

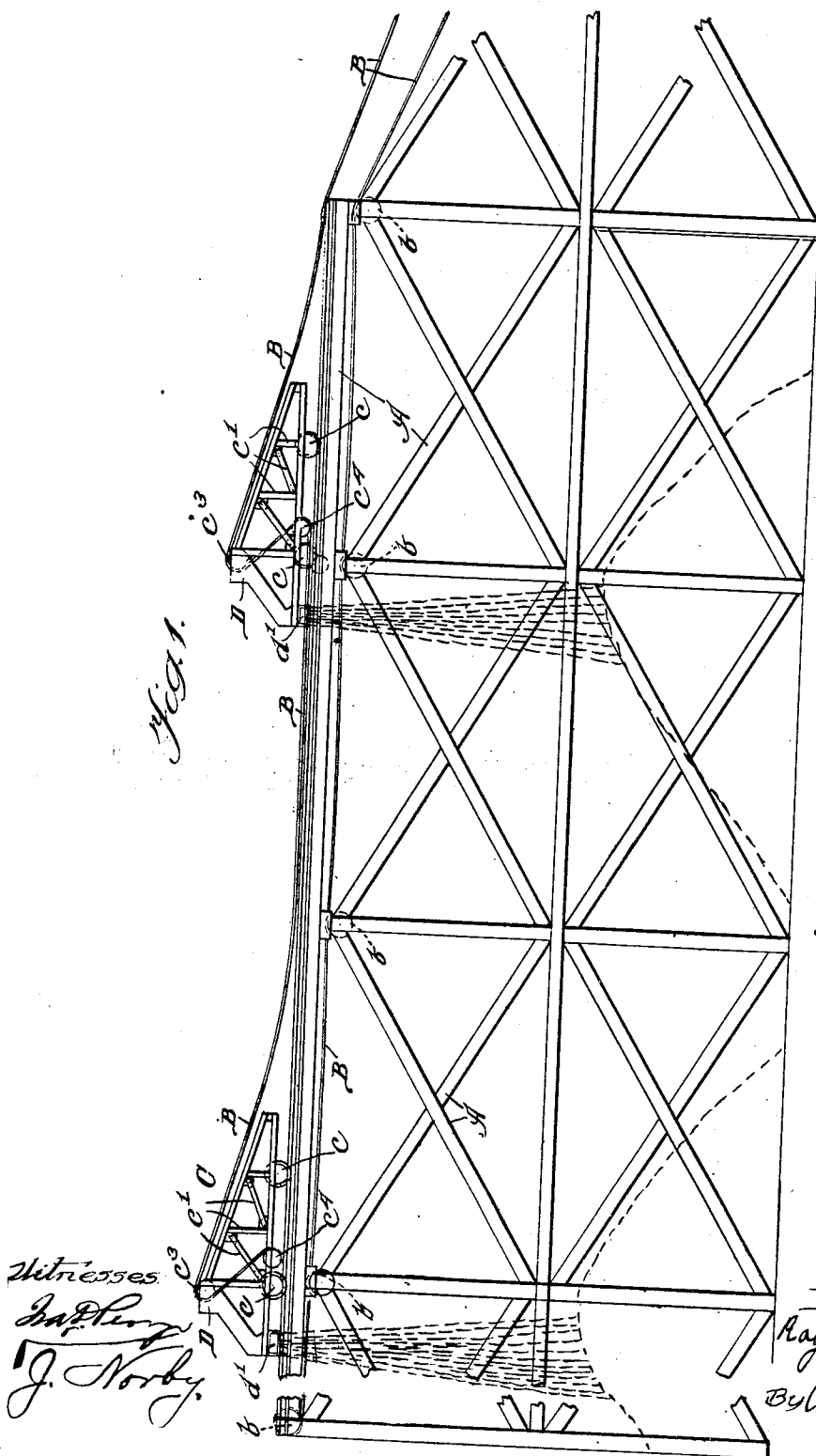
R. W. DULL.
 APPARATUS FOR SIZING OR GRADING MATERIALS.
 APPLICATION FILED MAY 26, 1911.

1,058,161.

Patented Apr. 8, 1913.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses
James
J. Norby.

Inventor:
Raymond W. Dull
By Arthur F. Duane
Att'y.

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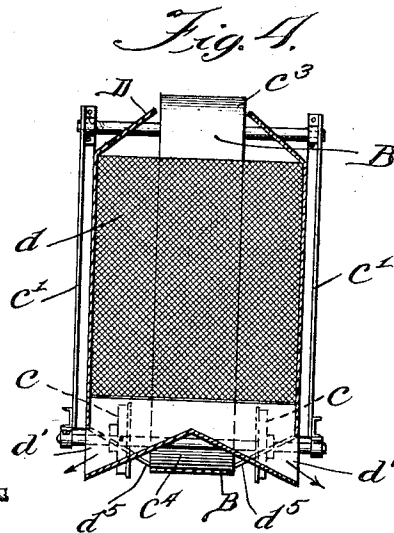
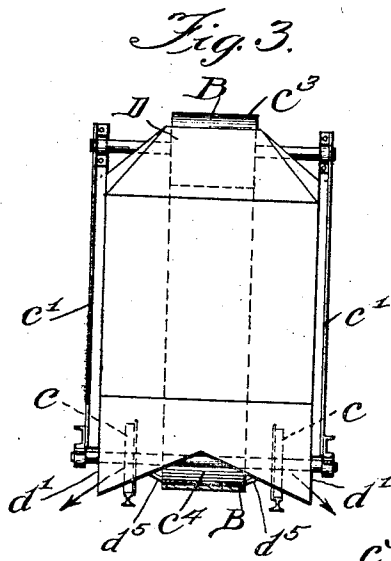
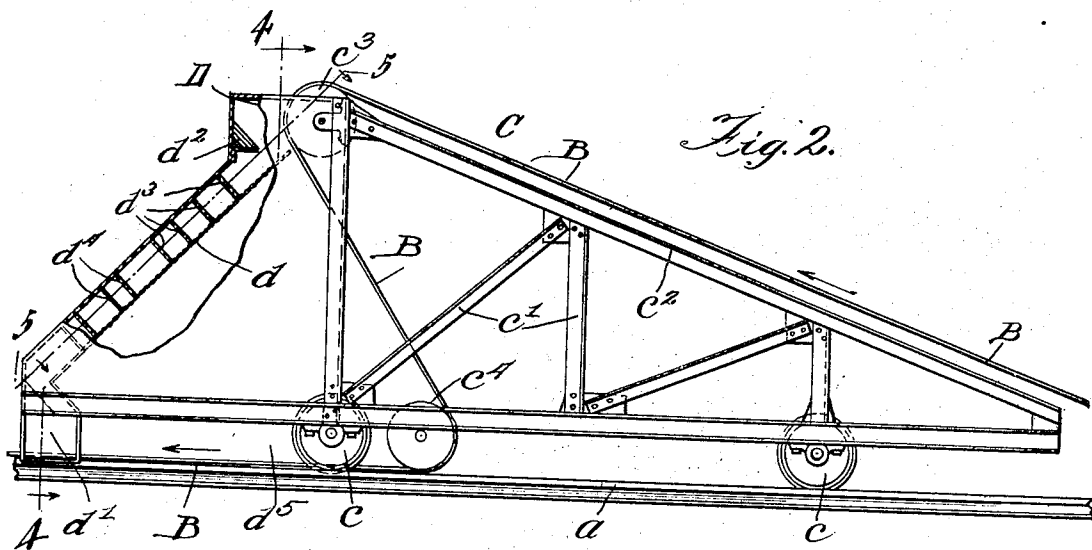
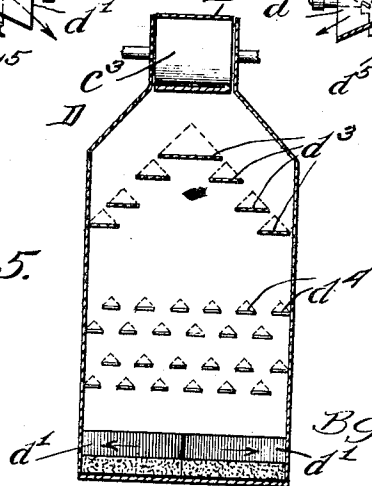


Fig. 5.



Witnesses:
 Chas. Perry
 J. Norby.

Inventor:
 Raymond W. Dull
 By Arthur F. Denard
 Att'y

UNITED STATES PATENT OFFICE.

RAYMOND W. DULL, OF AURORA, ILLINOIS.

APPARATUS FOR SIZING OR GRADING MATERIALS.

1,058,161.

Specification of Letters Patent.

Patented Apr. 8, 1913.

Application filed May 26, 1911. Serial No. 629,585.

To all whom it may concern:

Be it known that I, RAYMOND W. DULL, a citizen of the United States of America, and resident of Aurora, Kane county, Illinois, have invented a certain new and useful Improvement in Apparatus for Sizing or Grading Materials, of which the following is a specification.

My invention relates to apparatus for sizing or grading materials of different kinds, such for example as crushed rock, coal or ore, and for accumulating the different sizes or grades in separate piles or bins.

The object of my invention is to provide an apparatus for this purpose in which provision is made for extending the size or growth of each pile of material in a horizontal direction, whereby the capacity of each pile or bin will not depend upon the vertical height thereof, as was heretofore the case in the use of apparatus of this kind, and whereby the properly sized or graded materials may be discharged at any suitable or desired point along the length of the said apparatus, each size or grade being accumulated in a pile which is separate from the others.

To these and other useful ends, my invention consists in matters hereinafter set forth and claimed.

In the accompanying drawings—Figure 1 is a side elevation of a sizing or grading apparatus embodying the principles of my invention. Fig. 2 is an enlarged side elevation of one of the so-called trippers shown in Fig. 1, certain portions thereof being broken away for convenience of illustration. Fig. 3 is an end elevation of the tripper or machine shown in Fig. 2. Fig. 4 is a section on line 4—4 in Fig. 2. Fig. 5 is a section on line 5—5 in Fig. 2.

As thus illustrated, my invention comprises a stationary frame or superstructure A upon which is mounted a track a . A conveyor belt B is also mounted on the said frame or superstructure, being arranged to travel on rollers b , the upper horizontal portion of the belt traveling in the direction indicated by the arrow, and the two ends of this endless belt being arranged upon rolls and driven in any suitable or desired manner. The co-called trippers C and C' are provided with car wheels c that travel on the said track a , whereby the said trippers can be moved back and forth along the track to trip the load off the belt, or some portion thereof, and discharge the same at any de-

sired point in the length of the apparatus. As the two trippers are exactly alike, a description of one will be sufficient for both.

Referring, therefore, to Figs. 2 to 5, inclusive, it will be seen that the tripper C has a frame or body c' which is carried upon the said car wheels c , and which is provided with an incline c^2 at the upper portion thereof. The said frame is provided with an upper roll c^3 and a lower roll c^4 , the belt B traveling first up the incline c^2 , then over the roll c^3 , then downwardly and under the roll c^4 , and then forward upon the rolls b of the frame or superstructure A. Thus any material carried on the belt is discharged therefrom at the time that it travels over the roll c^3 . The materials thus discharged are caught by a hopper D which is provided with an inclined gravity screen d upon which the materials are free to roll downward and discharge through the spouts d' at each side of the tripper. The initial impact of the materials is sustained by an accumulation of such materials upon the plate d^2 in the upper portion of the hopper. The said materials are then distributed over the surface of the screen by the plates d^3 , which are arranged in stepped relation, there being two series or rows of these plates, and the arrangement being such that the materials are forced to travel between the plates, each plate thereby deflecting a certain proportion of the main stream of materials. These plates are adjustable edgewise, in a direction transverse of their length, and in a direction crosswise of the conveyer belt B, whereby the flow of the materials downward and over the screen d may be regulated at will. In this way the materials are evenly distributed over the surface of said screen, each plate forming an accumulation of the materials to protect itself against wear by abrasion. A second set of plates d^4 is arranged below the plates d^3 , in straight rows, but with the members of each row opposite the spaces between the members of the previous row, whereby the materials are again distributed and retarded in their downward movement. These plates d^4 may also be adjustable edgewise, and in a direction crosswise of the tripper, whereby the action of these plates may be properly adjusted or regulated. Anything that drops through the said screen is caught by the hopper or spout d^5 , and thereby returned to the upper surface of the belt B. These materials thus

returned to the belt then travel onward to the next tripper, or to the final point of discharge at the end of the belt, as the case may be. Suppose, for example, that the mesh or size of the opening in the said screen is of such character that everything except the coarsest portions of the material is allowed to pass through and fall into the hopper d^3 , and then back upon the belt. In such case the said relatively coarse portion of the materials will stay in the hopper D and travel downwardly over the screen d , and finally escape through the lateral spout d' , being then allowed to fall upon the ground at the base of the frame or superstructure A. All other portions of the said materials then travel onward on the belt to the next tripper, where they are again subjected to another sizing or grading operation, or to the point of final discharge at the end of the belt, as the case may be. The said trippers are, as previously explained, exactly alike, except that the mesh or size of opening of the screen of each tripper is necessarily different from that of the screens of all other trippers in the path of the conveyor belt. As stated, the screen of the first tripper to receive the materials may be of wide or coarse mesh, to produce the effect described, whereby the extremely coarse materials will be eliminated first, thus saving wear and tear on the apparatus, and reserving the thinner materials, which in some cases may be the impalpable powder incident to crushing or grinding operations, for the final discharge. Or, on the other hand, the method of sizing or grading can be reversed, as by arranging the trippers so that the one having the finer mesh screen will receive the materials first, thus passing the materials from one tripper to another until the coarsest portions thereof are finally discharged by the last tripper, or at the end of the belt. With this method, of course, the arrangement of the spouts d' and d^3 is necessarily the reverse of that shown—that is to say, the materials passing through the screen are discharged laterally at the sides of the tripper, while the materials which do not pass through the screen are delivered back on to the belt or conveyor B. Either method may be employed, without departing from the spirit of my invention, although it will be found, as previously stated, that the elimination of the coarsest portions of the materials first has some advantage, as in this way the apparatus is saved considerable wear and tear. By an arrangement of this kind, it will be seen that the discharge of the different sizes or grades of materials is not limited to fixed points, as is the case, for example, with a rotary screen, the use of trippers permitting each particular size or grade of material to be discharged at various points in the length

of the track upon which the trippers are movable back and forth, whereby each pile of material may be increased or caused to grow horizontally. In this way the capacity of any bins employed for the different sizes or grades of material may be increased to any size without the necessity of building them up vertically to an undesirable and inconvenient height, which latter is the case when rotary screens or other like sizing and grading devices are employed. With my improved arrangement a large quantity of each size or grade of material may be carried in piles or bins, regardless of the height of the apparatus, as bins which are long and low can be filled by gradually moving the trippers along—that is to say, by causing each tripper to move from one end to the other of its allotted bin. As a matter of fact, however, and as will be seen, it is not necessary to employ bins in connection with the arrangement shown, and this is one of the advantages of my invention.

With the arrangement shown, involving the use of trippers provided with screens of different mesh or size of openings, the different sizes or grades of material can be dumped in the open and accumulated in piles which are widely separated—that is to say, which are separated to the extent that each pile will have ample room in which to grow without encroaching upon or becoming mixed with the others. In this way it is possible to build a track of considerable length, where the materials are to be used and to discharge the different sizes or grades exactly at the points where they are to be used. This is quite different, of course, from the practice when the rotary screen is employed, or other stationary screening apparatus, as in such case the different sizes or grades of materials are discharged at fixed points. Moreover, and with my improved sizing and grading apparatus, the different sizes and grades can be mixed or combined in any desired manner. This can be done, for example, by causing a tripper to discharge the coarse portions of the materials into a certain bin to the desired and necessary extent, and by then causing another tripper to move along and add thereto a suitable quantity of a finer grade or smaller size of materials.

There are various other uses and modes of operation which are possible with my improved apparatus, which are obvious, and which are impossible, or at least inconvenient, with the apparatus heretofore employed in the sizing and grading of materials.

What I claim as my invention is:

1. Apparatus for sizing and grading material, comprising a conveyor belt arranged to travel horizontally, adapted to support the material thereon, and a plurality of

trippers disposed in the path of travel of said belt, adapted to successively intercept the material thereon, each tripper being provided with a sizing mechanism, the mechanism of each tripper comprising a screen, and the screens of said trippers being of different character, each tripper being movable to intercept the load at different points in the length of said belt.

2. Apparatus for sizing and grading material, comprising a conveyer for the material, and a tripper in the path of said conveyer, adjustable along the length thereof, said tripper being provided with a sizing mechanism for dividing the material into two parts, means for preventing one of said parts from returning to the conveyer, and means for returning the other part to the conveyer, whereby the tripper unloads only a portion of the material from the belt.

3. Apparatus for sizing and grading material, comprising an endless traveling conveyer belt, means for supporting said belt in a horizontal position, said belt being adapted to carry the material on the upper surface thereof, and a tripper disposed in the path of travel of said belt, adjustable along the length thereof, said tripper being provided with a screening mechanism for separating out of the bulk of the material a certain predetermined size or grade thereof, permitting the ungraded portions of the material to return to the conveyer belt, and means for preventing the said separated size or grade from returning to said belt, whereby the tripper unloads only a portion of the material from the belt.

4. Apparatus for sizing and grading material, comprising an inclined gravity screen, and a distributing mechanism comprising a plurality of inclined plates ar-

ranged in stepped relation along the surface of said screen, whereby the said plates act on the material moving along the said screen, each plate being disposed at an angle to said screen, and with one edge engaging the surface thereof.

5. Apparatus for sizing and grading material, comprising a traveling conveyer, a tripper in the path of said conveyer, adjustable along the length thereof, and a screening mechanism on said tripper, said mechanism comprising an inclined gravity screen for separating out of the bulk of the material a certain predetermined size or grade thereof, permitting the remainder to travel onward with the said conveyer, whereby said tripper unloads only a certain size of the material from the belt.

6. A belt conveyer, and a tripper therefor, adjustable along the length thereof, said tripper being operative to remove only certain size portions of the load from said belt.

7. A belt conveyer, and a tripper therefor, adjustable along the length thereof, said tripper being operative to remove only certain portions of the load from said belt, and having a screen whereby the load is divided.

8. A belt conveyer, and a tripper therefor, adjustable along the length thereof, said tripper being operative to remove only certain portions of the load from said belt, and having a screen that intercepts the entire load and returns only a portion thereof to the belt.

Signed by me at Chicago, Illinois, this 19th day of May, 1911.

RAYMOND W. DULL.

Witnesses:

ELLEN H. CLEGG,
S. LEWIS.