Oct. 30, 1928. 1,689,241

E. HABER

MECHANICAL DRAFT INSTALLATION

Filed Nov. 30, 1927 2 Sheets-Sheet 1

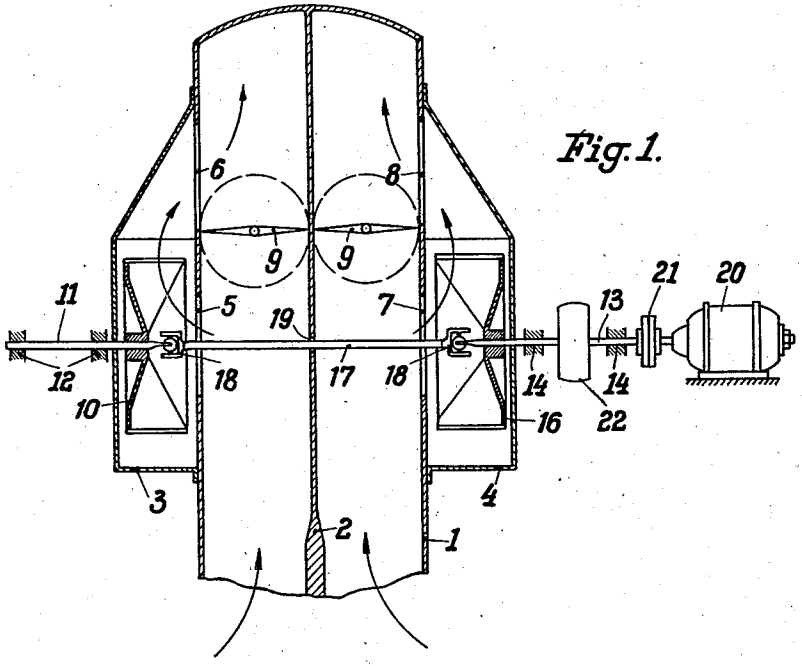


Fig. 1.

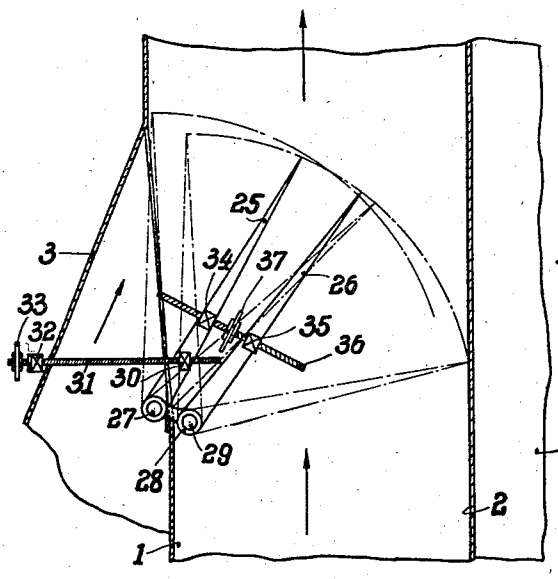


Fig. 5.

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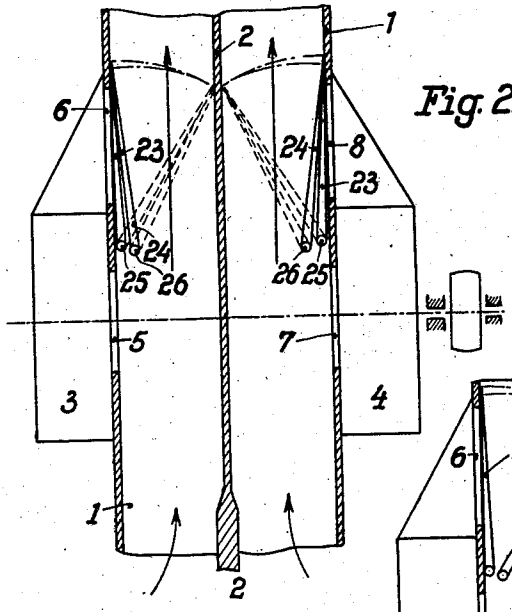


Fig. 2.

Fig. 3.

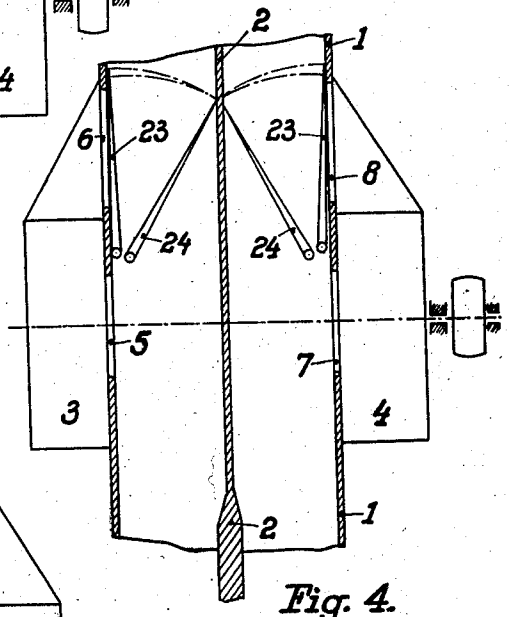
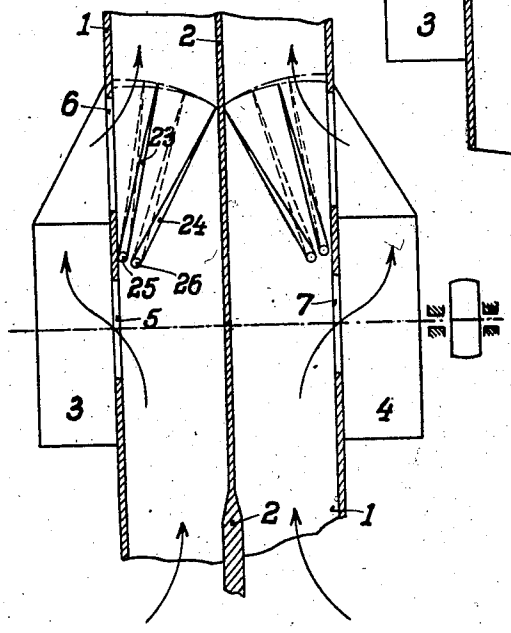


Fig. 4.



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Patented Oct. 30, 1928. 1,689,241

UNITED STATES PATENT OFFICE.

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MECHANICAL-DRAFT INSTALLATION.

Application filed November 30, 1927, Serial No. 236,711, and in Germany December 29, 1926.

This invention relates to a mechanical draft-installation with double blowers in which the chimney is directly above the flue gas-channel so that the flow of the flue-gases to the chimney is upwardly directed in straight direction of flow without any deflection. This arrangement makes possible, in order to economize energies, the maximum utilization of the ascending force of the gases, which is generally very little in the mostly low chimneys. In installations of this kind the blowers are arranged on the sides of the chimney and fitted with diffusor-like discharge-tubes which tap directly into the chimney.

This invention has for its object, to ensure, notwithstanding the prejudicial effect of the hot flue-gas, uniform and proper working of the blowers. This is obtained by fixing the two vane-wheels of the double blowers on independent journals, arranged axially the one with regard to the other, and yieldably connected by means of a suitable intermediate element. A further improvement of the installation consists in shutting-off the chimney by a double-flap or by a pair of single flaps for deflecting the flue-gases into the double-blowers the one flap element controlling the passage for the blower-jet and the other element controlling the natural draft, both elements being adjustable simultaneously and the one being independent of the other.

An embodiment of the invention is illustrated, by way of example, in the accompanying drawing, in which

Fig. 1 is a vertical section showing a section draft-installation with double blower.

Fig. 2 is a similar section showing a modified construction of the draft-installation.

Figs. 3 and 4 are sectional views, similar to Figs. 1 and 2 respectively, the regulating flaps being shown in other positions.

Fig. 5 is a longitudinal section on enlarged scale, showing a chimney with double regulating flaps.

In the form of construction shown in Fig. 1 the discharge tube for the flue-gases, or the chimney 1, is subdivided by a central vertical partition 2. On either side of the chimney 1 a casing of a blower is fixed the one opposite the other, the blower 3 connecting the aperture 5 of the chimney with the other aperture on the same side for deflecting the flue-gases. The flue-gases flow analogously during the service through the aperture 7 in the other side-wall into the blower casing 4 and return through an upper aperture 8 in the same side-wall into the chimney, the direct ascending of the flue-gases in the chimney being prevented by shutting off flaps 9 to be operated from the outer side and known per se. When the blowers are stopped the flaps 9 are opened in order to ensure a natural chimney-draft, free from disturbances.

In the blower-casing 3 a vane-wheel 4 is keyed on a short shaft 11, the two bearings 12 for this shaft being on the outer side of the casing so that they do not come into touch with the flue-gases. In accurate axial alignment with the short shaft 11, a short shaft 14 journalled in bearings 13 on the outer side of the blower-casing 4, projects into this casing. On the short shaft 13 in casing 4 a vane-wheel 16 is mounted, said short shaft 13 being coupled with the short shaft 11 by means of an elastic connection, consisting preferably of a transverse rod 17, yieldably connected by Cardan-joints 18, or by similar means, with the two short shafts 11 and 13 and passing freely through a bore 19 of the partition 2.

The two vane-wheels 10, 16 are loosely mounted on their shafts. By the provision of this yieldable connection, instead of a continuous shaft, the axle 17 has to withstand only the driving torque and need not be specially resistant to withstand warping due to high temperature. All the alterations due to the action of the strong heat of the flue-gases remain without influence on the transmission of the revolving motion from the short shaft 13 to the short shaft 11. The double blower is driven as shown by a directly coupled electromotor 20, which is connected to the short shaft 13 through the intermediary of an elastic clutch 21. When this electromotor is disengaged or does not exist, the blowers might be driven from any source of power by means of a belt-pulley 22.

When, for relieving the blower, the natural draft of the chimney has to be utilized only partly, the flaps 9 have to be opened accordingly. In this case exists however the danger that the blower overcomes by its strong draft the natural ascending force in the chimney whereby the flue-gases are again drawn downward, so that a continuous circulation is produced by which the power-

demand of the blower is increased in an undesirable manner, the draft-effect itself being nevertheless decreased at the same time. To avoid this backward drawing of the suction-effect, a regulating flap, composed of two parts is substituted for each of the two shutting-off flaps 9, the parts 23, 24 of these regulating flaps being each mounted independently of the other on a separate adjusting axle. The flap 23 is rigid on its axle 25 and designed to regulate the free cross-section of the passage for the corresponding blower-jet. The flap 24 is keyed on a parallel axle 26 and adapted to be adjusted independently of the axle 25. The free cross-sections of the chimney-halves and of the apertures 6 and 8 respectively and thereby the gas-quantities can be actually mutually regulated so that the blowers do not cause backward sucking of flue-gases from the chimney-sections above the apertures 5 and 7 respectively.

According to the prevailing conditions the flap-elements 23, 24 may be adjusted to different positions. The flap elements 23, 24 might for instance be brought both into the positions indicated in dash-lines in Fig. 2, the passage for the blower-jet being completely liberated and the natural ascending force of the gases being completely interrupted. For throttling the blower-jet the flap element 23 may be brought into an intermediate position, as shown in Fig. 3, the flap-element 24 remaining either in the position for shutting off the chimney or in such a position that it liberates the passage partly. By means of such regulating flaps, composed of two elements, the free cross sections of the passages can be regulated and relieving of the blowers can be carried through up to those limits in which no sucking back of flue-gases by the blower-draft from the chimney occurs.

Special adjusting of the blowers, necessary in the construction of older types is no longer necessary.

Another advantage resulting from the regulating flaps, composed of two elements is due to the fact that, as shown in Fig. 4, both upper apertures for the passage of the flue-gases can be closed simultaneously. In this case repairs can be carried out without disturbance by the natural draft in the chimney.

In order that the adjusting of the two flap-elements may be carried out more rapidly, the one flap-element may be, as shown in Fig. 5, rigid on its pivot-axle and the other flap element may be connected to a sleeve enclosing said pivot-axle.

In Fig. 5 the flap-element 25 is rigid with its adjusting axle 27 and it has an inwardly projecting lateral arm 28, in the end of which the pivot-axle 9 is rotatably mounted on which the flap-element 26 is fixed.

In order that both flap-elements may be adjusted at the same time the flap-element 25 carries a rotatable nut 30, in which a screw-spindle 31 is guided which traverses further a nut 32, rotatably mounted on the outer side of the casing 3. On the outer end of the screw-spindle 31 an adjusting-wheel 33 is fixed which may be moved by hand or by endless rope or chain or the like. By rotating the adjusting wheel 33 the screw-spindle 31 is screwed in the nut 30, whereby the flap-element 25 is oscillated and makes the flap-element oscillate around its axle 27. The flap-element 25 has another rotatable nut 34 and the flap-element 26 has a similar nut 35, a screw spindle 36 projecting through these two nuts 34, 34 and carries, preferably on the middle, an adjusting wheel 37. The adjusting wheel 37 is rotated by means of a traction-element, for instance, an endless chain or cable, the free side of which extends to the outer side of the chimney. By rotating this adjusting wheel 37 in the one or other direction, the two flap-elements 25, 26 are adjusted, the one with regard to the other, whereby the free cross-sections of the passages in the two conduits are altered accordingly.

I claim:—

1. A mechanical draft installation, comprising in combination with a chimney having in each of two opposite side walls an upper aperture and a lower aperture, a vertical central partition subdividing said chimney into two compartments, a blower casing on each of said opposite side walls of said chimney covering the corresponding two apertures, a blower consisting of a vane wheel in each casing for sucking the flue gases from the corresponding compartment into the blower casing and for returning said flue gases through the corresponding upper aperture into the chimney, regulating flaps in each chimney compartment between said two apertures, a short shaft projecting from the outer side into each blower casing and carrying the corresponding vane wheel, means for driving one of said short shafts, a transverse rod extending from one short shaft to the other short shaft through said partition, and an elastic clutch at each end of said transverse rod for elastically coupling said two short shafts the one with the other.

2. A mechanical draft installation, comprising in combination with a chimney having in each of two opposite side walls an upper aperture and a lower aperture, a vertical central partition subdividing said chimney into two compartments and having a horizontal bore, a blower casing on each of said opposite side walls of said chimney covering the corresponding two apertures, a blower consisting of a vane wheel in each casing for sucking the flue gases from the corresponding compartment into the blower

casing and for returning said flue gases through the corresponding upper aperture into the chimney, regulating flaps in each chimney compartment between said two apertures, a short shaft projecting from the outer side into each blower casing and carrying the corresponding vane wheel, said two short shafts being accurately in alignment the one with the other, means for driving one of said short shafts, a transverse rod extending from one short shaft to the other short shaft through said horizontal bore in said partition, and a Cardan-joint at each end of said transverse rod for elastically coupling said two short shafts the one with the other.

3. In a mechanical draft installation as specified in claim 2 the regulating flaps in the chimney consisting each of two elements one element controlling the passage for the blower jet and the other element controlling the natural draft in the chimney, and means for adjusting said two flap elements simultaneously and independently the one of the other.

In testimony whereof I affix my signature.

EUGEN HABER.