No. 654,252. Patented July 24, 1900.

A. HUMBERGER.

FORCE BLAST ELEVATOR.

(Application filed Jan. 30, 1899.)

(No Model.)

Fig 1

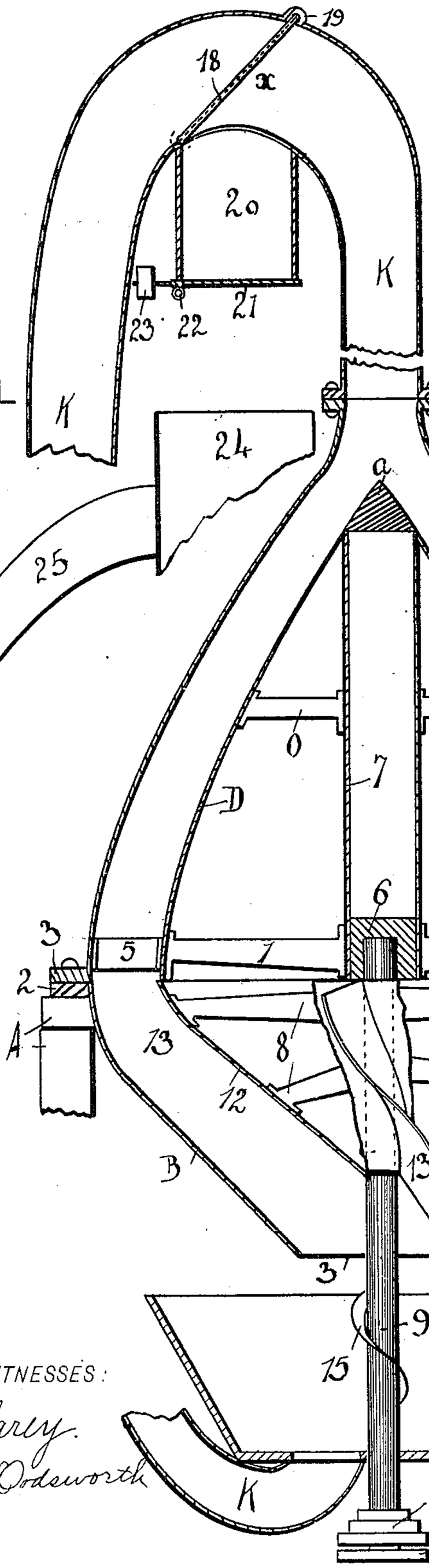
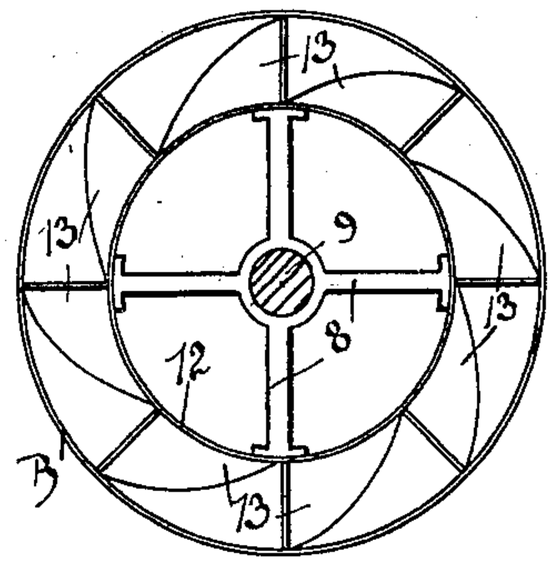


Fig 2



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ALONZO HUMBERGER, OF NORTH PLATTE, NEBRASKA.

FORCE-BLAST ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 654,252, dated July 24, 1900.

Application filed January 30, 1899. Serial No. 703,853. (No model.)

To all whom it may concern:

Be it known that I, ALONZO HUMBERGER, residing at North Platte, in the county of Lincoln and State of Nebraska, have invented certain useful Improvements in Force-Blast Elevators; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention has relation to a new and novel improvement in force-blast elevators.

The object of my invention is to provide an elevator in which the propelling force is a confined air-blast which is given suitable direction and which is brought directly in contact with the material to be displaced and propelled.

In the accompanying drawings I have shown in Figure 1 a broken sectional view of a blast-elevator embodying my invention, while Fig. 2 shows a top view of the fan adapted to create the force-blast as employed in my invention.

My invention embodies, essentially, a suitable supporting-standard A, adapted to support and hold a bottomless dished casing B, provided with a lower, preferably central, opening 3 and the upper outwardly-extending flange 2, by means of which flange said lower casing B is secured to a suitable support or standard. Secured to this lower casing B is an approximately-cone-shaped inverted drum C, which is provided with the extending flange 3, corresponding to and coinciding with the flange 2, so that these two casings B and C may be removably connected, preferably by means of suitable bolts. At the upper end this upper casing is further provided with an outwardly-flared flange 4, by means of which said upper casing C is secured to a suitable duct or pipe K, made to extend any suitable distance from this upper casing C.

Centrally positioned within the upper casing C is an approximately-cone-shaped drum D, which drum above is provided with the solid cone *a*, and which drum further follows in outline the conformation of the upper casing C, with the exception that the drum D more nearly approaches the casing C as it rises, so that an air-space is formed between this upper casing C and the drum D, which air-space decreases in capacity as it nears the exit-point of this upper casing C, as will be readily understood in referring to Fig. 1 in the accompanying drawings. This drum may be solid or be composed of sheet metal, held in proper shape by means of the spiders 0 and 1. To securely hold this drum D within the upper casing C, I prefer to use a plurality of preferably flat stay-pieces 5, which are disposed between and connect this drum D to the casing C.

For the sake of convenience I have provided the drum D with an inner tube 7, from which the spiders 0 and 1 radiate, and this tube farther below is made to accommodate a bearing 6, securely held and supported by the lower spider 1. For the sake of convenience the lower spider 1 may be provided with the central hub, provided with a suitable bearing.

Extending from a suitable bearing 10 upward through the opening 3, within the lower casing B, is a main operating-shaft 9, which shaft above snugly fits into and works within the hub 6, so that said shaft 9 is revolubly supported within said bearing 6 and said hub, as is shown in Fig. 1. At a suitable point this shaft 9 is provided with the speed or other pulley 16, adapted to receive a suitable power to rotate this shaft. Secured to the upper end of this shaft 9 is a spider 8, which spider supports an approximately-cone-shaped jacket 12, preferably of sheet metal, which jacket begins at a point below and adjacent to the drum D, so that said jacket 12 in effect forms a continuation of this inner drum, the spiders 8 of which are fixed to the drive-shaft 9. Secured to the outer face of this jacket 12 are a plurality of blades 13 13, which blades begin near the upper edge of said jacket 12 and then spirally wind downward upon this jacket. At their lower ends these blades terminate in a line approximately at right angles to the face of the jacket 12, and they are made wider at the bottom than at the top, as the jacket 12 approximately conforms to the outer shape of the lower casing B, so that the wall-space between said lower casing and jacket contracts as it rises, as is shown in the drawings. From this it will be seen that my invention embodies, essentially, a housing

provided with an inner stationary shell adapted to form a wall-space of decreasing capacity, while the lower portion of said housing is occupied by a revolubly-supported jacket, to which are secured suitable fan-blades 13.

Surrounding the shaft 9 and immediately below the intake-opening of the lower casing B is a hopper 14 of suitable capacity, into which empties a suitable chute *z*, through which the material to be elevated or propelled is fed. Secured to the shaft 9 at a point within the hopper 14 is a simple stub spiral 15, which is adapted to agitate and elevate the material within the hopper 14.

Extending from the exit-opening of the upper casing C and forming a continuation thereof is a suitable pipe or duct K, which pipe or duct is continued in the direction in which the material is to be fed, and at the discharge-point this duct is widened or increased in capacity, as is shown in Fig. 1, and is provided with an interrupter, preferably in the form of a shield or screen 18, which shield or screen, however, is not made air-tight, but is of a mesh fine enough to arrest the progress of the material passing through this upper duct. This arrester or screen is preferably removably held within the pipe K, which pipe for that purpose may be provided with a suitable outwardly-flanged seating 19, within which this interrupter, which may be of any suitable size, shape, or material, is held.

At a point within the duct K and below the interrupter 18, which interrupter is preferably set at an angle declining toward the direction from which the material is to be fed, is a suitable receptacle 20, which receptacle is provided with a counterbalanced drop-door 21, as is shown. Extending from the interrupter 18 the pipe K continues downward until it is led into the lower hopper 14.

Positioned below the receptacle 20 is a suitable bin 24, from which extends a suitable spout 25, which is preferably flexible, so that the material as it is fed into the bin 24 may be distributed within suitable receptacles within reach of the spout 25.

The operation of the device as described would be as follows: A sufficiently-high speed being imparted to the shaft 9 to rotate the fan-blades 13, a powerful force-blast would be created, which would be fed through the lower opening 3 and continue through the housing C, then through the duct K, through the interrupter 18, and then sweeping downward until it found an exit through the bottom of the hopper 14 to terminate immediately below the intake-opening 3. The material to be elevated or propelled, which might be grain, ore, coal, or any other suitable material, would find its way through the chute *z* into the hopper 14, where the combined forces of the air and the spiral would tend to lift the same until it was properly drawn through the inlet-opening 3, where it would come within and receive the full force of the powerful air-blast generated by the fan 13, and with this current the material would be carried up the duct until it came in contact with the arrester 18, upon which it would be impinged and given a new direction in the receptacle below, while the current would freely pass through the interrupter to continue the air-belt. After a sufficient amount of material had been collected upon the drop-bottom of the receptacle 20 this bottom would open to permit the escape of a part of the material within the receptacle, and this material would escape in about the same proportion below as would be fed into it above, so that there would be practically no loss of air at this point.

The hopper 14 is provided with a duct *k*. The receptacle is provided with a bottom 21, pivoted at the point 22, and which bottom is counterbalanced by means of a weight 23. As soon as any material collects within this receptacle upon the bottom 21 to a weight exceeding that of the counterbalance 23 this weight will drop to empty the material into the bin 24.

I do not wish to be understood as confining myself to the precise construction as hereinbefore set forth for the reason that the same might be modified without departing from the spirit of my invention.

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

1. The combination with a suitable housing provided with an intake and an exit opening, said housing decreasing in capacity toward said intake and exit openings, of a shaft positioned within said housing and extending beyond the same, a fan secured to said shaft within said housing adjacent to said intake-opening, and a duct continuing from said exit-opening.

2. The combination with a suitable housing decreasing in capacity toward opposite ends and having an intake-opening near one of said decreasing ends and an exit-opening at the remaining decreased end, of a shell within said housing near the exit end to provide an annular space of decreased capacity within said housing, a shaft entering said housing at the intake end, said shell supporting said shaft within said housing, a bearing external to said housing supporting said shaft, and a fan forming a continuation of said shell and being secured to said shaft within said housing.

3. The combination with a suitable housing decreasing in capacity toward opposite ends and having an intake-opening near one of said decreased ends and an exit-opening at the remaining decreased end, of a shell within said housing near the exit end to provide an annular space of decreased capacity within said housing, a shaft entering said housing at the intake end, said shell supporting said shaft within said housing, a bearing external to said housing supporting said shaft, a fan forming a continuation of said

shell and being secured to said shaft within said housing, and a duct extending from said exit end.

4. The combination with a suitable housing decreasing in capacity toward opposite ends and having an intake-opening near one of said decreased ends and an exit-opening at the remaining decreased end, of a shell within said housing near the exit end to provide an annular space of decreased capacity within said housing, a shaft entering said housing at the intake end, said shell supporting said shaft within said housing, a bearing external to said housing supporting said shaft, a fan forming a continuation of said shell and being secured to said shaft within said housing, a duct extending from said exit end, and an interrupter positioned within said duct.

5. The combination with a suitable housing decreasing in capacity toward opposite ends and having an intake-opening near one of said decreased ends and an exit-opening at the remaining decreased end, of a shell within said housing near the exit end to provide an annular space of decreased capacity within said housing, a shaft entering said housing at the intake end, said shell supporting said shaft within said housing, a bearing external to said housing supporting said shaft, a fan forming a continuation of said shell and being secured to said shaft within said housing, a duct extending from said exit end, an interrupter positioned within said duct, and a hopper adjacent to said intake end.

6. The combination with a suitable housing decreasing in capacity toward opposite ends and having an intake-opening near one of said decreased ends and an exit-opening at the remaining decreased end, of a shell within said housing near the exit end to provide an annular space of decreased capacity within said housing, a shaft entering said housing at the intake end, said shell supporting said shaft within said housing, a bearing external to said housing supporting said shaft, a fan forming a continuation of said shell and being secured to said shaft within said housing, a duct extending from said exit end, an interrupter positioned within said duct, a hopper adjacent to said intake end, and a receptacle continuous with said duct, said receptacle being positioned adjacent to said interrupter.

7. The combination with a suitable housing decreasing in capacity toward opposite ends, said housing having an intake and an exit opening at said ends, of a shell within said housing and terminating adjacent to said exit-point and approximately conforming to the shape of said intake-housing to provide an air-space of decreasing capacity toward the exit-opening, a bearing supported by said shell, an operating-shaft entering said housing through the intake-opening and working within said bearing, a fan secured to said shaft and positioned within said housing, a hopper adjacent to said intake-opening, a spiral within said hopper and secured to said shaft, a duct extending from the exit-opening and continuing and returning to enter said hopper below said intake-opening, an interrupter within said duct, and a chamber communicating with said interrupter.

ALONZO HUMBERGER.

In presence of—
GEORGE W. SUES,
MABEL A. DODSWORTH.