

(No Model.)

G. W. CROSS.  
SCREEN.

No. 572,966.

Patented Dec. 15, 1896.

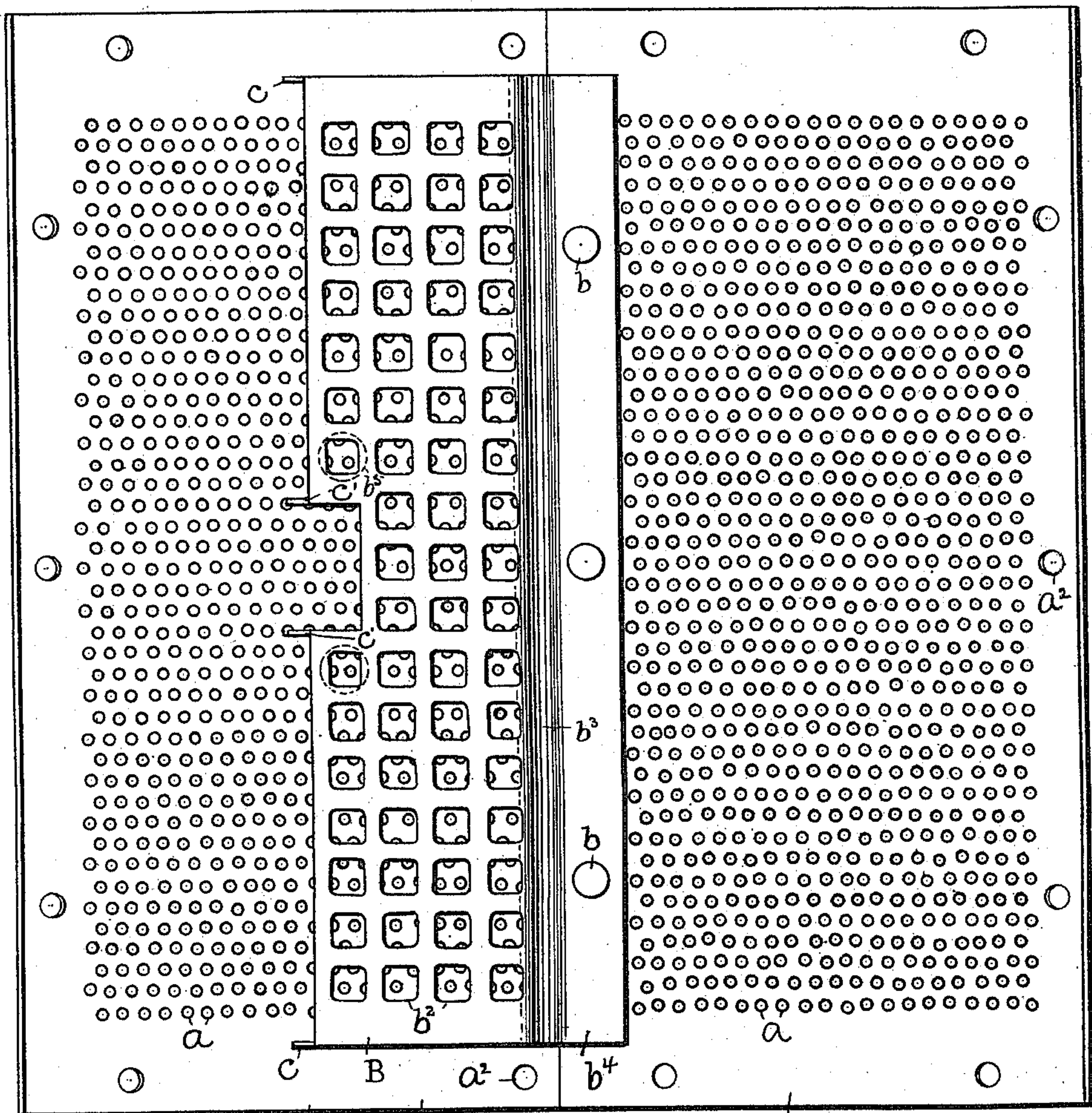


Fig. 1.

Fig. 2

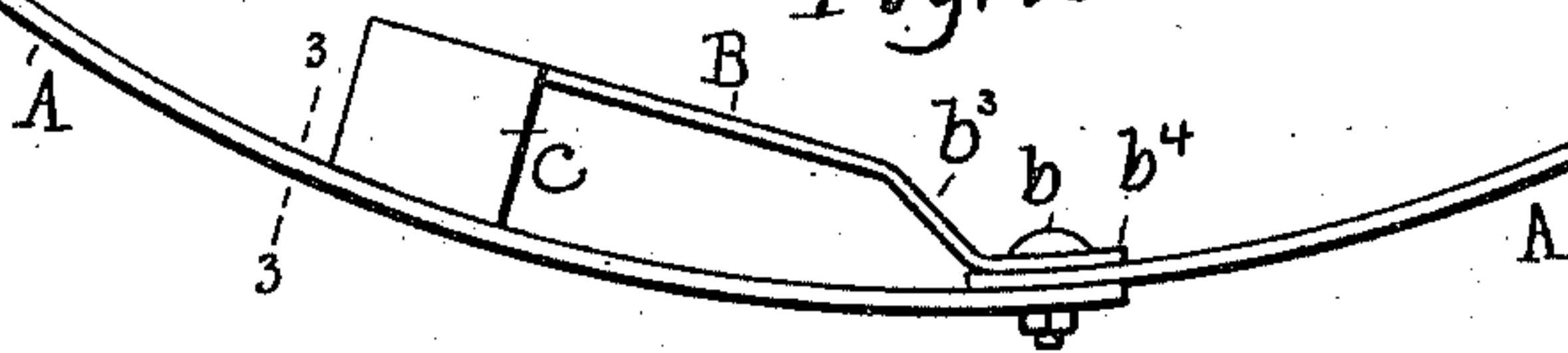


Fig. 3.

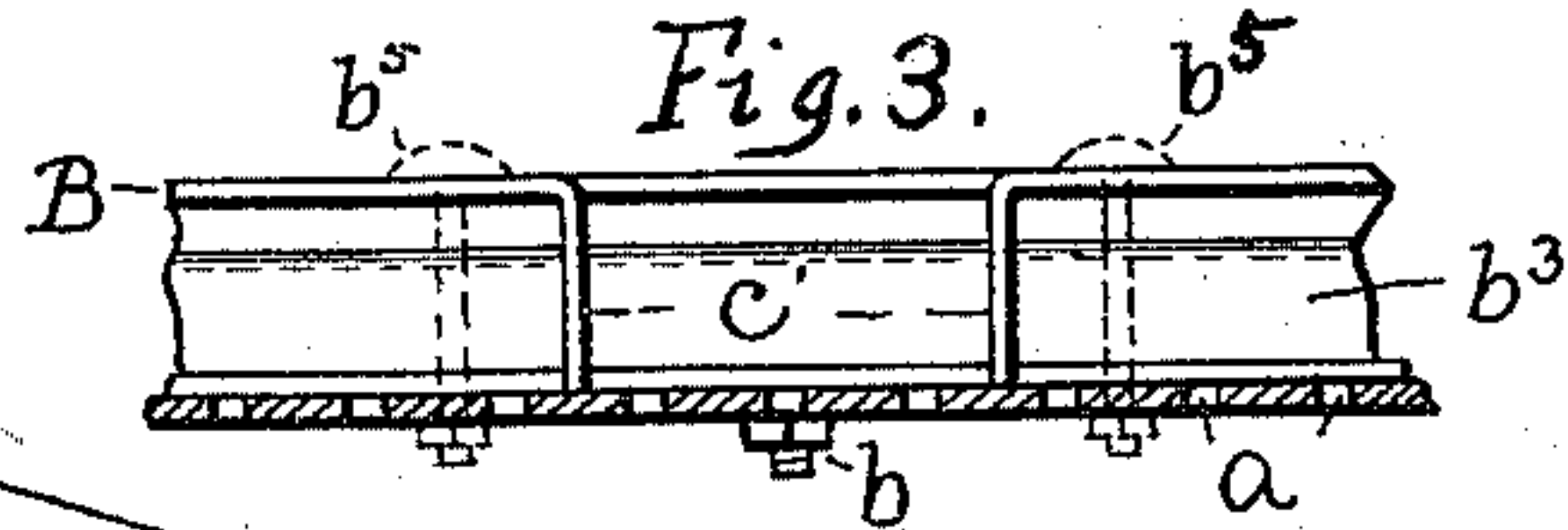
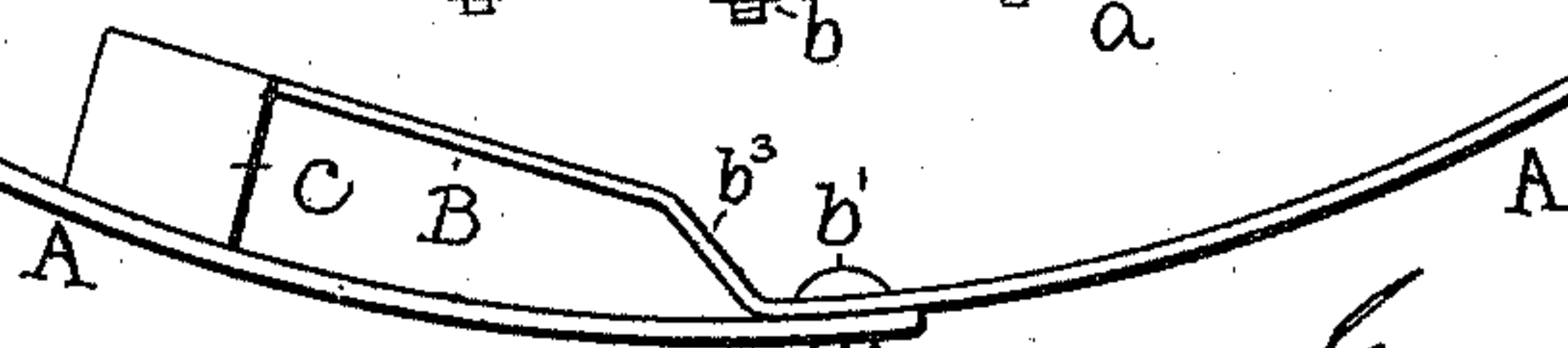


Fig. 4.



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# UNITED STATES PATENT OFFICE.

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## SCREEN.

SPECIFICATION forming part of Letters Patent No. 572,966, dated December 15, 1896.

Application filed November 23, 1895. Serial No. 569,901. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE W. CROSS, a citizen of the United States, residing at Pittsburgh, in the county of Luzerne and State of Pennsylvania, have invented a certain new and useful Improvement in Screens, of which the following a specification.

My invention relates to improvements in screens for the separation of particles of coal, ore, &c., into various sizes.

The invention concerns particularly mechanism designed for agitating the coal in its passage through the screen, so as to promote the separating operation.

As is well known, in the use of revoluble screens particles of materials of various sizes are passed through the screen, such screen having perforations increasing progressively in dimension from the inlet end to the outlet end. The coal or other material in passing over a plain screen-surface is liable to slide thereon, and the larger particles, by reason of their greater specific gravity, frequently ride upon the screening-surface and prevent those particles which are of such size as to pass through the perforations at that point from being separated from the mass. The operation of tumbling or agitating the material so as to preclude the sliding of the larger particles on the screen-surface is designed to prevent this and to so agitate the particles or change their relation to each other as to permit the smaller particles to find the screening-surface and to pass through the perforations therein at the proper point.

To the end that this may be accomplished more perfectly than has heretofore been done I employ a revoluble screen consisting of perforated segments which may be mounted upon the spider rims or bands of the screen by bolts, rivets, or other suitable means. The imperforate margins of these segments may overlap each other and be secured in any desired manner, or the edges thereof may abut. At the joint between two segments I employ a perforate tumbler. This perforate tumbler is provided with an imperforate margin depressed below the perforate portion and secured upon the imperforate margin of a segment or upon the adjoining margins of two abutting segments. The perforate portion of said tumbler is raised above the work-

ing surface of the segment, and its free edge may be supported by means of suitable lips secured to or formed integral with the perforate tumbler. The perforations in the tumbler are preferably of greater dimension than those in the segments to which it is applied. The operation made possible by this construction, and which will be hereinafter described, insures a more perfect separation of the material than has heretofore been accomplished.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of two adjoining screen-segments with my invention applied thereto. Fig. 2 is an end elevation of the structure shown in Fig. 1. Fig. 3 is a detail sectional view on line 3 3, Fig. 2, looking in the direction of the arrow on the latter figure; and Fig. 4 is an end elevation illustrating a modification.

Referring to the drawings, in which similar letters of reference denote corresponding parts, A A designate screen-segments, here shown as oblong in form and provided with perforations  $a$ , round in the present instance, and with imperforate margins  $a'$ . The imperforate end margins of the segments are adapted to be secured to the spider rims or bands of a revoluble screen by any suitable means. I have shown perforations  $a^2$  adapted to receive bolts for this purpose. The side margins may also, if desired, be provided with holes for the reception of bolts or rivets.

In the example of my invention illustrated in Figs. 1 and 2 the adjacent side margins of the segments are overlapped. It is not essential that this construction be followed, as I may, if desired, form a butt-joint between the side margins of the two segments.

B designates the perforate tumbler. This may be separable from one of the tumbler-segments and secured thereto by means of bolts or rivets or may be formed integral with one of the segments and constitute a perforate extension thereof on the longitudinal edge. Both of these forms are illustrated in the drawings. In Figs. 1 and 2 I have shown the perforate tumbler as separable from the segments, the edges of said segments being lapped and secured together and the imperforate edge of the tumbler secured upon such



lap by means of bolts or rivets  $b$ . The integral construction is illustrated in Fig. 4, in which, as will be seen, the perforate tumbler is formed as an extension of one of the segments, the imperforate edge of the next adjacent segment being secured to the segment formed integral with the perforate tumbler by means of bolts or rivets  $b'$ .

The perforate tumbler consists of a plate which is oblong in the present instance and which is provided over the greater portion of its expanse with perforations  $b^2$ . These perforations, as well as the perforations in the segments, may be of any desired form and construction. Thus one or the other or both may be either round or square or oblong in form. The perforate tumbler  $B$  is bent downwardly at  $b^3$  and is provided with an imperforate offset  $b^4$ , provided with holes for the reception of the bolts or rivets  $b'$ . The object of this construction is to maintain the perforate portion of the tumbler-bar in a position above the plane of the working surface of the screen, and this location relatively to the screening-surface may be further assured by supports for the free edge of the perforate tumbler. I have illustrated for this purpose lips  $c$ , located at either end of the perforate tumbler and depending so as to bear upon the segment below the tumbler. If desired, I may also form lips upon the free edge of the perforate tumbler intermediate of the ends, these lips being formed by slitting the free edge and bending down the slitted portion, as shown at  $c'$ . An advantage of the lips shown and described is that the narrow edge of a lip is presented to the coal in the revolution of the screen.

If desired, I may, in addition to providing supports for what I have termed the "free" edge of the perforate tumbler, employ means for maintaining said edge in its proper relation to the working surface. For instance, I may employ bolts  $b^5$ , passing through perforations in the perforate tumbler and the corresponding perforations in the screen-surface, said bolts being provided with heads and nuts sufficiently large to preclude their passage through the perforations. Each of these bolts may pass through a perforation adjacent to the intermediate supporting-lips  $c'$ . Thus by reason of the lips  $c'$  and the bolts  $b^5$  the perforate tumbler is precluded from being pressed downwardly upon the screening-surface or from being forced upwardly therefrom beyond its proper plane.

The operation of the device is as follows: The coal or other material being fed to the screen passes over the screening-surface, and, as before stated, the action of gravity upon the particles causes the larger and heavier particles to first reach the screening-surface. At the point at which the material is fed to the screen the perforations in the screening-surface are too small to permit such large particles to pass therethrough, and obviously unless means were provided to allow the

smaller particles to come into contact with the screening-surface such smaller particles would be carried along within the screen until they reached the point where they were allowed to pass through a perforation adapted to screen larger particles. This is precluded by the perforate tumbler of the present invention. Thus in the revolution of the screen the larger particles next the screening-surface are caught by the relatively large perforations in the perforate tumbler and carried a short distance up the side of the screen, thus turning the particles over and agitating them in such manner as to allow the smaller particles to pass downwardly, come in contact with the screening-surface, and pass through the perforations therein. A further advantage of this construction is one incident to the practice of first screening from the mass the smaller sizes of coal or other material. For this purpose, as I have said, the perforations in the screen increase in dimension progressively from the inlet end to the outlet end. Of course the large particles cannot be separated until they reach that portion of the screen provided with perforations of suitable size, and it is therefore desirable that the larger particles of coal or other material should be passed as quickly as possible to that point. This is attained in the present construction for the reason that the larger particles of coal are caught and carried up the side of the screen a short distance by the perforations in the perforate tumbler. When released from the perforate tumbler, they fall on the top of the mass, and by reason of the pitch of the screen are projected forward as well as downward, and in this manner their passage over the smaller perforations and to the point where the perforations are of sufficient size to separate them is hastened.

Having now described my invention, what I claim is—

1. In a revoluble screen, the combination with a screening-surface, of a tumbler located in the interior of the screen and revolving therewith, said tumbler consisting of a perforate plate or sheet arranged substantially parallel with the screening-surface and extending over only a portion thereof, and having an inclined forward edge by which the tumbler is secured in place and up which the material will be moved to the upper perforate surface of the tumbler, substantially as and for the purposes set forth.

2. In a revoluble screen, the combination with a screening-surface, of a tumbler located in the interior of the screen and revolving therewith, said tumbler consisting of a plate or sheet having perforations of larger size than those of the screening-surface, and arranged substantially parallel with the screening-surface and extending over only a portion thereof, and having an inclined forward edge by which the tumbler is secured in place and up which the material will be moved to the upper perforate surface of the tumbler,



substantially as and for the purposes set forth.

3. In a revoluble screen, the combination with a screening-surface, of a tumbler located  
5 in the interior of the screen at the point between two adjacent segments, said tumbler consisting of a perforate plate or sheet arranged substantially parallel with the screening-surface and extending over only a portion  
10 thereof, and having an inclined forward edge by which the tumbler is secured in place by the bolts or rivets for holding said adjacent segments together, substantially as and for the purposes set forth.

15 4. In a revoluble screen, the combination with a screening-surface, of a tumbler located in the interior of the screen and revolving therewith, said tumbler consisting of a perforate plate or sheet arranged substantially  
20 parallel with the screening-surface and extending over only a portion thereof, having

an inclined forward edge by which the tumbler is secured in place, and having downturned lugs or ears for supporting its after edge, substantially as set forth. 25

5. In a revoluble screen, the combination with screen-segments, of a perforate tumbler having one edge secured to the margin of a segment adjacent to the joint between said segment and the next adjoining segment, integral downturned lips on said tumbler for  
30 maintaining the opposite edge of the same in position relatively to the screening-surface, and bolts passing through said screening-surface and the tumbler adjacent to said downturned lips, substantially as described. 35

This specification signed and witnessed this 16th day of November, 1895.

GEORGE W. CROSS.

Witnesses:

EUGENE CONRAN,  
JOHN R. TAYLOR.