W. F. BENSON.

DUSTLESS COAL ASH SIFTER.

APPLICATION FILED DEC. 15, 1910.

1,041,001. Patented Oct. 15, 1912.

2 SHEETS—SHEET 1.

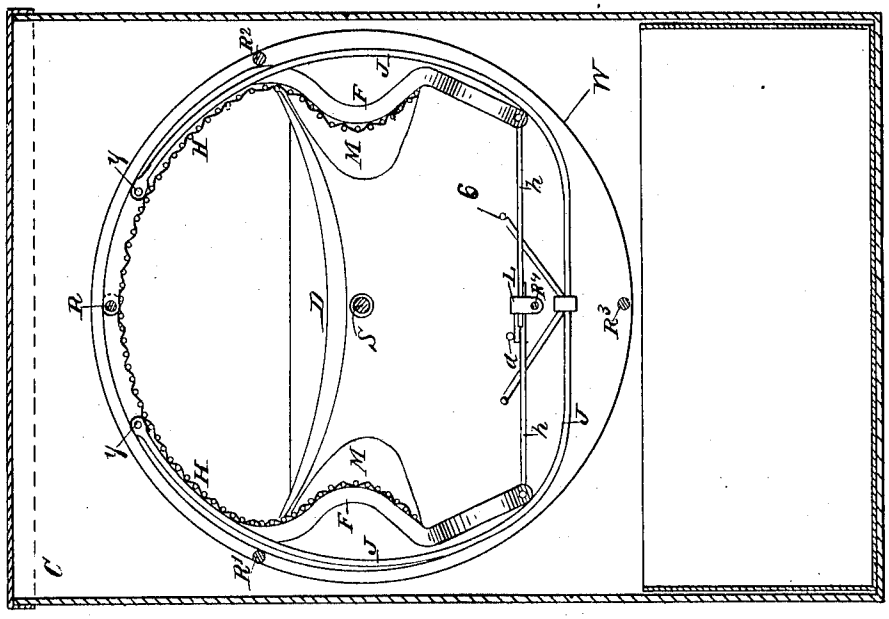

Fig. 1.

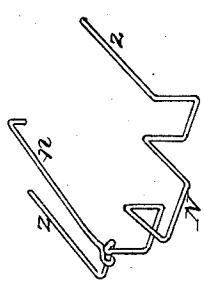

Fig. 6.

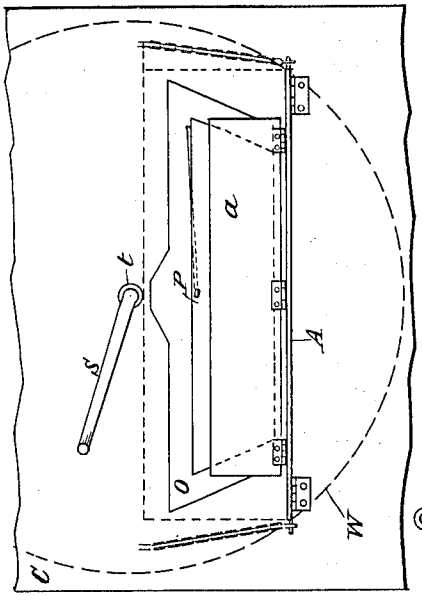

Fig. 2.

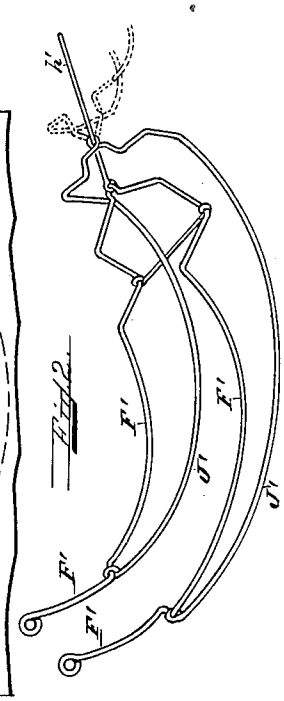

Fig. 7.

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Edward H. Taylor.

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COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

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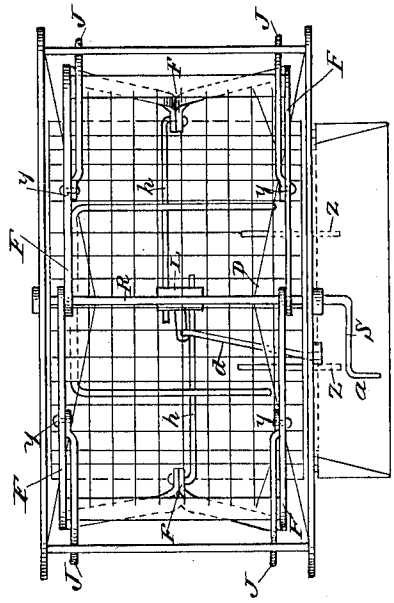

Fig. 4.

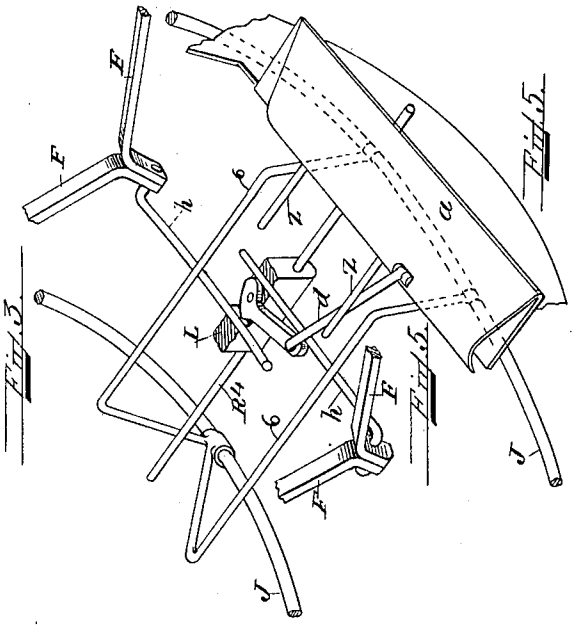

Fig. 5.

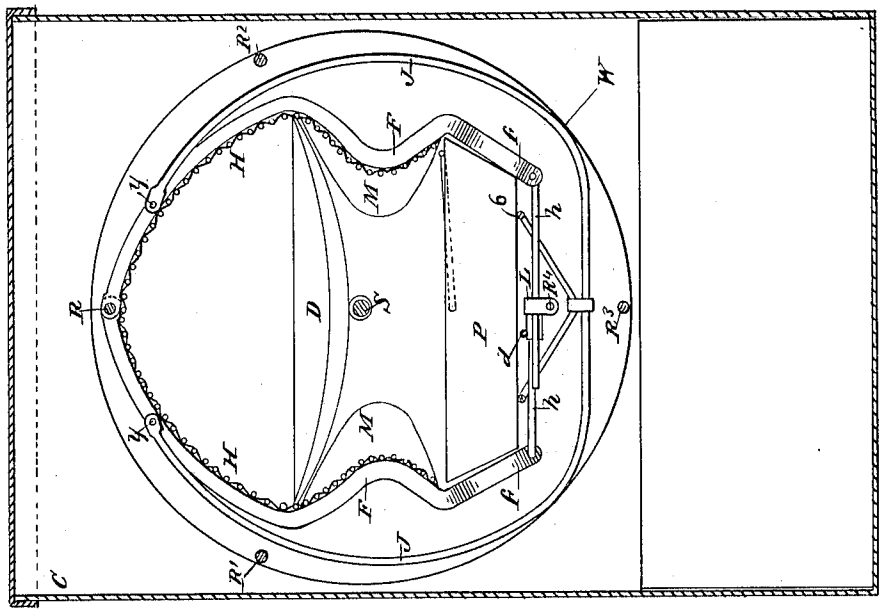

Fig. 6.

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UNITED STATES PATENT OFFICE.

WILLIAM F. BENSON, OF BROCKTON, MASSACHUSETTS.

DUSTLESS COAL-ASH SIFTER.

1,041,001. Specification of Letters Patent. Patented Oct. 15, 1912.

Application filed December 15, 1910. Serial No. 597,589.

To all whom it may concern:

Be it known that I, WILLIAM F. BENSON, a citizen of the United States, residing at Brockton, in the county of Plymouth and State of Massachusetts, have invented a new and useful Dustless Coal-Ash Sifter, of which the following is a specification.

My invention relates to improvements in coal sifting machines, in which the coal and ashes are thrown from the stove pan upon a revolving grating and the objects of my improvements are: First: To provide a mechanism which shall be practically dust proof. Second: To provide a mechanism which shall be simple in its operation and satisfactory in its results. Third: One that will throw the coal and ashes upon the grate, and operate to separate them quickly and with small labor to the operator. Fourth: To combine the working parts in a space as small as possible for effective operation. Fifth: To arrange the whole mechanism so that it will not easily get out of order. I attain these objects by the mechanism illustrated in the accompanying drawings, in which similar letters refer to like parts in all the several views, and in which:

Figure 1 is a front vertical section of my invention, including the outside case and the inclosed mechanism; Fig. 2 is a front view of the middle part of the case with the upper door open showing the pan of partly burned coal and ashes in place; Fig. 3 is a plan or horizontal section of my mechanism in the case but not including the pan; Fig. 4 is a front vertical section of my invention including the outside case with the inclosed mechanism and the pan of partly burned coal and ashes locked into the revolving wheel; Fig. 5 is a perspective view of the pan supporting parts, the lock and rods which operate it; Fig. 6 is a perspective of a modification of the inner door in the wheel; Fig. 7 is a modification of the two sets of frames which carry the pan and connected parts, this drawing showing one side of the device for supporting the pan, a part of the other side being shown in dotted lines.

The following is my preferred form for the construction of my invention, but variations and modifications may be made to some extent in some of the minor parts, without essentially departing from my invention.

Substantially all the parts of my mechanism should be made from metal, but perhaps some parts may be made from some other material.

The operative parts of my mechanism are contained in a closed case C made as nearly dust proof as possible. On one side of the case I use one or more doors made to fit tightly. It would be well to fit them with some dust proof material like felt, so that when fastened, the coal ashes will not pass out. The upper door A is made the proper height and of the right size to allow the coal ash pan to be put in and taken out easily. The upper edge of the door A should be below the center of the operative mechanism within the case, and directly opposite the opening O Fig. 2 in the end of the wheel W when said wheel is at rest in its normal position. A lower door is made near the bottom of the case and is large enough to allow the passage of a receiver of the ashes which fall from the grates. This lower door and receiver are not necessary parts of my invention as other means may be used to dispose of the ashes. Within the case Figs. 1 and 4 is the wheel W which receives the pan P containing the coal and ashes beneath the sifting grates H H; this pan being locked in place so as to allow the ashes to escape only through the sifting grating. The wheel W is made preferably cylindrical. At one end there is an opening O large enough to receive the pan P. This wheel is supported on a spindle S, one end of which extends through the casing and is made into a crank for the purpose of rotation. The spindle S is firmly attached to the wheel and revolves in a boss or other device at the back side of the casing and in a trunnion *t* on the front side of the casing, or by any other such proper arrangement as would be common and well known to mechanics.

The ends of the wheel W are preferably held in place by five rods. One of these, R, is placed at the top of the wheel when it is at rest, and the others are placed as follows: Rod R^3 at the bottom of the wheel; R′ is upon one side and R^2 on the other side of R, each about 80° from R, and both are near the edges of the wheel. These four rods are near the edges of the wheel ends. R^4 is placed above R^3 substantially on a line between it and R, but is not necessarily exactly so. The distance of R^4 from the edge of the cylinder end might be varied some-

what, especially in wheels of different sizes, but I prefer to place it about two inches from the edge of the wheel. Possibly one of these rods, R′, R² or R³, might be omitted, but I prefer to use all of them.

Near each end of the wheel W, I hang two frames, all four marked F, all substantially alike, all attached to the rod R as a pivot, so as to allow a small adjusting motion and all operating in the same way and for the same purpose. They are shown in Figs. 1 and 4.

By means of the connecting parts the two frames on the right hand and the other two on the left hand severally operate so that the lower ends move together or separate at the same time and for the same purpose, being controlled by the same device. They are made substantially in the form shown in Fig. 1 and the two on each side are supplied with a sifting grate H. At their lower extremities the ends of the grates are protected by metallic facings *f f*. In some cases the sifting grating might be made in one piece, the upper part being made continuous, or it may be made in two parts, they being separated at or near the rod R. In small machines I prefer to make it separated. These grates are attached to the frames F F, although they might not need to be attached in many places if the grates were of stiff material made to conform to the shape of the frames. I prefer to attach the grates and the facings *f f* to the frames F. These grates extend nearly to the lower part of the frames F F. I prefer to connect the lower ends of the frames F F and at the juncture of each I place a rod *h* which rods are pivoting so that they may all have a slight up and down movement. These rods *h h* extend to and through a locking device L carried upon rod R⁴, Fig. 5. Any of the common devices may be used to lock these rods, but I prefer to use one to be operated by rod *d* shown in Fig. 5, the locking device itself being preferably a small cam lying between the rods *h h* and being elliptical or oval in shape. Such a device would be very well known to all mechanics.

Near the top of each frame F F F F I attach other frames J J, Figs. 1 and 4. These frames are continuous beneath frames F F to which they are pivoted by pivots Y Y on either side of the top rod R, at the same distance, about 20° from the top rod R, Figs. 1 and 4. The distance from the top rod R may vary a little, but all the four upper ends of the frames J J must be at the same distance from the rod R to obtain the best results. These ends of frames J J need only a slight movement on the pivot Y Y but that amount of movement they must have and this part of the device must be carefully attended to.

Near the bottom parts of frames J J I connect them by a device which serves the double purpose of holding J J in their proper position laterally and of providing a support for the pan of coal and ashes. This device is shown in Fig. 5. The two sides of this device, as shown, are made a little different as a matter of convenience in construction or stability. This difference is not essential and the device would operate if both sides were the same. The two sides of this device are attached as shown, Fig. 5, one side at two points to the frame J J. The two arms of this device, both alike, are placed, one on each side of R⁴ both being marked 6. Those connect and support the frames J J and also form a table on which is placed the pan of coal and ashes. As these frames J J must be to some extent elastic, I prefer to make them of metal wire, which will make them sufficiently resilient. When the pan P is not in the wheel the top of this pan supporter is substantially level with the lower side of the opening O. The two prongs *z z* are so placed that the pan can be inserted and removed easily when the door *a* is open, for the door, or its equivalent shown in Fig. 6 to be described hereafter, operates the prongs *z′ z′*.

When the pan has been put in place the door *a* or its equivalent device shown in Fig. 6 is closed and rod *d* is moved by this operation so as to fasten the rods *h h* in the lock L. As a modification, the door may be omitted and a cheaper device shown in Fig. 6 may be used. This device operates at the lower side of the opening O and moves the prongs *z′ z′* and the rod *m* much the same as is done when the door is used. This device is made from two pieces of wire marked N and *n*. N is bent into the form shown in Fig. 6. The two ends form the prongs *z′ z′* much the same as those attached to the door *a*. It is pivoted to the inside of the case, so as to give it a quarter turn and the central part is bent into a form to make a convenient handle. On one side it is bent into a shoulder which carries the rod *n*, the end of *n* being made into a circlet around a shoulder so that there may be a little play. N takes the place of *d* when a door is used.

Inside the sifting grates on the inside of the ends of the wheel are deflectors D D. These deflectors help to throw the coal back into center of the pan while the wheel is operating and to keep the coal from going outside the grates. Just above where the pan P is placed, I put four deflectors, each marked M, as shown in Figs. 1 and 4, all substantially in the form shown in these figures, one at each corner of the pan; and I prefer to attach them to the frames F F, thereby helping to fasten the grates to the frames. I prefer to make all the frames of round rods and to construct the connecting ends by forming circlets *c c* so that there

may be an easy movement of the parts upon each other where necessary. At the juncture of the frames J J and the frames F F I prefer to make shoulders on frames F F and attach frames J J as shown in Fig. 7.

The pan containing the partly burned coal is put through the opening O and rests upon the supporter shown in Figs. 4 and 5. The weight of the pan causes the frames J J to sink and this causes the frames F F to draw together, closing the lower end of the frames tightly against the pan, holding it firmly in place. The door, if one is used, is then closed, or the device shown in Fig. 6 is operated to fasten the rods *h h* in the lock L. This holds all parts of the wheel firmly in place. The door is closed, making the case dust proof and the wheel is made to revolve by means of the spindle S. At each complete revolution of the wheel the coal is thrown from the pan on to the grates and back again into the pan, separating the ashes, which pass through the gratings and fall to the bottom of the case.

I have described my invention in such terms as will enable any one of reasonable skill in the art to make and use it, but I do not wish to be understood that the foregoing must be entirely followed in all particulars. The ordinary skill of men having knowledge of this art may suggest some modification in construction which can be used, within the scope of my invention.

What I claim and desire to secure by Letters Patent is:

1. In a coal ash sifter the combination of a casing in which is a mechanism adapted for rotation, comprising two disks spaced apart; a set of frames pivotally suspended within and near the top of the disks; a second frame made of resilient material, the ends of which are pivotally connected to the first named frame; two sifting screens; a pan adapted to hold coal ashes and a device attached to the two sides of said second frame, adapted to support said pan; means for locking the pan and other means adapted to allow the whole mechanism to be rotated substantially as shown or described.

2. In a coal ash sifter the combination of a mechanism comprising a set of frames pivotally connected to a rod between two disks and carrying sifting screens; a second frame of resilient material pivotally connected to the first named frames and having at their lower ends a device adapted to support a pan; a pan adapted to contain coal ashes; means for locking said pan upon said device; a casing inclosing said mechanism and means for causing said mechanism to be revolved within said casing, substantially as shown or described.

3. In a coal ash sifter the combination of a casing, a pan adapted to hold coal and ashes, two pivoted frames, one carrying a sifting screen and the other having means of upholding the pan, means for locking the pan in place and means for causing the mechanism to revolve within the casing and to separate the coal ashes from the cinders, substantially as shown or described.

4. In a coal ash sifter the combination of a pan adapted to be filled with coal ashes; frames supporting said pan, and another frame pivotally connected to said supporting frames; means adapted to draw two of the frames together and to close the lower ends tightly against said pan; screens upon said frames and other means adapted to agitate said coal ashes within said screens, substantially as shown or described.

5. In a coal ash sifter the combination of two sets of frames pivotally connected, one set being pivotally supported; sifting screens attached to two of said frames; a pan supporting device attached to the lower ends of two of said frames; a pan adapted to receive coal ashes and means adapted to cause the weight of said pan of coal ashes to press the lower ends of two of said frames together tightly against said pan, and other means to agitate the said coal ashes within said screens, substantially as shown or described.

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Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."