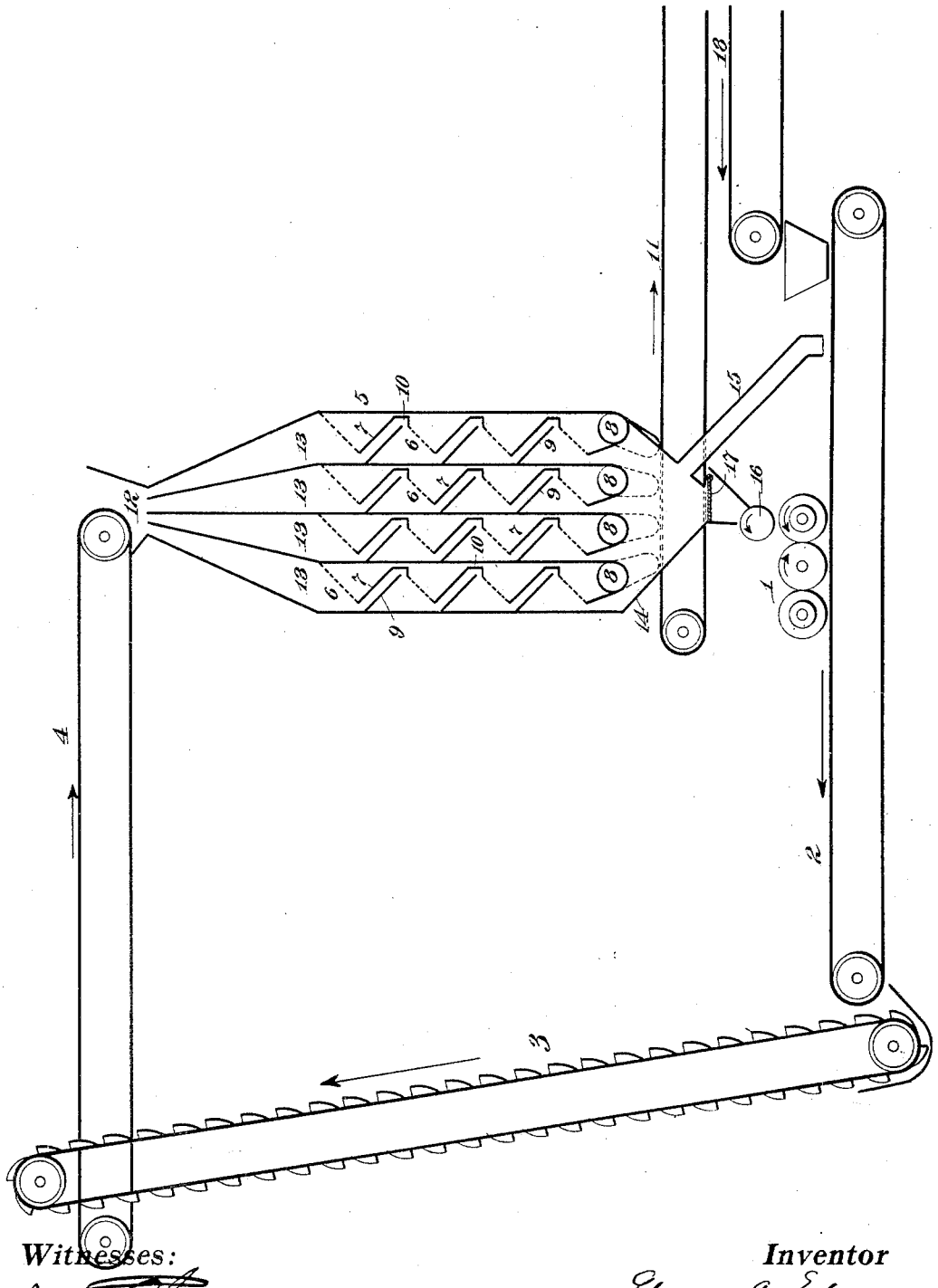
No. 679,500. Patented July 30, 1901.

T. A. EDISON.

APPARATUS FOR SCREENING OR SIZING VERY FINE MATERIALS.

(Application filed Jan. 31, 1900.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR SCREENING OR SIZING VERY FINE MATERIALS.

SPECIFICATION forming part of Letters Patent No. 679,500, dated July 30, 1901.

Application filed January 31, 1900. Serial No. 3,457. (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 Apparatus for Screening or Sizing Very Fine Materials, (Case No. 1,027,) of which the following is a specification.

In Letters Patent No. 648,934, dated May 8, 1900, I describe and claim an improved process for screening or sizing very fine materials, consisting 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.

My present invention relates to improved apparatus for carrying such a process into effect.

In the accompanying drawing I illustrate diagrammatically the form of apparatus embodying my present invention which may be conveniently used for the crushing and screening of a suitable material—such, for example, as Portland cement.

1 represents the crushing-rolls, which are preferably similar to the three-high rolls described and claimed in my Letters Patent No. 637,327, dated November 21, 1899, 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 bur-stones, 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 describe 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 one hundred and fifty 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.

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

1. In apparatus for screening very fine material, the combination of a screen, a crushing device, means to divide the tailings of the screen and to pass a proportion of such tailings through the crushing device, and means to convey the crushed proportion and the uncrushed proportion of tailings back to the screen, substantially as set forth.

2. In apparatus for screening very fine material, the combination with a screen, a crushing device, means to divide the tailings of the screen and to pass a proportion of such tailings through the crushing device, means to convey the crushed proportion and the uncrushed proportion of tailings back to the screen, and means to supply an additional proportion of uncrushed material to the screen equal to the screenings removed from the crushed proportion, substantially as set forth.

3. In apparatus for screening very fine material, the combination of a screen, a hopper, a crushing device, a conveyer below said device, means to direct a proportion of the screen tailings in said hopper through the crushing device and to direct the other proportion of such tailings onto said conveyer, and connections between the conveyer and the screen, substantially as set forth.

4. In apparatus for screening very fine material, the combination of a screen, a hopper, a crushing device, a conveyer below said device, means to direct a proportion of the screen tailings in said hopper through the crushing device and to direct the other proportion of such tailings onto said conveyer, connections between the conveyer and the screen, and a supply-conveyer for supplying to the system uncrushed material to compensate for the separated screenings, substantially as set forth.

5. In apparatus for screening very fine material, the combination of a bank of screens, a hopper located beneath all of said screens and receiving the tailings therefrom, crushing-rolls beneath said hopper, a conveyer beneath said rolls, a roller-feed for directing a proportion of the tailings from said hopper through the rolls, a chute for directing a proportion of said tailings to the conveyer, and connections between the conveyer and the bank of screens for returning to the screens the crushed and uncrushed tailings therefrom, substantially as set forth.

6. In apparatus for screening very fine material, the combination of a bank of screens, a hopper located beneath all of said screens and receiving the tailings therefrom, crushing-rolls beneath said hopper, a conveyer beneath said rolls, a roller-feed for directing a proportion of the tailings from said hopper through the rolls, a chute for directing a proportion of said tailings to the conveyer, connections between the conveyer and the bank of screens for returning to the screens the crushed and uncrushed tailings therefrom, and a supply-conveyer for supplying to the system a proportion of uncrushed material to compensate for the removed screenings, substantially as set forth.

This specification signed and witnessed this 24th day of January, 1900.

THOMAS A. EDISON.

Witnesses:
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