(No Model.) 2 Sheets—Sheet 1.

V. DISTL & A. SUSKY.

SCREENING APPARATUS.

No. 530,262. Patented Dec. 4, 1894.

Fig. 1.

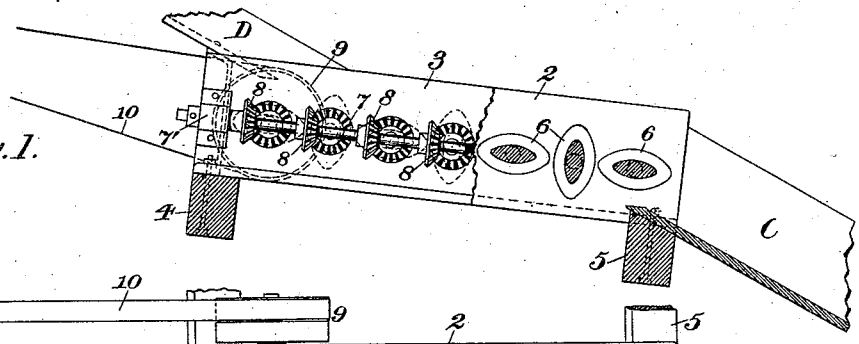


Fig. 2.

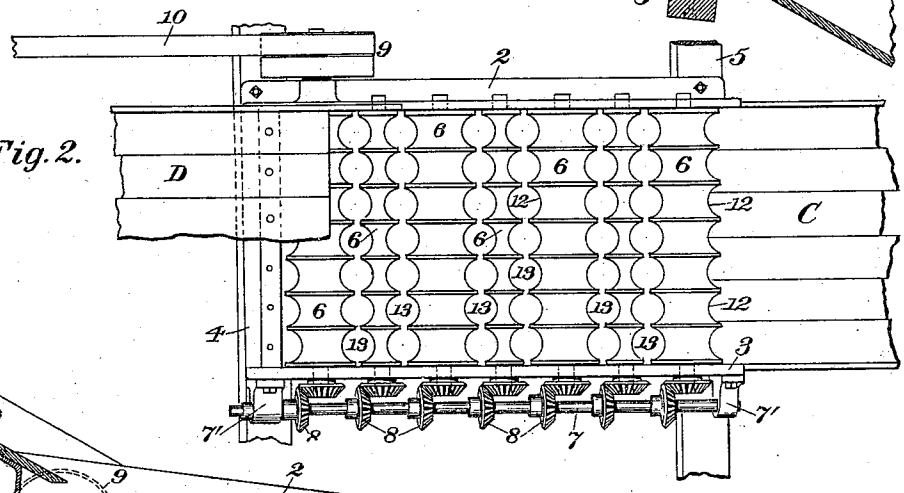


Fig. 3.

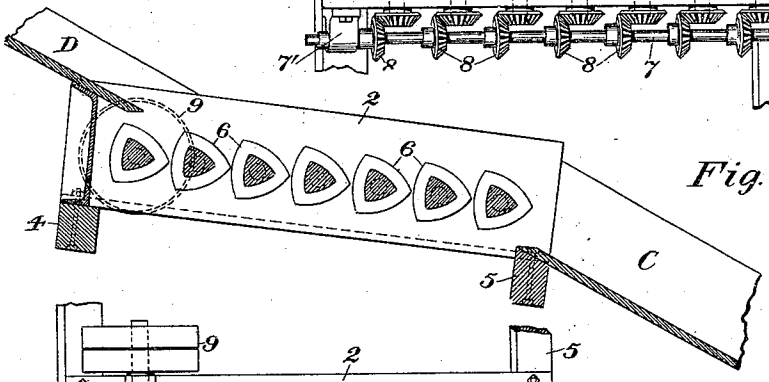
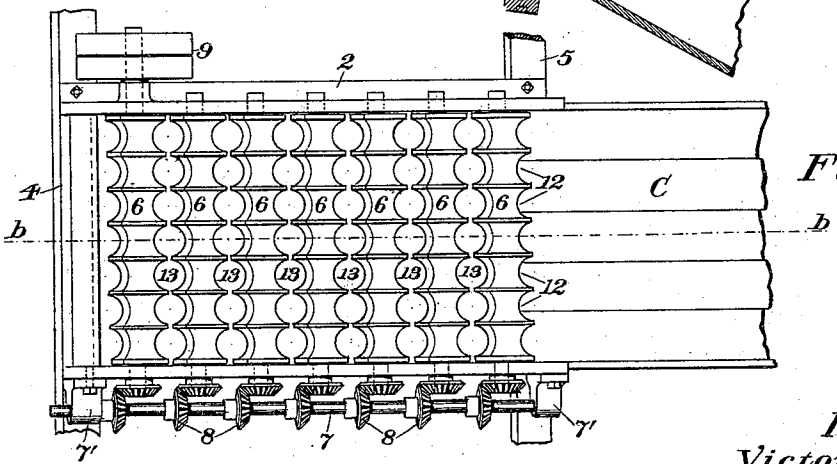


Fig. 4.



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(No Model.) 2 Sheets—Sheet 2.

V. DISTL & A. SUSKY.

SCREENING APPARATUS.

No. 530,262. Patented Dec. 4, 1894.

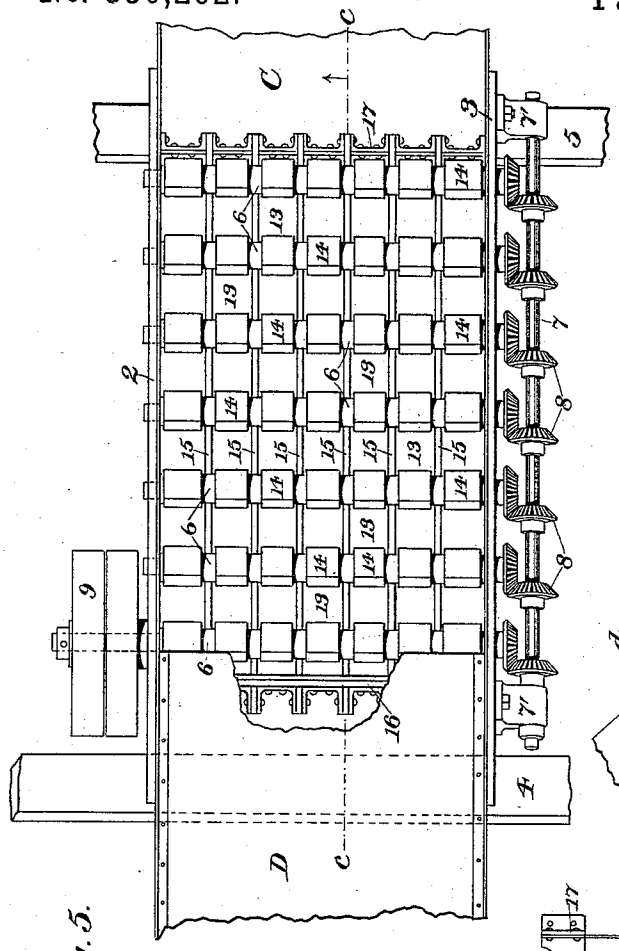

Fig. 5.

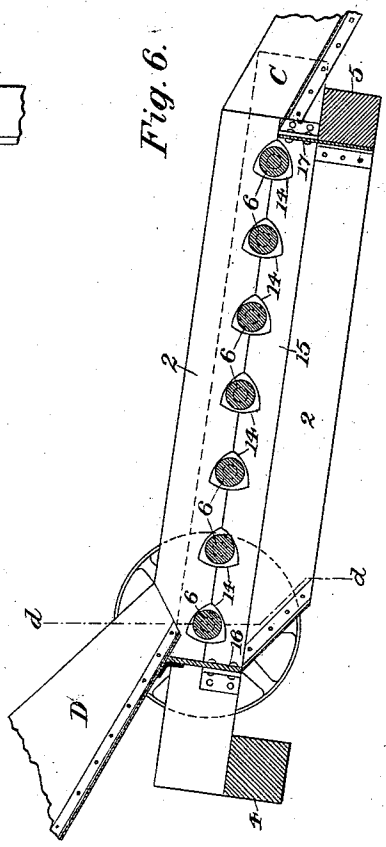

Fig. 6.

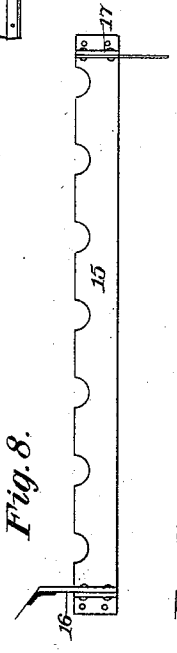

Fig. 8.

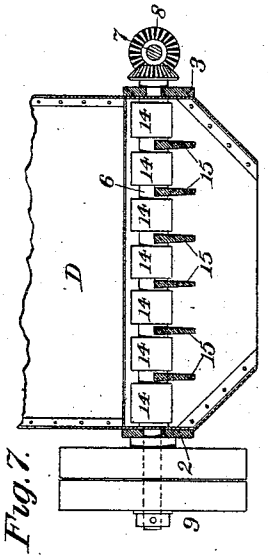

Fig. 7.

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UNITED STATES PATENT OFFICE.

VICTOR DISTL AND ADOLF SUSKY, OF KLADNO, AUSTRIA-HUNGARY.

SCREENING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 530,262, dated December 4, 1894.

Application filed June 16, 1894. Serial No. 514,742. (No model.) Patented in Germany November 22, 1891, No. 64,997, and in Austria-Hungary December 28, 1892, No. 14,084 and No. 70,288.

To all whom it may concern:

Be it known that we, VICTOR DISTL and ADOLF SUSKY, subjects of the Emperor of Austria-Hungary, residing at Kladno, in the district of Bohemia, Austria-Hungary, have invented certain new and useful Improvements in Screening Apparatus, of which the following is a specification, which invention has been patented in the following countries: in Germany November 22, 1891, No. 64,997, and in Austria-Hungary December 28, 1892, No. 14,084, at Vienna, Austria, and No. 70,288, at Buda-Pesth, Hungary.

This invention relates to screening apparatus for use in screening hard material such as coal, ore, &c.

The object of our present invention is to provide a mechanically-operative screen apparatus in which the screen-surface or screen-floor shall be operable for automatically effecting an even distribution of the material to be screened, carrying it forward over the screen surface in a thin layer of practically uniform thickness, and to thereby produce a very complete classification of the material with a comparatively short screen; also, to provide a screen of such construction and organization that the liability of breaking of any part thereof will be reduced to a minimum, and also to so construct and organize the members constituting the screen-floor that any undue jamming or disintegration of the material will be obviated.

In the drawings accompanying and forming a part of this specification, Figure 1 is a sectional side elevation of a screening apparatus embodying our invention. Fig. 2 is a plan view of the same. Fig. 3 is a vertical longitudinal section taken in line *b*—*b*, Fig. 4, of a screening-apparatus embodying a modified form of screen-surface or floor. Fig. 4 is a plan view of the screening-apparatus shown in Fig. 3. Fig. 5 is a plan view of a screening-apparatus, embodying another form of screen-floor. Fig. 6 is a longitudinal vertical section of the screening-apparatus illustrated in Fig. 5, said section being taken in line *c*—*c* in said Fig. 5, looking in the direction of the arrow. Fig. 7 is a cross-sectional view of the same, taken in line *d*—*d*, Fig. 6, looking toward the left-hand in said figure. Fig. 8 is a detailed side view of one of the partition-bars shown in Fig. 5.

Similar characters designate like parts in all the figures.

In the several forms of our invention herein shown and described the screening apparatus embodies a suitable frame-work, for carrying the several operative parts, and a series of rotary screen-bars mounted for rotation upon the frame-work and having successive peripheral surfaces of non-cylindrical cross-sectional form oppositely-disposed upon said bars and of proportionately advancing and retreating form, the alternate bars being set in advanced rotative positions, so that, when the bars are rotated simultaneously and synchronously, the peripheral surfaces of said bars will have proportionate advancing and retreating and rising and falling movement, whereby the areas of the screen-spaces will be maintained substantially unchanged during the rotation of the screen-bars.

The framework for carrying the several operative parts of the screen-mechanism will preferably consist, as herein shown, of the two side-walls, or beams, 2 and 3, bolted or otherwise secured to suitable cross-beams, or supports, 4 and 5. This frame, which may be set either at an inclination to a horizontal line, or level, is provided, at the forward end thereof, with a hopper, D, for delivering the material to the screen-floor, and is provided at its opposite end with a chute, C, for carrying off the residue or screened material.

The screen-floor consists of a plurality of cross-sectionally angular screen-bars, 6, located side by side, preferably in a horizontal plane with their longitudinal axes at right angles to the direction of movement of the material being screened, said screen-bars being supported for rotation in bearings formed in the side-rails, or beams, 2 and 3, as most clearly shown in Figs. 2, 4 and 5, mechanism being provided for rotating the said bars simultaneously in the same direction.

One form of means for rotating the screen-bars synchronously and in the same direction is shown in the drawings as consisting of a suitable driving-shaft, 7, carrying thereon a

series of bevel-gear wheels, 8, which mesh with similar bevel-gears secured one to each screen-bar. The shaft 7 is journaled at its ends in suitable bearings, 7′, carried upon the side-wall, 3, of the framework of the apparatus.

As a convenient means of rotating the shaft 7 to operate the screen-bars in unison, one of said screen-bars is herein shown provided at its end with a driving-pulley, 9, which is driven from any suitable source of power (not shown) through the medium of the belt 10 upon said pulley. It is desired to state in this connection that any suitable means for imparting the requisite rotary movement to the screen-bars may be employed without departing from our invention.

In the drawings we have shown three different forms of screen-floor, all of which are within the scope of our invention, their operation and effects being substantially identical.

In Figs. 1 and 2, the screen-bars constituting the screen-floor are shown of elliptical or oval cross-sectional form, successive bars being arranged with their respective, transverse, major and minor axes in opposite directions; or, in other words, two adjacent bars are arranged with their transverse, major axes substantially perpendicular to each other but with their longitudinal axes in coinciding planes, as will be clearly understood by reference to Fig. 1 of the drawings.

In Figs. 3 and 4, the screen-bars constituting the screen-floor are shown as of triangular cross-sectional form with curved sides, their angles being preferably located, as shown, in the same plane.

In both the forms illustrated in Figs. 1 to 4, inclusive, the screen-bars are peripherally grooved, as shown at 12, at right angles to their longitudinal axes, there being a series of grooves to each bar, and said bars are so arranged to each other as to leave a series of screen-spaces, 13, between adjacent bars, through which the finer particles of the material being screened may pass.

Referring to Figs. 1 and 2, it will be observed that, owing to the cross-sectional form and relative positions of adjacent bars constituting the screen-floor, the screen-spaces or openings 13 will, during the rotation of said bars, have a reciprocatory shifting movement in the direction of movement of the material being screened, but that the areas of said screen-spaces will remain unchanged during the rotation of said bars. The screen-bars being rotated in the direction of the arrow, their effect upon the material being screened will, when the form of bars shown in Fig. 1 is employed, be to move the material forward with an undulating action, alternately lifting and dropping the same, which will effectually stir and loosen the mass, allowing the finer particles to pass through the screen-spaces 13, the larger particles or residue of the material being carried forward over the last screen-bar of the series and delivered upon the chute C.

The action of the screen-floor illustrated in Figs. 3 and 4 is substantially the same as the action of the screen-floor illustrated in Figs. 1 and 2, the only difference being that the screen-spaces between adjacent bars of the floor do not change their positions quite so much during the rotation of the bars.

In Figs. 5, 6 and 7 of the drawings, the screen-floor is shown consisting of a series of screen-bars arranged remotely with relation to each other side by side in the same plane. In the form shown in said figures, the screen-bars have an annular central or axial portion provided with a series of remotely-disposed angular flanges or projections, 14, these projections being herein shown of triangular cross-sectional form or of a form similar to the cross-sectional form of the bars shown in Figs. 3 and 4. In this instance the bars are not grooved to form screen-spaces, but are set sufficiently remote from each other to leave a screen-space between adjacent bars extending the entire length thereof, which screen-spaces are transversely divided into a plurality of small screen-spaces, 13, by means of longitudinal partitions, 15. These partitions are herein shown bolted at their ends to cross-bars, 16 and 17, secured to the side-walls of the frame, said partitions being located below the bars between adjacent flanges thereof, as illustrated in Fig. 5, and constituting not only division-walls for the oblong spaces between adjacent bars, but also constituting supports for said bars.

The form of screen-floor shown in Fig. 5, and just described, is particularly adapted for screening the larger grades of material such as ore, the operation being substantially the same as the operation of the screen-floors shown in Figs. 1 to 4, inclusive.

It will be evident that any configuration of screen-bar will be within the scope of our invention, in which the portions thereof, which form, respectively, one longitudinal side of each of a series of screen-spaces, are non-cylindrical and are so disposed and arranged that when placed adjacent to, and in operative relation with, a second screen-bar, having screen-face-forming portions of similar cross-section opposed to the corresponding screen-space forming portions of the first-mentioned bar, and the two bars are then synchronously rotated in the same direction, the peripheral surfaces of the bars will have proportionate advancing and retreating movements, in the plane of the screen, which will maintain the areas of the screen-spaces substantially constant and unchanged throughout the rotation of said screen-bars.

Having thus described our invention, we claim—

1. In a screening-apparatus of the class specified, the combination with a frame-work

adapted for supporting rotary screen-bars, of a plurality of rotary screen-bars mounted upon said frame-work and having successive peripheral surfaces of non-cylindrical cross-sectional form oppositely disposed thereon and of proportionately advancing and retreating form, the alternate bars being set in advanced rotative positions, and means for simultaneously and synchronously rotating the screen-bars, whereby said peripheral surfaces have in the plane of the screen proportionate advancing and retreating movements, and whereby the areas of the screen-spaces are maintained substantially unchanged during the rotation of the screen-bars, substantially as described.

2. In a screening-apparatus of the class specified, the combination with a frame-work adapted for supporting rotary screen-bars, of a plurality of rotary screen-bars mounted upon said frame-work with their longitudinal axes in parallelism and in the same plane and transversely-disposed with relation to the direction of movement of the material to be screened, and said bars having successive peripheral surfaces of non-cylindrical cross-sectional form oppositely-disposed thereon and of proportionately advancing and retreating form, the alternate bars being set in advanced rotative positions, and means for simultaneously and synchronously rotating the screen-bars, whereby said peripheral surfaces have in the plane of the screen proportionate advancing and retreating movements, and whereby the areas of said screen-spaces are maintained substantially unchanged during the rotation of the screen-bars, substantially as described.

3. In a screening-apparatus of the class specified, the combination with a frame-work adapted for supporting rotary screen-bars, of a plurality of peripherally-grooved non-cylindrical rotary screen-bars mounted upon said frame-work and having their longitudinal axes substantially in parallelism and also having peripheral surfaces oppositely disposed thereon and of proportionately advancing and retreating form, the alternate bars being set in advanced rotative positions, and means for simultaneously and synchronously rotating the screen-bars, whereby said peripheral surfaces have in the plane of the screen proportionate advancing and retreating movements, and whereby the areas of the screen-spaces are maintained substantially unchanged during the rotation of the screen-bars, substantially as described.

4. In a screening-apparatus of the class specified, the combination with a frame-work adapted for supporting rotary screen-bars, of a plurality of non-cylindrical rotary screen-bars mounted upon said frame-work and peripherally-grooved at right angles to their longitudinal axes and having said axes in the same plane and substantially in parallelism and transverse to the direction of movement of the material being screened, and also having peripheral surfaces oppositely disposed thereon and of proportionately advancing and retreating form, the alternate-bars being set in advanced rotative positions, and means for simultaneously and synchronously rotating the screen-bars, whereby said peripheral surfaces have in the plane of the screen proportionate advancing and retreating movements, and whereby the areas of the screen spaces are maintained substantially unchanged during the rotation of the screen-bars, substantially as described.

5. In a screening-apparatus of the class specified, the combination with a frame-work adapted for supporting rotary screen-bars, of a plurality of rotary screen-bars mounted upon said frame-work and each having a major and a minor transverse axis and said bars having also peripheral surfaces oppositely disposed thereon and of proportionately advancing and retreating form, adjacent bars having their like transverse axes substantially perpendicular to one another, the alternate bars being set in advanced rotative positions, and means for simultaneously and synchronously rotating the screen-bars, whereby said peripheral surfaces have in the plane of the screen proportionate advancing and retreating movements, and whereby the areas of the screen-spaces are maintained substantially unchanged during the rotation of the screen-bars, substantially as described.

6. In a screening-apparatus of the class specified, the combination with a frame-work adapted for supporting rotary screen-bars, of a plurality of rotary screen-bars mounted upon said frame-work and having successive peripheral surfaces of non-cylindrical cross-sectional form oppositely disposed thereon and of proportionate advancing and retreating and rising and falling form, the alternate-bars being set in advanced rotative positions, and means for simultaneously and synchronously rotating the screen-bars, whereby said peripheral surfaces have in the plane of the screen proportionately advancing and retreating movements and also have proportionate rising and falling movements transversely of said plane and whereby also the areas of the screen-spaces are maintained substantially unchanged during the rotation of the screen-bars, substantially as described.

7. In a screening-apparatus of the class specified, the combination with a frame-work adapted for supporting rotary screen-bars, of a plurality of rotary screen-bars mounted upon said frame-work and having members thereon forming oppositely-disposed successive peripheral surfaces of non-cylindrical cross-sectional form and of proportionately advancing and retreating and rising and falling form, the alternate bars being set in advanced rotative positions, and means for simultaneously rotating the screen-bars, whereby said peripheral surfaces have in the plane of the screen proportionate advancing

and retreating movements and also have proportionate rising and falling movements transversely of said plane, and whereby the areas of the screen-spaces are maintained substantially unchanged during the rotation of the screen-bars, and whereby also the material supported upon said bars is positively carried forward with an undulating movement, substantially as described.

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