No. 675,057. Patented May 28, 1901.

T. A. EDISON.

APPARATUS FOR SCREENING PULVERIZED MATERIAL.

(Application filed June 29, 1897.)

(No Model.)

Fig. 1.

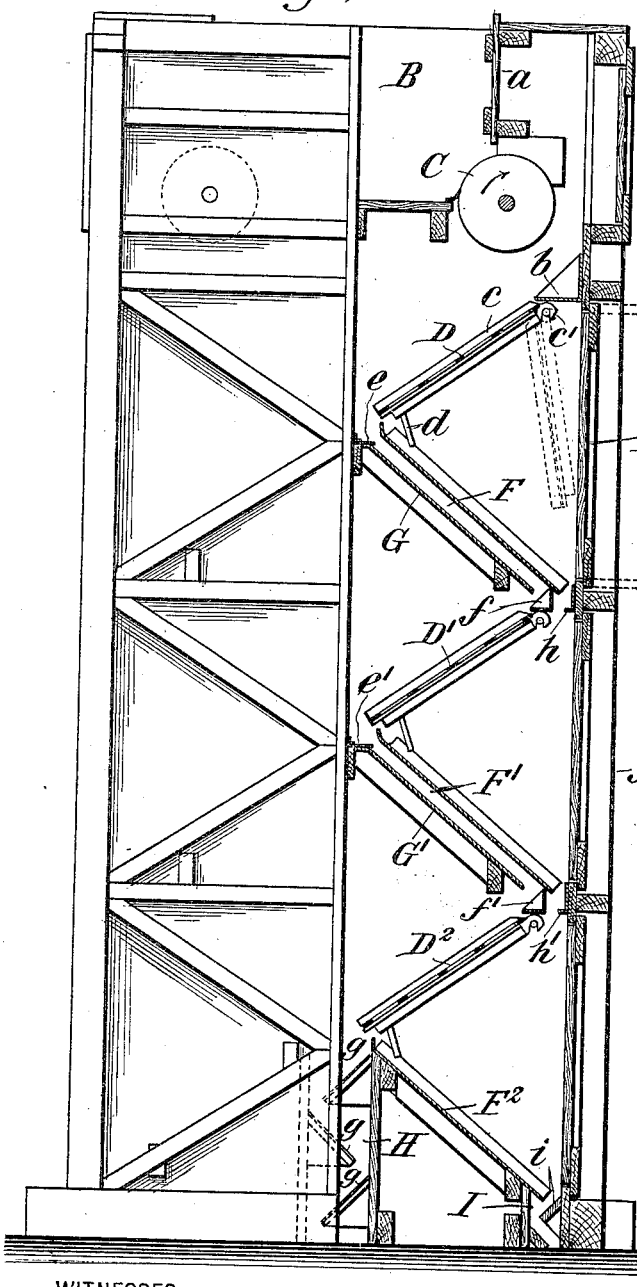
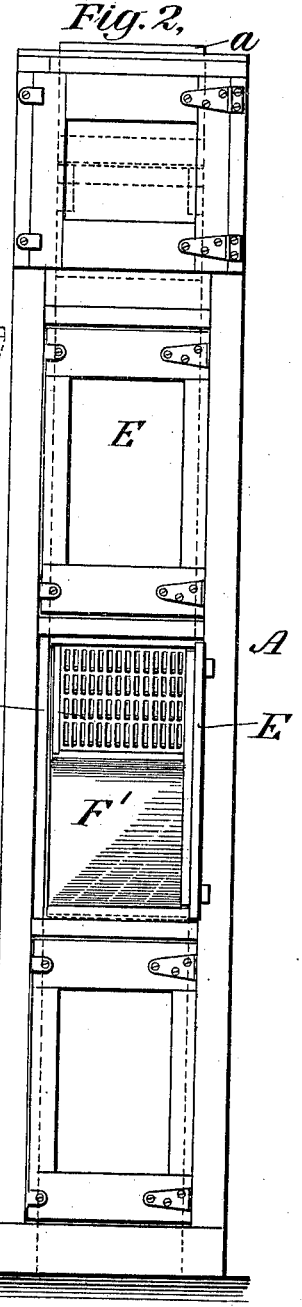


Fig. 2.



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APPARATUS FOR SCREENING PULVERIZED MATERIAL.

SPECIFICATION forming part of Letters Patent No. 675,057, dated May 28, 1901.

Application filed June 29, 1897. Serial No. 642,812. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, a citizen of the United States, residing at Llewellyn Park, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Apparatus for Screening Pulverized Material, (Case No. 978,) of which the following is a specification.

The object I have in view is to produce an apparatus for screening pulverized material which will result in largely increasing the screening capacity for the same area of screen-surface and by which little or no clogging of the screen-surface will occur and the wear will be reduced to a minimum.

In carrying out my invention I place in a vertical stack, one above the other, a series of short stationary inclined screen-surfaces having slotted openings running in the direction of flow of the material. The pulverized material runs by gravity over these screen-surfaces in an exceedingly thin but uniform stream, and its motion is arrested before it is delivered to each screen. The material is fed to the top screen by a roller-feed, which delivers to the entire width of the screen-surface a stream of material having a uniform thickness of only one or two particles. The inclination of the screen-surface is such that the material will run freely over it by gravity, some of the finer particles passing through the slots. The screen is, however, short in length, so that the material does not acquire a very great velocity before reaching the lower end of the screen. After leaving the first screen the motion of the material is arrested, and it is delivered with a slow rate of speed by gravity to a second and similar inclined screen, and so on, successively over the full number or screens in the stack. I have found that in passing pulverized material over a stationary inclined screen-surface the particles soon acquire such a speed and bounding motion that the screen-surface becomes ineffective, but that if the screen-surface is made in short lengths or sections and the material is arrested in its motion and delivered to each successive section at a slow rate of speed stationary inclined screen-surfaces can be employed to advantage and will have a large screening capacity.

It has not heretofore been found practicable to employ inclined stationary screens on account of their small screening capacity. The difficulty, I have discovered, has been due to the accelerated speed of the particles, arising from the fact that a screen which has inclination enough to cause the material to flow does a large percentage of the work in the first foot of its surface and the rest of the surface is largely ineffective. My screen-sections being exceedingly short—for example, two feet—the material does not accelerate greatly in speed before its movement is arrested. I also make the inclination of the screens as small as the nature of the material will admit and cause a free flow by gravity. For dry ore I have found an angle of forty degrees to be sufficient; but, generally speaking, the less the inclination which can be employed the slower will be the speed and the greater will be the screening effect. The ineffectiveness of stationary inclined screens heretofore has led to the almost universal adoption of rotating or vibrating screens; but these have, compared with my screens, a small screening capacity, take considerable power to operate them, are expensive to build, and have great wear. This great wear is due to the weight of the material pressing on the screen-surface, which also results in the rapid clogging of the screen by the jamming of particles in the openings. With my screens the wear is not only slight, but the clogging is reduced to a minimum, and it is only after considerable use that any cleaning becomes necessary.

In the accompanying drawings, forming a part hereof, Figure 1 is an elevation and partial section showing two of the screen-stacks; and Fig. 2 is an elevation, at right angles to Fig. 1, of one of the stacks, a door in the stack being open to show the slotted screen-surface.

A is an inclosed stack, which may be of any suitable height and may be provided with a large number of screens, three of such screens being shown for illustration. At the top of the stack is a hopper B, from which the material is delivered by a roller C, having a length equal to the width of the screen-surface. The material is fed out over the top of the roller, the thickness of the stream being regulated by an adjustable gate *a*, so that a stream having a uniform thickness of one or

two particles will pass over the top of the roller. This stream will be delivered at one side of the stack upon a horizontal shelf *b*. This shelf becomes loaded with the pulverized material, and the falling stream striking the material on the shelf has its motion arrested and slides off of the shelf with a minimum speed upon the first inclined screen D, which crosses to the other side of the stack. The screen D is a thin steel plate slotted in the direction of flow of the material, so that the particles may pass through the screen, notwithstanding their sliding motion down its surface. The screen D is supported in a suitable frame *c*, provided with hooks *c'* at its upper end, which are hung over pins on the side of the stack, the lower end of the frame being removably supported by braces *d* or other suitable means. Opposite the screen D the stack is provided with a door E, which may be opened to give access to the screen and to permit it to be removed when worn and replaced by a similar screen without delay, or the door may be opened and the screen swung down into the position shown in dotted lines in Fig. 1 for cleaning it by a brush.

The material which passes through the screen D falls upon an inclined board or metal plate F, down which it runs to the discharge. The material which passes over the screen D is discharged at the lower end of the screen upon a horizontal shelf *e*, which arrests its motion and from which it passes to an inclined board or plate G placed directly beneath the board or plate F. The board G is inclined in the opposite direction to the inclination of the screen D. This changes the direction of flow of the pulverized material and arrests its motion. The material is discharged from the plate G upon a horizontal shelf *f*, which again arrests the motion of the material and delivers it with a minimum speed to the second screen D'. The screen-surface D' is similar to the screen-surface D and is supported in the same way. It is inclined in the same direction as the screen D, but opposite to the board G, and hence changes the direction of flow of the material and arrests its motion. The material which passes through the screen D' is received by an inclined board or plate F', similar to F, while the material which passes over the screen D' is received by a horizontal shelf *e'*, similar to *e*, and passes over an inclined board or plate G', similar to G, when it is received by a horizontal shelf *f'*, similar to *f*, and passes onto a screen D^2, similar to the other screens. The material which passes through the screen D^2 is received by an inclined board or plate F^2, while the material which passes over the screen D^2 enters a discharging-conduit H, provided with baffling-plates *g* for arresting its motion. An adjoining screen-stack discharges the coarse material into the same conduit H. The material which passes through the screens is checked in its descent from the inclined boards F and F' by horizontal shelves *h h'* and is discharged from the board F^2 into a discharging-conduit I, provided with baffle-plates *i*.

It will be observed that the direction of the flow of the material is changed in presenting it to each screen, and hence its motion is arrested. The arresting of the motion is best accomplished by delivering the material at the receiving end of each screen to the horizontal shelf and against the angle formed between the shelf and the side of the stack; but it will be understood that the arresting of the motion, however it is accomplished, is the purpose of this construction. It might be arrested by discharging directly upon the upper end of each screen; but this would result in the wear of the screens, and hence I prefer to discharge it into an angle where the material accumulates and forms a wearing-surface of the material itself. Since the weight of the material in passing over the screens is very slight, the pressure upon the screen-surface is a minimum and the wear is exceedingly small. I have also found that scarcely any clogging of these screen-plates occurs.

What I claim is—

1. An improved screening apparatus comprising a series of short, stationary, inclined screen-sections each formed of a thin plate slotted in the direction of flow of the material, means for causing the material to flow by gravity successively over the screen-sections, means for feeding material to the upper end of the upper screen-section in a thin, wide stream, and means for checking the velocity of the particles after they have passed over each screen-section except the last, substantially as set forth.

2. An improved screening apparatus comprising a series of short, stationary, inclined screen-sections each formed of a thin plate slotted in the direction of flow of the material, means for causing the material to flow by gravity successively over the screen-sections, means for feeding material to the upper end of the upper screen-section in a thin, wide stream, and a checking-shelf below each of the screen-sections except the last, by which the particles will be brought to rest after passing each screen-section except the last, substantially as set forth.

3. An improved screening apparatus comprising a series of short, stationary, inclined screen-sections each formed of a thin plate slotted in the direction of flow of the material, means for causing the material to flow by gravity successively over the screen-sections, means for feeding material to the upper end of the upper screen-section in a thin, wide stream, and means for changing the direction of flow of the particles after they have passed each screen-section, whereby the particles will be brought to rest, substantially as set forth.

4. An improved screening apparatus comprising a series of short, stationary, inclined screen-sections each formed of a thin plate

slotted in the direction of flow of the material, said sections being placed one above the other and inclining in the same direction, means for feeding material to the upper end of the upper screen-section in a thin, wide stream, and pairs of parallel imperforate plates arranged between the lower end of each screen-section except the last and the upper end of the next succeeding screen-section for conveying the tailings successively over the screen-sections and separating the screenings removed by the screen-sections, whereby the material after leaving each screen-section except the last will be brought to rest by having its direction changed, substantially as set forth.

5. In a screening apparatus, the combination of the casing provided with the door or doors E, the screen or screens D pivotally supported at the upper end in proximity to the said door or doors, and a removable support for the lower end of said screen or screens, whereby said screen or screens may be dropped into vertical position in proximity to the said door or doors for cleaning, substantially as set forth.

This specification signed and witnessed this 10th day of June, 1897.

THOMAS A. EDISON.

Witnesses:

RICHARD N. DYER,

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