

J. H. WALKER.  
SEPARATOR FOR COAL.  
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904,738.

Patented Nov. 24, 1908.

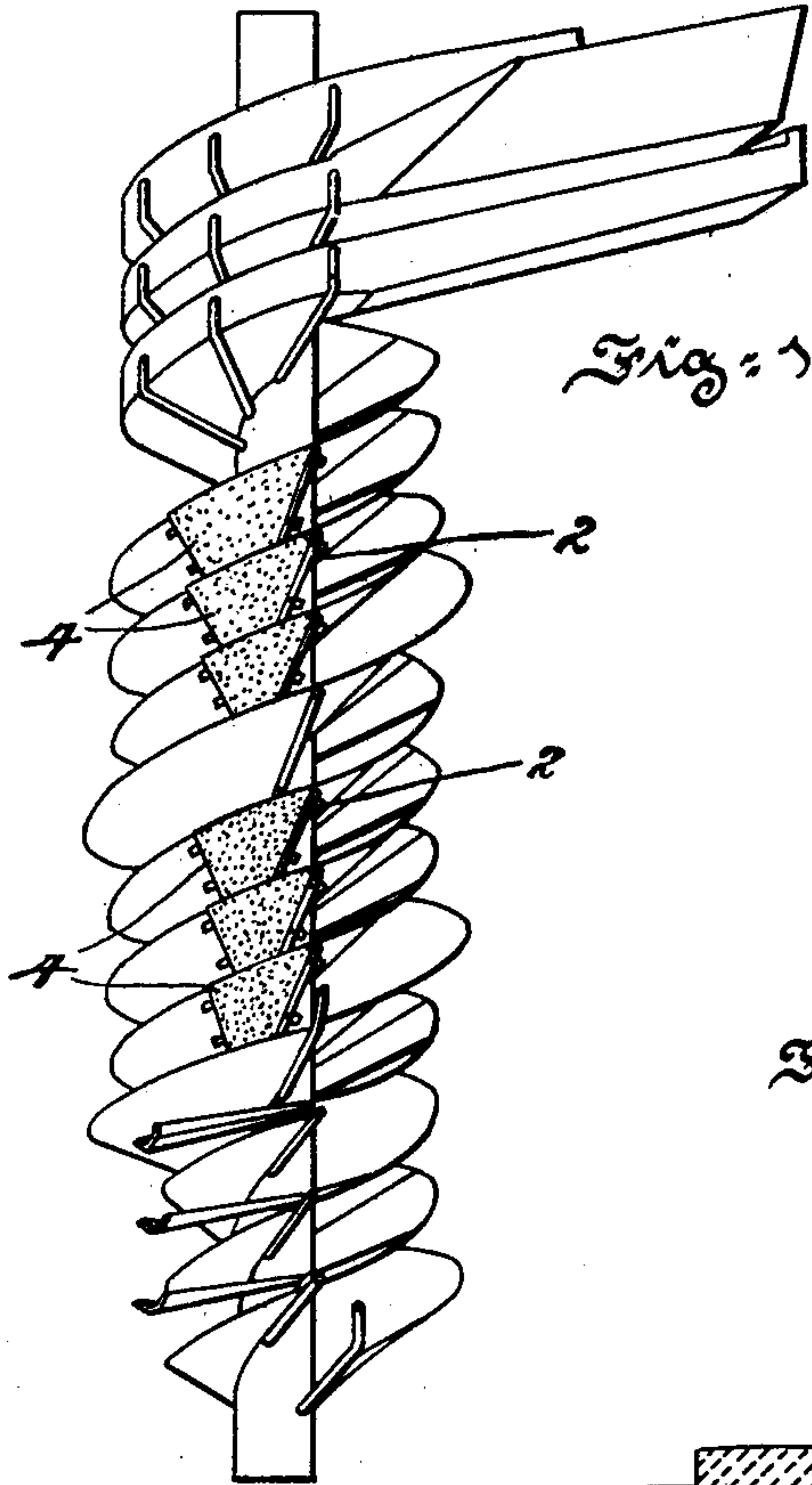


Fig. 1

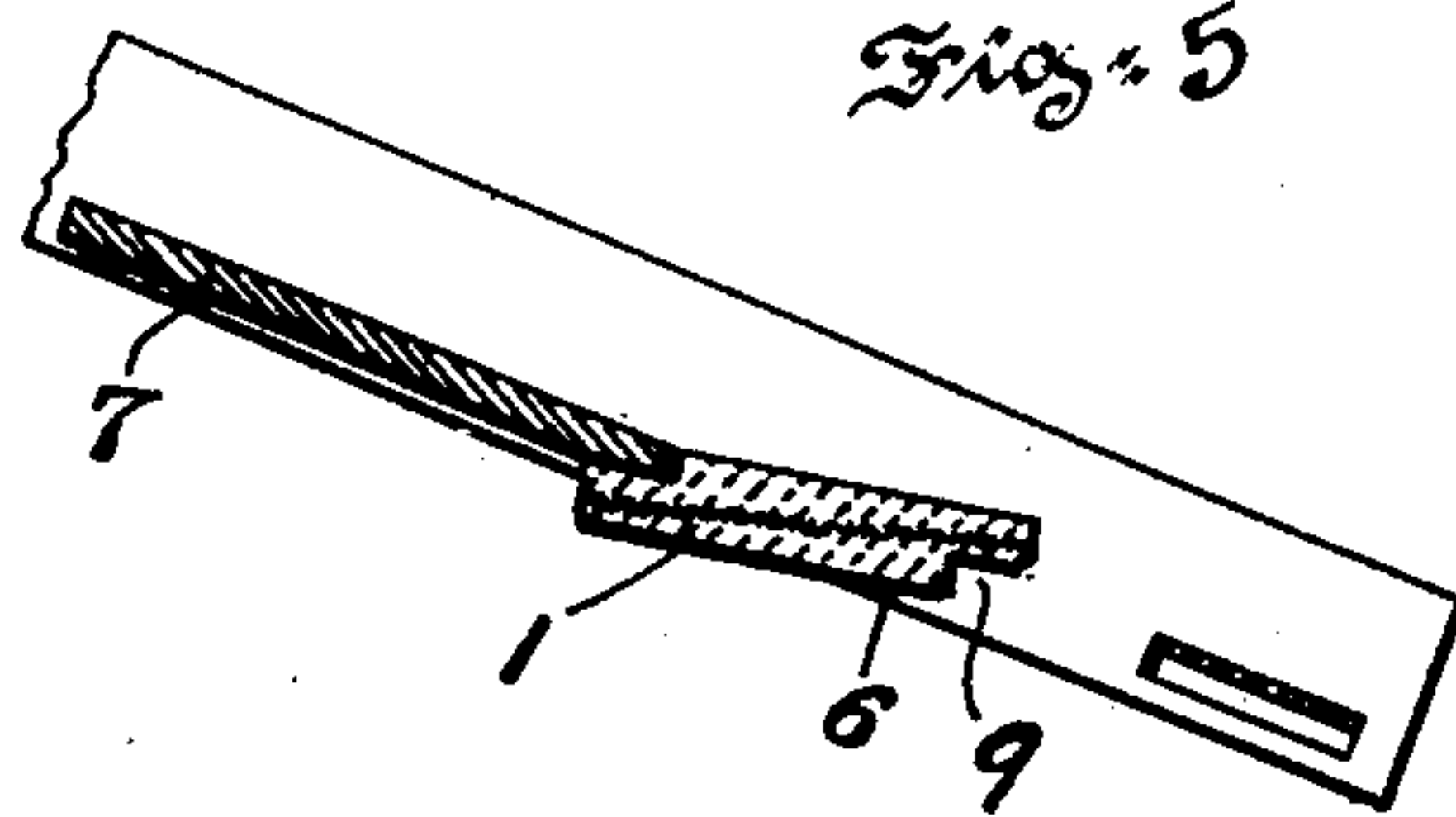


Fig. 5

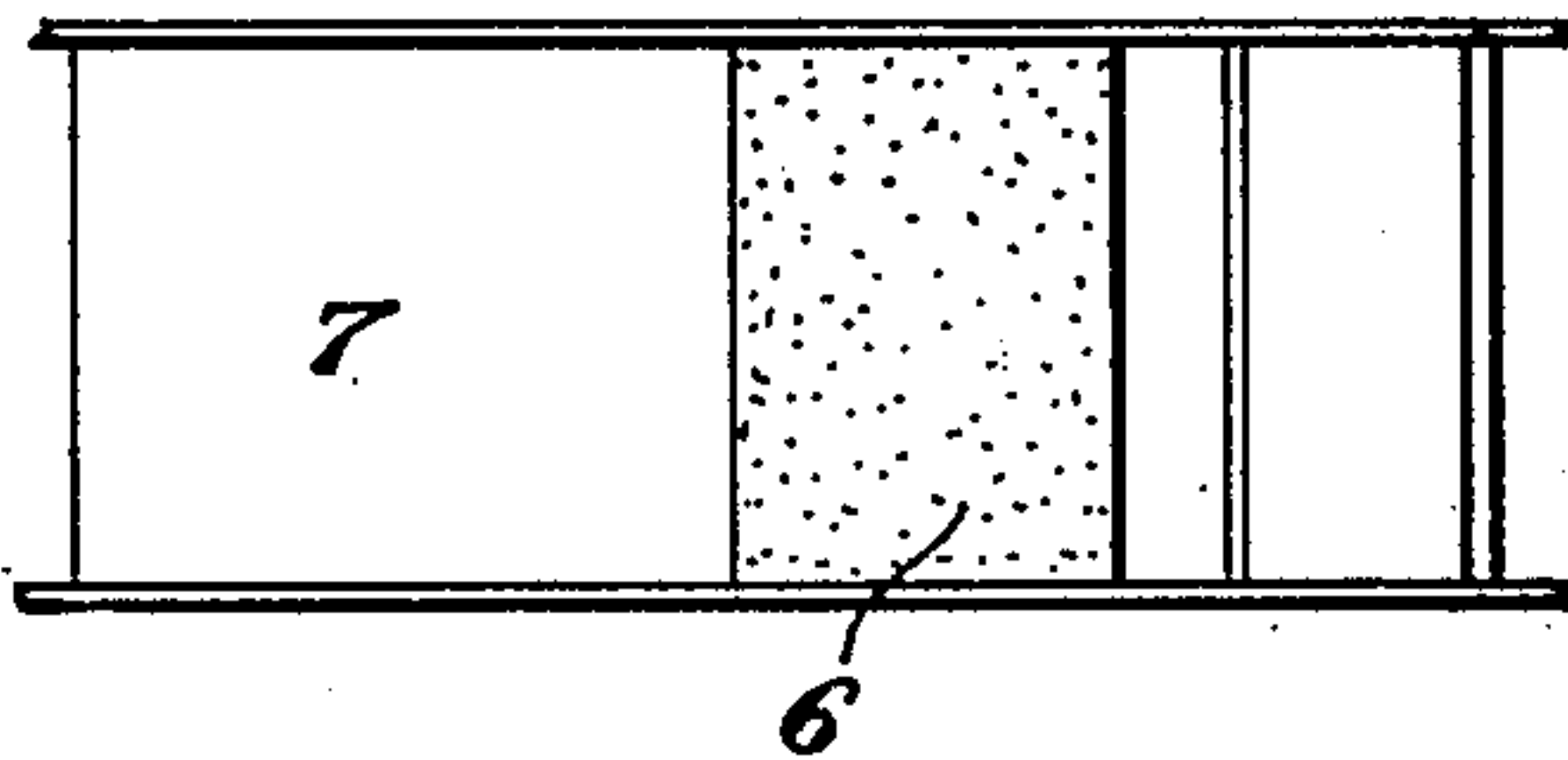


Fig. 4

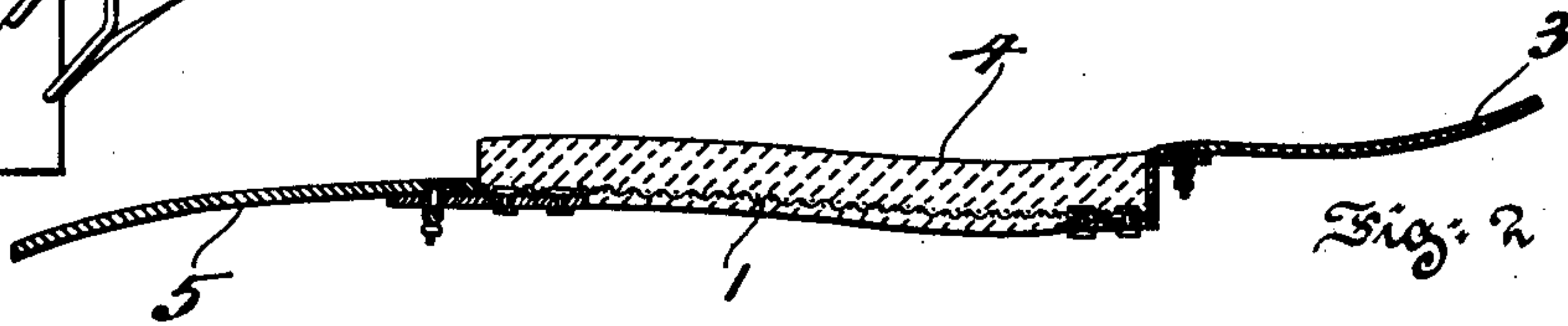


Fig. 2

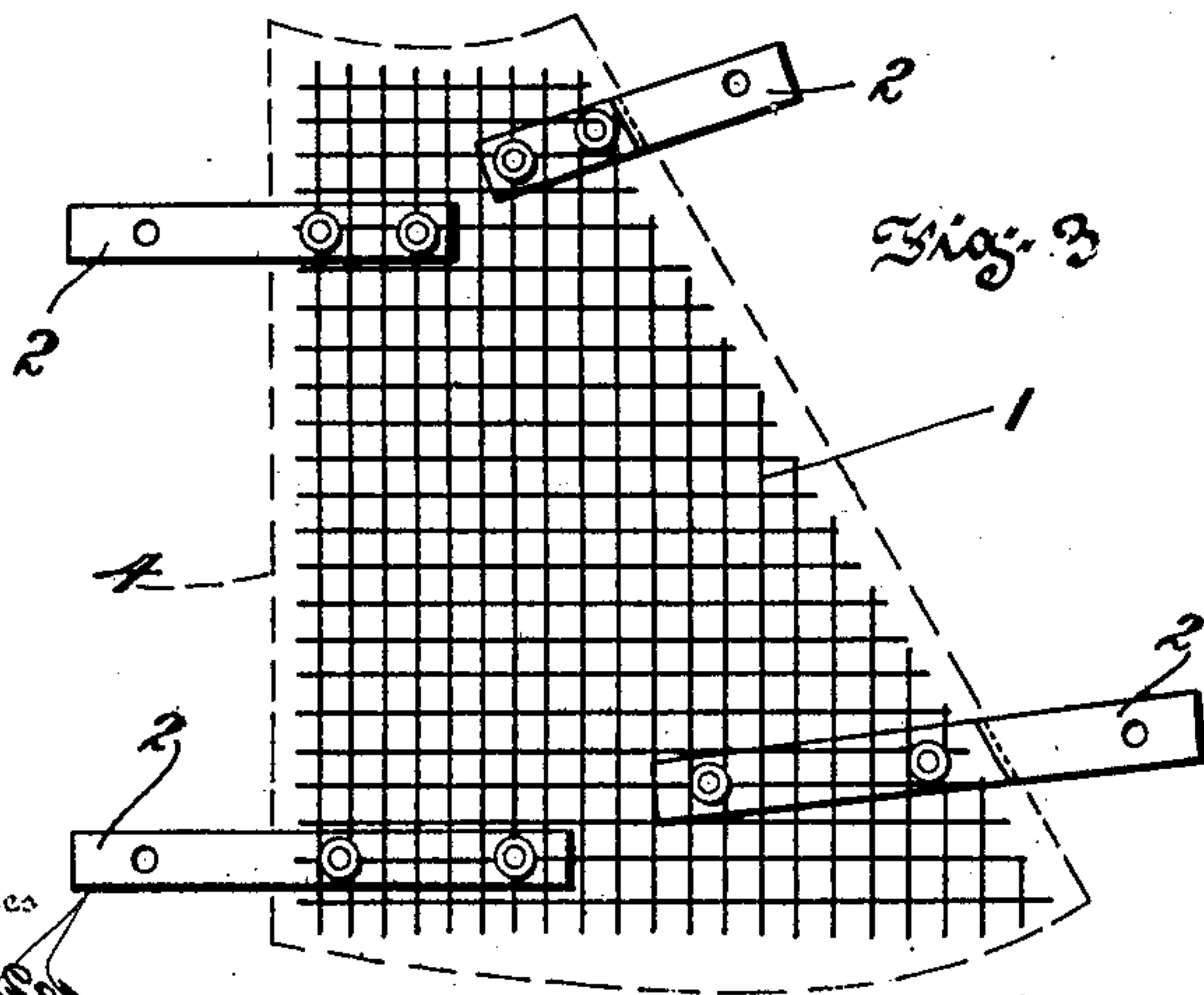


Fig. 3

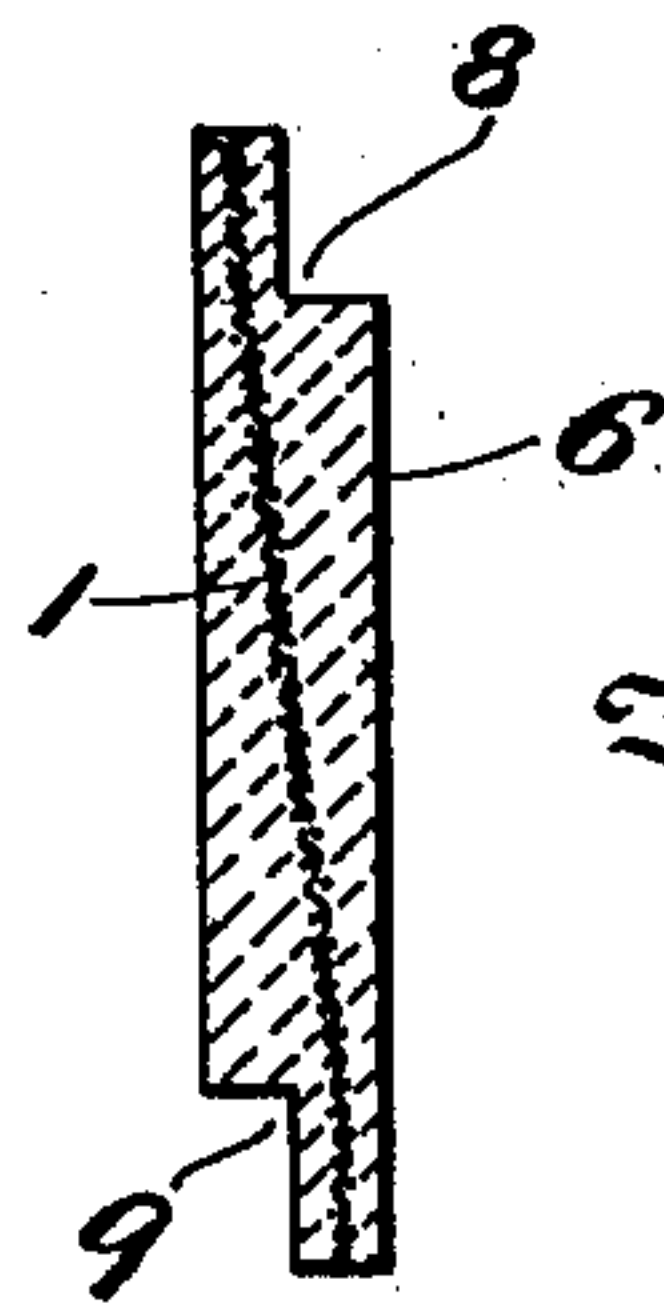


Fig. 6

Witnesses

*R. M. Gilligan*

Inventor

*John H. Walker*

By

*Augustus D. Slaughter*

Attorney



# UNITED STATES PATENT OFFICE.

JOHN H. WALKER, OF SCRANTON, PENNSYLVANIA.

## SEPARATOR FOR COAL.

No. 904,738.

Specification of Letters Patent.

Patented Nov. 24, 1908.

Application filed September 17, 1907. Serial No. 393,308.

*To all whom it may concern:*

Be it known that I, JOHN H. WALKER, a citizen of the United States, residing at Scranton, county of Lackawanna, State of Pennsylvania, have invented certain new and useful Improvements in Separators for Coal, of which the following is a specification.

In the mechanical separation of coal from slate and so-called "bone," advantage is taken of gravity, centrifugal force and a retarding action or frictional resistance, either altogether or in various combinations. Although various expedients and materials have been resorted to for producing friction and retardation of the slate and "bone," still, the results, while commercial are often unreliable and dependent upon the condition of wetness or dryness or other characteristic of the material, and upon other varying conditions. By reason of the structure and form of the various types of the machines by which the separation is effected, it is practically an expensive matter to employ materials such as stone for producing the desired retardation.

The objects of the present invention are to afford a construction of friction plates for types of coal separators which will retard the momentum of the slate and "bone" under conditions of wetness and dryness and varying composition and character of material such as interfere with the operation of coal separators as at present employed; to provide a section or plate for use in separators for coal which shall be comparatively inexpensive, easily constructed in any desired form, and possessed of the necessary strength and qualities and characteristics that are required for producing a character of retardation which is effective and reliable in separating the slate and "bone" from the coal; to deliver the coal, slate and "bone" over the improved section or plate with a gliding motion and in such way that the latter is not subjected to the deleterious results that might follow if the section or plate were to suffer the impact of the material, to provide a composition of matter especially adapted for use as a section or plate in separators for coal, and to provide for reinforcing and supporting such a section or plate.

The invention consists in the combination of a concrete or admixture of sand, stone screenings and Portland cement, possessed

of the necessary degree of hardness for withstanding the usage to which it is put, and of the qualities or characteristics which are efficient and reliable in effecting the separation.

It also consists in reinforcing and supporting such an admixture or concrete, and it also consists in the form or construction by which the coal, slate and "bone" is delivered over the section or plate with a gliding motion; all these together or separately.

For the sake of description, reference may be made to the accompanying drawings, in which

Figure 1 is an elevational view of a spiral separator for coal, showing sections or plates of my invention applied to its spiral runway. Fig. 2 is a sectional view illustrating a section or plate of my invention, together with the adjacent metal sections or plates. Fig. 3 is a top or plan view of a reinforcement for the section or plate of my invention. Fig. 4 is a face view of the runway of another type of separator, showing my invention in application to it. Fig. 5 is a sectional view of the device shown in Fig. 4, and Fig. 6 is a sectional view of the section or plate shown in Fig. 5.

The best admixture or concrete known to me for use in making sections or plates for coal separators consists of slightly less than  $1\frac{1}{2}$  parts of granite screenings and granite sand, and about 1 part A<sup>1</sup> Portland cement, by bulk. These proportions are not the common proportions, and they produce a concrete especially adapted for the purpose. I have discovered that, by using what is known as a freezing mixture with these ingredients, the resultant admixture or concrete is unusually hard and possessed of high tensile strength. The freezing mixture which I have used consists of a 4 oz. mixture of sal ammoniac and sodium chlorid in the proportions of ten per cent. sal ammoniac and ninety per cent. sodium chlorid by weight, dissolved in a gallon and a half of water.

In mixing the concrete, the sand and the screenings and cement are thoroughly mixed, and then wet with the freezing mixture named. The proportion of sand and screenings may be somewhat varied, and the purpose is that the screenings may be properly held, and that the concrete may have the requisite strength and hardness. The granite



sand is therefore comparatively fine, and the granite screenings are about the size of fine or small gravel.

I am not prepared to state why it is that the use of the freezing mixture imparts to the finished concrete unusual hardness and especially fits it to withstand the action to which it is subjected in the coal separator, but actual use shows that the granite granules are firmly held in place until worn down, with the result that the separation itself is more complete and can be carried on under conditions of wetness and dryness and varying composition and character of material such as interfere with the operation of coal separators as at present constructed.

The section or plate of the described composition has embedded in it and is formed around a reinforcement 1, shown to consist of wire netting, although I do not intend to limit myself to that material, but I may say that it produces excellent results in practice. To the reinforcement are secured attaching means 2. In the case of a spiral runway such, for example, as is described in Letters Patent 694,420, and in Letters Patent, 815,856, the metal section or plate 3 which delivers the coal, slate and "bone" to the described section or plate 4, is arranged in such way, that the top surfaces of the two are flush with each other, and this may be readily accomplished by properly adjusting the attaching means for this purpose. The metal section or plate 5, to which the material is delivered from the described section or plate of my invention, may be so arranged that the material drops upon it, and this can be accomplished by properly adjusting the fastening devices. When this construction is employed the section or plate 4, presents practically its full thickness for wear. In the case of the type of separator, of which Letters Patent 784,783 is an example, shown in Figs. 4, 5 and 6, the section or plate of my invention has its face arranged flush with the face of section or plate 7, which delivers the material to it. This is the case with the spiral separator, and the purpose in each case is to cause the material to glide over the concrete section or plate. The section or plate 6, is provided with a reinforcement, and it may be recessed as at 8 and 9, so that when one face is worn it can be turned around and its use continued.

A concrete section or plate of the invention when new may present a smooth surface, but the material passing over it in a very short time causes it to present upon its surface the granite screenings which it contains, and they appear to retard or otherwise control the passage of the slate and "bone" in such a way that the separation from the coal is made more complete. Sections or plates of the invention can be readily made in flat, warped or other form by the

use of appropriate molds and without any material expense.

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

1. The combination of the run-way of a coal separator with a section or plate constituting part of the run-way and having a surface of granular texture with a relatively softer binding medium and the binding medium containing cement and sand and a hardening substance or material and the granular material consisting of stone screenings relatively coarser than the ingredients of the binding medium, substantially as described.

2. The combination of the run-way of a coal separator with a section or plate constituting part of the run-way and having a surface of granular texture with a relatively softer binding medium and consisting of an admixture of less than  $1\frac{1}{2}$  parts granite screenings and granite sand and one part A1 Portland cement by bulk, and a solution of a 4 oz. mixture of sodium chlorid and sal ammoniac in the proportions of ninety per cent. common salt and ten per cent. of sal ammoniac by weight, dissolved in one and one-half gallons of water, and the granular material being relatively coarser than the materials of the binding medium, substantially as described.

3. The combination in a coal separator of a run-way with inserts arranged in the run-way and having a surface of granular texture with a relatively softer binding medium, and the material or granules of the surface being relatively coarse as compared with the material of the binding medium, substantially as described.

4. The combination in a coal separator of a run-way with inserts arranged in the run-way and consisting of hard granules adapted to resist wear by attrition and a relatively softer binding medium subject to wear by attrition to expose the granules and present a rasp-like surface, substantially as described.

5. The combination of the run-way of a coal separator with a section or plate constituting part of the run-way and having a surface of granular texture with a relatively softer binding medium and consisting of an admixture or concrete of granite screenings and sand and cement and common salt and sal ammoniac, and the granular material being relatively coarser than the materials of the binding medium, substantially as described.

6. The combination of the run-way of a coal separator with a section or plate constituting part of the run-way and having a surface of granular texture with a relatively softer binding medium and consisting of an admixture or concrete of less than one and



one-half parts of granite screenings and granite sand and one part of A<sup>1</sup> Portland cement by bulk, and the granular material being relatively coarser than the materials of the binding medium, substantially as described.

7. The combination of the run-way of a coal separator with, a section or plate constituting part of the run-way and having a surface of granular texture with a relatively softer binding medium and the binding medium containing cement and sand and a hardening substance or material, and the granular material consisting of stone screenings relatively coarser than the ingredients of the binding medium, and a foraminous reinforcement embedded in said section or plate, substantially as described.

8. The combination of the run-way of a coal separator with, a section or plate constituting part of the run-way and having a surface of granular texture with a relatively softer binding medium and the binding medium containing cement and sand and a hardening substance or material, and the granular material consisting of stone screenings relatively coarser than the ingredients of the binding medium, and a reinforcement embedded in said section or plate and provided with attaching means extending beyond the edge thereof, substantially as described.

9. The combination of the run-way of a coal separator with, a section or plate constituting part of the run-way and having a surface of granular texture with a relatively softer binding medium and the binding medium containing cement and sand and a hardening substance or material, and the granular material consisting of stone screenings relatively coarser than the ingredients of the binding medium, and a foraminous reinforcement embedded in said section or plate

and having a warped form, substantially as described.

10. The combination of the run-way of a coal separator with, a section or plate constituting part of the run-way and having a surface of granular texture with a relatively softer binding medium and the binding medium containing cement and sand and a hardening substance or material, and the granular material consisting of stone screenings relatively coarser than the ingredients of the binding medium, with a reinforcement embedded in said section or plate and provided with attaching means extending beyond the edges thereof, and with a metal section or plate having its surface arranged flush with said section or plate whereby substances glide from the former onto the latter, substantially as described.

11. The combination in a separator for coal of a metallic spiral run-way, and inserts arranged in the run-way and having a surface of granular texture with a relatively softer binding medium and the material or granules of the surface being relatively coarse as compared with the material of the binding medium, substantially as described.

12. The combination in a separator for coal of a metallic spiral run-way, and warped inserts arranged in the run-way and having a surface of granular texture with a relatively softer binding medium and the material or granules of the surface being relatively coarse as compared with the material of the binding medium, substantially as described.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN H. WALKER.

Witnesses:

EDGAR A. JONES,  
GEO. F. OWENS.