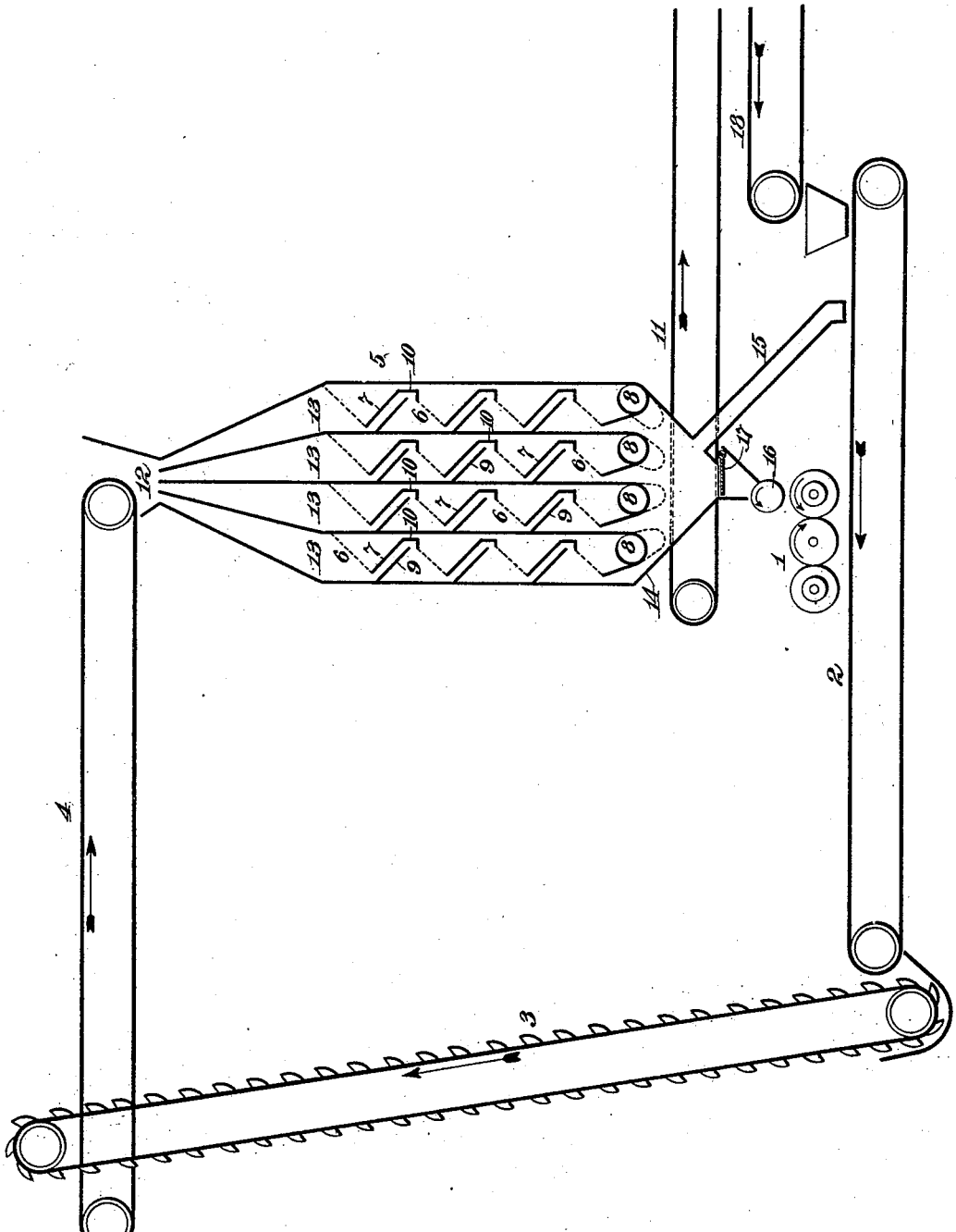
No. 648,934. Patented May 8, 1900.

T. A. EDISON.

PROCESS OF SCREENING OR SIZING VERY FINE MATERIALS.

(Application filed Mar. 17, 1899.)

(No Model.)



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UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF LLEWELLYN PARK, NEW JERSEY.

PROCESS OF SCREENING OR SIZING VERY FINE MATERIALS.

SPECIFICATION forming part of Letters Patent No. 648,934, dated May 8, 1900.

Application filed March 17, 1899. Serial No. 709,447. (No specimens.)

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 Process of Screening or Sizing Very Fine Materials, (Case No. 1,002,) of which the following is a specification.

In the screening of very dry materials, such as Portland cement, difficulty is experienced at the present time, due to the clogging of the screens, and in consequence the operations are tedious and expensive.

The object of my invention is to provide a process by which very fine materials may be screened or sized effectively and economically.

The invention resides in the discovery that if the very fine materials are admixed with a very much greater quantity of coarser particles of the same or different material the screening operation is effected without any clogging whatever, even when screens of extremely fine mesh are employed.

The invention consists generally in maintaining in movement a practically-constant load of very much larger material than the material to be screened out, in adding to this constant load the products of crushing, in subtracting from the combined larger material and such products of crushing the sufficiently-fine particles by a screening operation, and in supplying to the continuously-moving load as much of the larger material as is necessary to compensate for the withdrawal of the screened material.

In practice I find that the quantity of coarse material necessary to permit the successful and economical screening of fine material added to it depends upon the fineness of the latter. With a screen having slots, as is preferable, instead of perforations, said slots being .004 of an inch in width, about ninety per cent. of the whole load in continuous transit should be of coarse material, the largest particles thereof being preferably about one-eighth of an inch cube. If the screen-slots are .009 of an inch in width, seventy per cent. of the total load should be of the coarser material, while if said screen-slots are .012 of an inch in width sixty-three per cent. of the total load will constitute the coarse material. I find in practice that by employing relatively-large proportions of coarse material in connection with the fine material to be screened the screening operations take place without any clogging whatever, while if the proportion of coarse material is materially reduced the screens commence to clog.

In the attached drawing I illustrate diagrammatically the form of apparatus which I consider suitable for the crushing and screening of Portland cement or other material.

1 represents the crushing-rolls, which are preferably similar to the three-high rolls described and claimed in my application for Letters Patent filed July 16, 1897, Serial No. 644,746, except that they are horizontally disposed instead of vertically. Rolls of this character are preferable, as they can be operated for the crushing of material with the expenditure of relatively-little power; but it will be understood that any other variety of crushing-rolls or other varieties of grinding or crushing devices, such as burstones, may be employed, if desired.

2 is a conveyer for carrying the crushed materials from the rolls 1 (together with the approximately-constant load of coarser material) to an elevator 3, by which the material will be elevated to a conveyer 4, leading to a screening apparatus 5. This screening apparatus is of any suitable type, but preferably makes use of screen-sections mounted one above the other, each being relatively short, having longitudinal slots in lieu of perforations and provided with means for checking or arresting the velocity of the material before it commences its movement over each screen-section, as I described in my application for Letters Patent filed June 29, 1897, Serial No. 642,812.

In the drawing I illustrate four banks of screens, each having the short screen-sections 6, with longitudinal slots therein, with plates 7 for conveying the screenings from each screen-section to a chute 8 at the bottom of each bank, with plates 9 for conveying the tailings to and from the several screens, and with angle-irons 10 for checking the velocity of the falling material. The chutes 8 convey the screened material to a conveyer 11, by which it is carried to the storage-bins or elsewhere. The material from the conveyer 4 is delivered to the screens in any suitable way—

as, for instance, through a hopper 12, having passages 13 leading to each bank of screens. The tailings from the screens fall into a hopper 14, having a chute 15 leading to the conveyer 2, as shown. A roller-feed 16 is employed to feed material from the hopper 14, as may be desired, to the grinding-rolls 1. Preferably a gate 17 is located in said hopper above the roller-feed to cut off the feed to the grinding-rolls when desired. The coarse material is fed to the conveyer 2 by a conveyer 18.

The operation will be as follows: At the start—that is to say, before any crushing takes place—the feed is cut off to the crushing-rolls by closing the gate 17 or in any other suitable way. Material is now fed by the conveyer 18 to the conveyer 2, thence to the elevator 3, conveyer 4, and screens. The material being coarse passes over the screens and plates 9 into the hopper 14 and flows down the chute 15 onto the conveyer 2 again. When a sufficient load is imposed on the apparatus, the gate 17 is opened or the feed to the rolls 1 is started in any other way, and a small proportion of the material from the hopper 14 is passed through the grinding-rolls and is ground thereby. I find in practice that by using three-high rolls and by passing the material between one pair of the rolls under great pressure as much as ninety per cent. of the material, the particles of which average one-eighth inch cube, will be reduced to 150 mesh or finer at one pass. The ground or crushed material from the grinding-rolls falls upon the conveyer 2 with the coarse material thereon and is elevated by the elevator 3 and conveyer 4 to the screens, where by reason of the intermingled coarse material it is effectively screened, the screenings passing through the screens 6 and falling through the chutes 8 onto the conveyer 11. By mixing with the crushed material a relatively-large proportion of coarser material the screening operation will, as stated, be facilitated even when screens of very fine mesh are used, all clogging being overcome and the operations being carried on with great economy. As the screened material is drawn off through the conveyer 11 coarse material from the conveyer 18 is supplied to the conveyer 2, so that the proper proportion of coarse to fine material will be constantly maintained.

I do not claim herein the improved apparatus which I have described for the carrying out of my process, as such apparatus is made the subject of a separate application for patent filed January 30, 1900, Serial No. 3,457; nor do I claim the process of screening fine materials by mixing with the material to be screened a larger proportion of coarser particles, since such process is made the subject of my application for patent filed May 23, 1898, Serial No. 681,480.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is as follows:

The process of continuously screening very fine material, which consists in maintaining in movement a practically-constant load of a very much larger material than the material to be screened out, in deflecting and grinding a portion of such coarse material, in adding the ground portion to the moving stream of coarse material, in subjecting the mixed coarse and ground material to a screening operation, in removing the fine screenings, and in supplying to the stream of coarse material an additional amount of coarse material to compensate for the removed screenings, substantially as set forth.

This specification singed and witnessed this 6th day of February, 1899.

THOMAS A. EDISON.

Witnesses:
J. F. RANDOLPH,
S. G. BEVIN.