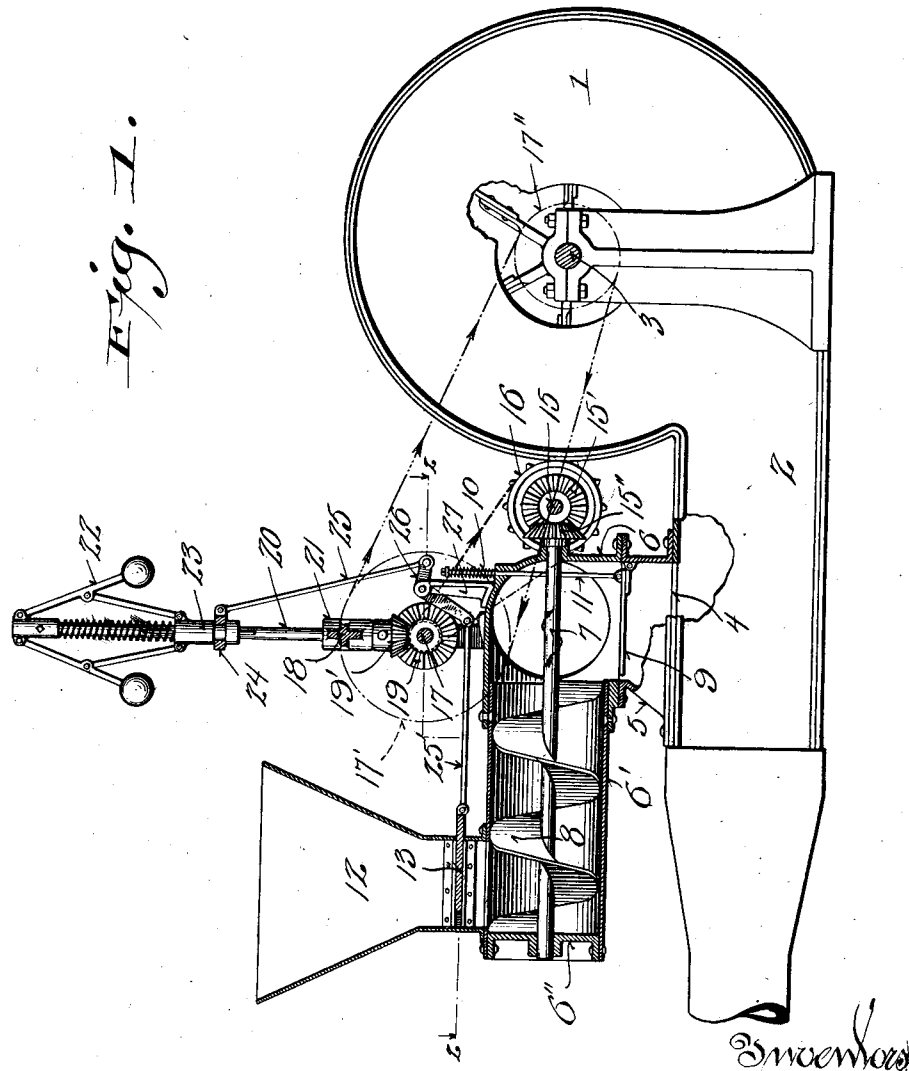
G. & J. BERNERT.
PNEUMATIC ELEVATOR.
APPLICATION FILED DEC. 1, 1911.

1,033,865.

Patented July 30, 1912.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

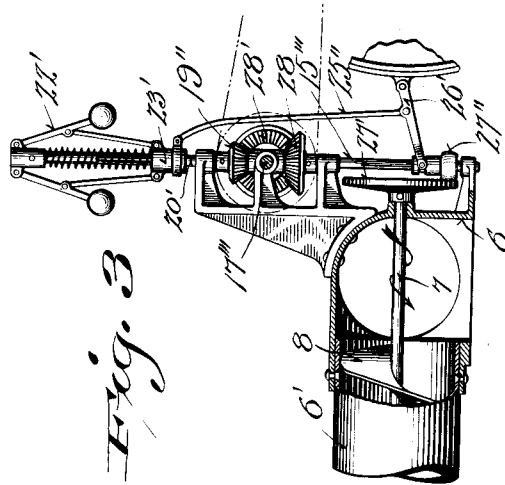


Fig. 3

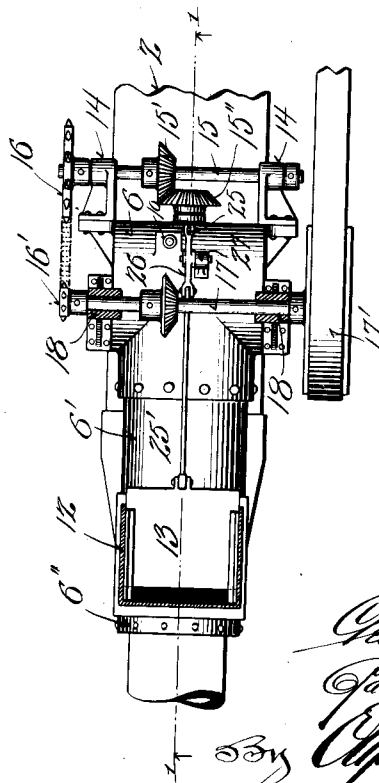


Fig. 2.

Witnessed:
Cammie King.
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In witness whereof
 George Bernard
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 Attorneys

UNITED STATES PATENT OFFICE.

GEORGE BERNERT AND JACOB BERNERT, OF SOUTH GERMANTOWN, WISCONSIN.

PNEUMATIC ELEVATOR.

1,033,865.

Specification of Letters Patent.

Patented July 30, 1912.

Application filed December 1, 1911. Serial No. 663,421.

To all whom it may concern:

Be it known that we, GEORGE BERNERT and JACOB BERNERT, both citizens of the United States, and residents of South GERMANTOWN, in the county of Washington and State of Wisconsin, have invented certain new and useful Improvements in Pneumatic Elevators; and we do hereby declare that the following is a full, clear, and exact description thereof.

Our invention refers to pneumatic elevators such, for instance, as disclosed in the patent issued to us September 5, 1911, No. 1,002,556, for improvements in pneumatic elevators, the object being to provide governor-controlled means for regulating the feed of material to such elevators.

Specific objects of our invention are to provide means in connection with a governor whereby the flow of grain or other product from a hopper to a trunk of a pneumatic elevator is controlled relative to the feed of the fan which supplies the pneumatic power, the governor being arranged to receive its drive either directly from the fan or from the same source of power as that from which said fan is driven; and to provide a valve in link connection with a driven governor whereby the position of the valve is changed relative to the speed of said governor.

With the above and other objects in view the invention consists in certain peculiarities of construction and combination of parts as hereinafter set forth with reference to the accompanying drawings and subsequently claimed.

In the drawings Figure 1 represents a side elevation of a portion of a pneumatic elevator embodying the features of our invention, the feed mechanism of the elevator being partly in section as indicated by line 1—1 of Fig. 2; Fig. 2, a detail sectional plan view of the feed mechanism, the section being indicated by line 2—2 of Fig. 1, and Fig. 3, a detail fragmentary elevation partly in section of another form of feed-control.

Referring by characters to the drawings 1 represents a fan casing provided with an air discharge trunk 2 and a fan-carrying shaft 3, which shaft is mounted as shown in suitable bearing posts. The discharge trunk 2 has a grain-receiving aperture 4 therein, about which is fitted and secured a valve-box 5. Secured to the mouth of the valve-box is a longitudinally disposed tubular

trough which trough for convenience in construction is formed with a head 6 that is directly fitted to the valve-box having a tubular drum extension 6' riveted thereto, the whole constituting the tubular trough. The feed end of the drum is provided with a head 6'' into which is journaled one end of a shaft 7, the opposite end of said shaft being journaled in a bearing that is formed in the head 6. The shaft carries a worm 8, the last flight of which terminates approximately in alinement with the opening in the valve-box whereby grain which is forced through the drum 6 is delivered through the valve-box to the air trunk, which, as stated, is suitably apertured at this point. The head 6, as shown, terminates with a curved end whereby grain is rendered less liable to choke, said curved head serving as a guide to deflect the same within the valve-box preparatory to its being delivered to the trunk.

A flap-valve 9 is pivoted within the valve-box, being held in its closed or normal position by a coiled spring 10, which spring surrounds a stem 11 that is connected to the valve and projects through an aperture in the head 6, the valve being interposed between a shoulder of the head and collar that is carried by said stem 11. By this construction it is apparent that the valve 9 serves as a closure for the trunk aperture 4 and will open automatically to admit grain incidental to pressure exerted thereon from above.

The outer end of the drum 6' is apertured and has fitted thereto a feed hopper 12, the discharge throat of which carries a slide-valve 13, whereby the feed of grain or other product to the trough is controlled.

Mounted in bearings 14 that extend from the head 6 of the feed trough is a shaft 15, which shaft carries a beveled gear 15' that meshes with a similar beveled gear 15'' that is secured to the worm-shaft 7, whereby the latter receives its motion. The shaft 15 has secured to one end a sprocket-wheel 16 that is in link-belt connection with a smaller sprocket-wheel 16', which latter sprocket-wheel is carried by a counter-shaft 17, the same being journaled in bearings of a bracket 18 that is suitably secured to the feed trough head 6. The counter-shaft 17 also carries a pulley 17' that is in belt connection with a pulley 17'' which is secured to the fan-shaft 3. The counter-shaft 17

also carries a beveled gear-wheel 19 that meshes with a beveled pinion 19' which beveled pinion is secured to the lower end of a vertically disposed governor spindle 20, the same being supported in a suitable journal-box 21 that forms part of the bracket 18. The upper end of the governor spindle carries a centrifugal governor 22, the links of which are connected to a sleeve 23, which sleeve is in spline engagement with the spindle. The sleeve is annularly grooved for the reception of a collar 24 that is connected by a rod 25 to the short arm of a bell-crank lever 26. The lever 26 is mounted upon a standard 27 that extends upwardly from the head 6 and the long arm of said bell-crank lever is connected by a rod 25' to the slide-valve 13.

From the foregoing description it will be seen that the governor mechanism is driven from the fan-shaft 3 and hence its speed is controlled relative to the speed of the fan. Should the fan be operating at a slow speed the blast therefrom will necessarily be of less conveying power and hence in order to compensate a small amount of grain or other product would be delivered under such conditions to the trunk. The restriction of the feed, as shown in Fig. 2, will be regulated in this instance by the slide valve 13 which is open to such a slight degree that passage from the hopper to the feed trough is restricted. The small amount of grain passing therethrough would thus be delivered by the worm 8 to the air discharge trunk. Should the speed of the fan be increased it will be apparent that the centrifugal force of the governor will cause the same to lift the sleeve 23 and through its bell-crank connection with the slide valve 13, the latter would be drawn open gradually as the speed of the fan and governor increased until the maximum area of the feed hopper discharge mouth has been exposed, whereby the full capacity of the apparatus would be taxed. It is apparent that should the power fluctuate that the governor will automatically control the feed opening in proportion to such fluctuations, the feed of the worm being constant in proportion to the number of rotations of the counter-shaft due to its gear connection therewith.

Fig. 3 illustrates another form of controlling the feed to the main air-trunk of the fan, in which form the worm shaft 7 carries a friction disk 27' that is driven by a shiftable friction-roller 27'', which friction roller is splined upon a vertically disposed shaft 15''', the same being journaled in suitable bearings that project from the head 6. The shaft 15''' receives its drive through miter gears 28, 28', the latter being mounted upon a counter-shaft 17''', which counter-shaft corresponds to the counter-shaft 17 described in connection with the

first form of our invention illustrated in Figs. 1 and 2, the said shaft being supported in suitable journals and receives its drive through a pulley and belt connection with the fan shaft. A governor spindle 20' is also journaled in a bearing bracket that extends from the head 6, which governor spindle is driven by a beveled pinion 19'' that meshes with the beveled wheel 28'. A similar governor 22' to that illustrated in Fig. 1 is mounted upon the spindle 20' and has a sleeve 23' which is connected by a rod 25'' to a lever 26', a spanner end of which lever is mounted in a groove formed in the hub of the friction drive pulleys 27', said lever being shown as fulcrumed to an ear that extends from the fan casing.

The above described modified form illustrates a means in connection with the governor for controlling the speed of the feed worm 8, it being apparent that when the speed of the governor is accelerated that through its connections it will move the friction driving roller 27' toward the center of disk 27 and thus increase the speed of the worm whereby feed of the material to the drum will be correspondingly increased in volume. Should the speed of the fan decrease the worm 8 will slow down and thereby feed material in decreased quantities. In this instance it is apparent that the slide valve may be dispensed with, in which case as stated the governor will act directly upon the worm to control the feed to the pneumatic elevator.

While we have described certain specific structural features in carrying out our invention it is apparent that said features may be varied in accordance with their mechanical equivalents without departing from the spirit of our invention.

While we have shown and described the invention as being adapted to be used in connection with grain delivery from a grain delivery chute of any source it should be understood that said machine is particularly adapted to be attached to or used in connection with threshing-machines in which case the grain from the threshing-machine will be discharged into hopper 12 and transferred from said thresher to a suitable source of storage direct from the machine and thus handling of the grain is eliminated.

We claim:

1. A pneumatic elevator comprising a fan casing having a fan-carrying shaft mounted therein, an apertured discharge trunk extending from the fan casing, a valve-box fitted about the trunk aperture, a yieldable valve mounted in the box, a horizontally disposed feed trough in communication with said box, the feed-trough being provided with a feed aperture at one end, a driven worm mounted in the feed-trough, a valve mounted in the feed aperture of the afore-

said trough, a counter-shaft, a gear connection between the counter-shaft and fan-carrying shaft, means for imparting drive to the trough worm from the counter-shaft, a
5 governor in gear connection with the counter-shaft, and a link connection between the governor and feed-trough valve.

2. A pneumatic elevator comprising a fan casing having a fan-carrying shaft mounted
10 therein, an apertured discharge trunk extending from the fan casing, a horizontally disposed feed trough in communication with said box, the feed-trough being provided with a feed aperture at one end, a driven
15 worm mounted in the feed-trough, a valve mounted in the feed aperture of the afore-said trough, a counter-shaft, a gear connec-

tion between the counter-shaft and fan-carrying shaft, means for imparting drive to the trough worm from the counter-shaft, a
20 governor in gear connection with the counter-shaft, and a link connection between the governor and feed-trough valve.

In testimony that we claim the foregoing we have hereunto set our hands at Menom-
25 onee Falls in the county of Waukesha and State of Wisconsin in the presence of two witnesses.

GEORGE BERNERT.
JACOB BERNERT.

Witnesses:

JNO. A. PRATT,
J. W. CANNON.