No. 650,120.

Patented May 22, 1900.

C. W. ZIEGLER.

COAL SEPARATOR.

(Application filed Oct. 9, 1899.)

(No Model.)

5 Sheets—Sheet 1.

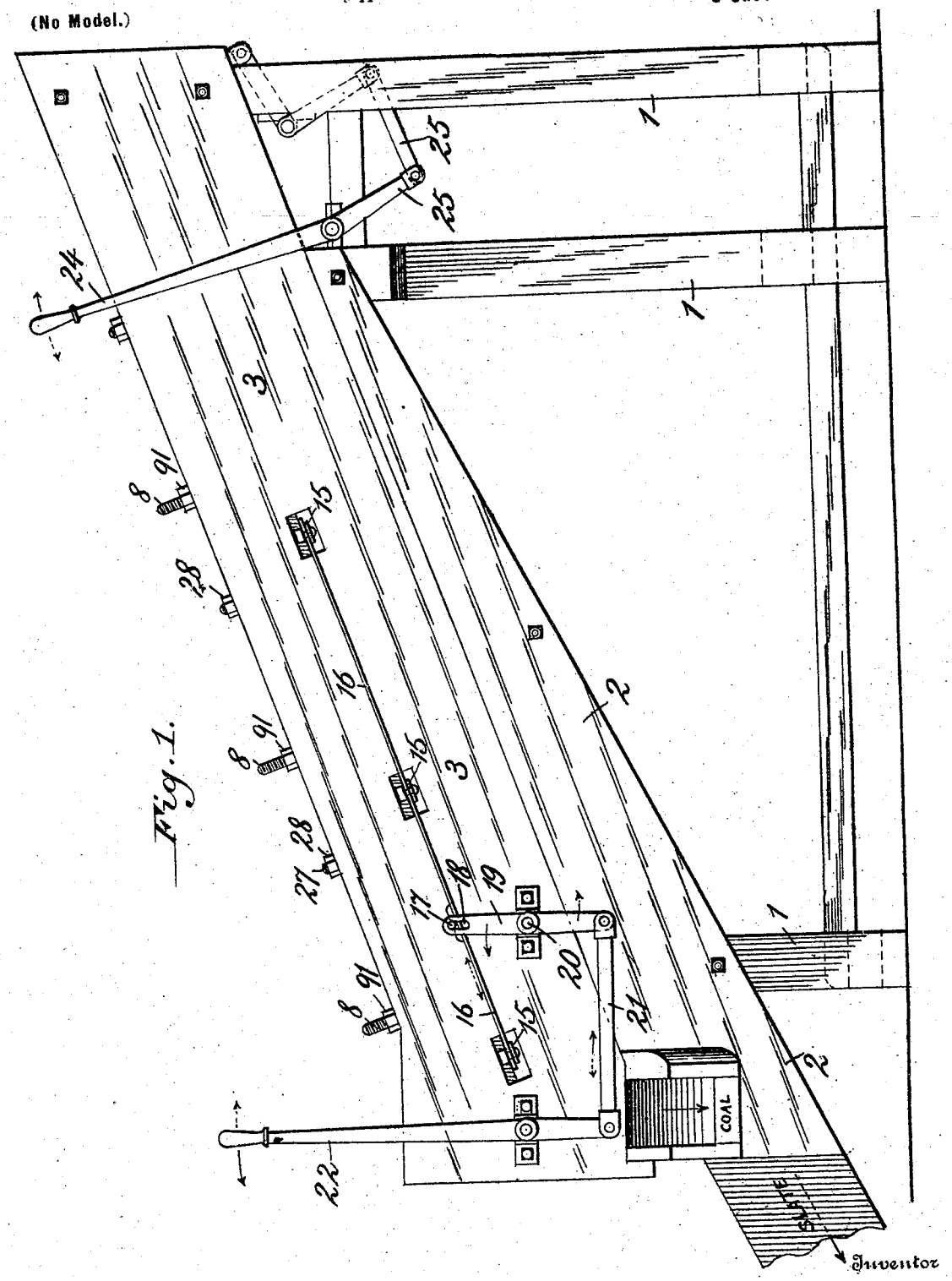

Fig. 1.

Witnesses

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(No Model.) 5 Sheets—Sheet 2.

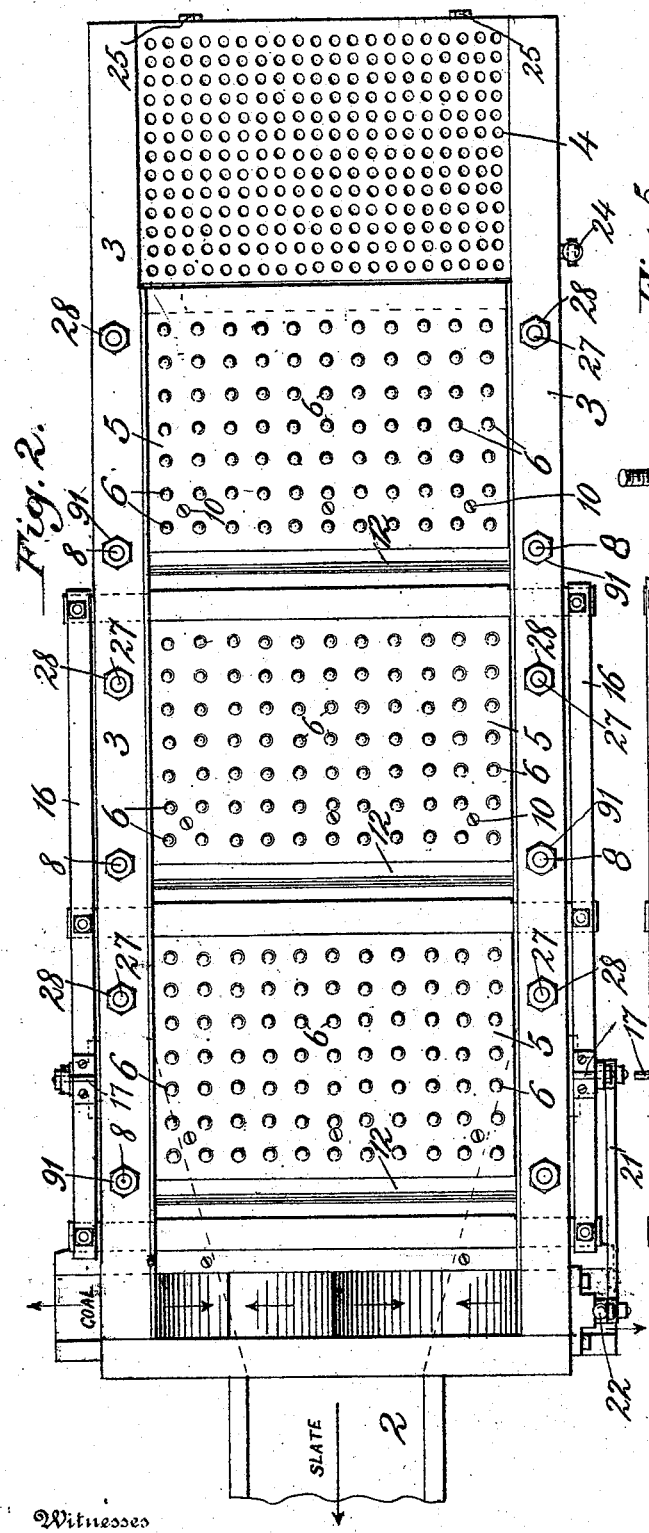

Fig. 2.

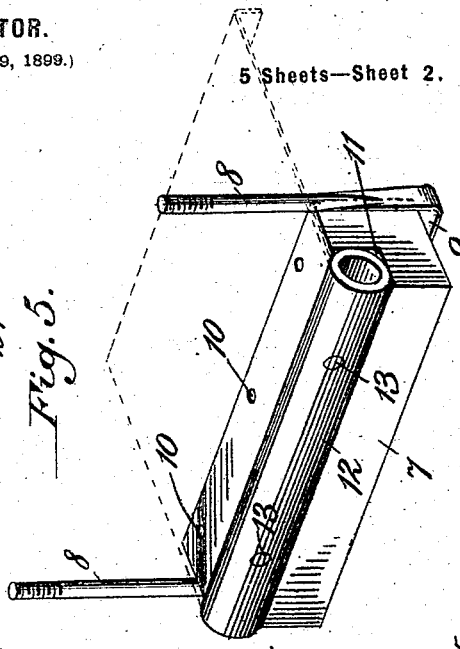

Fig. 5.

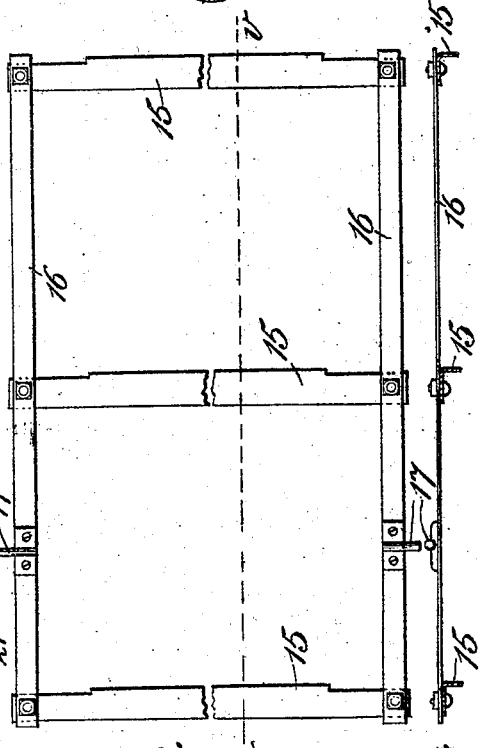

Fig. 3.

Fig. 4.

Witnesses

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(No Model.) 5 Sheets—Sheet 3.

Fig. 6.

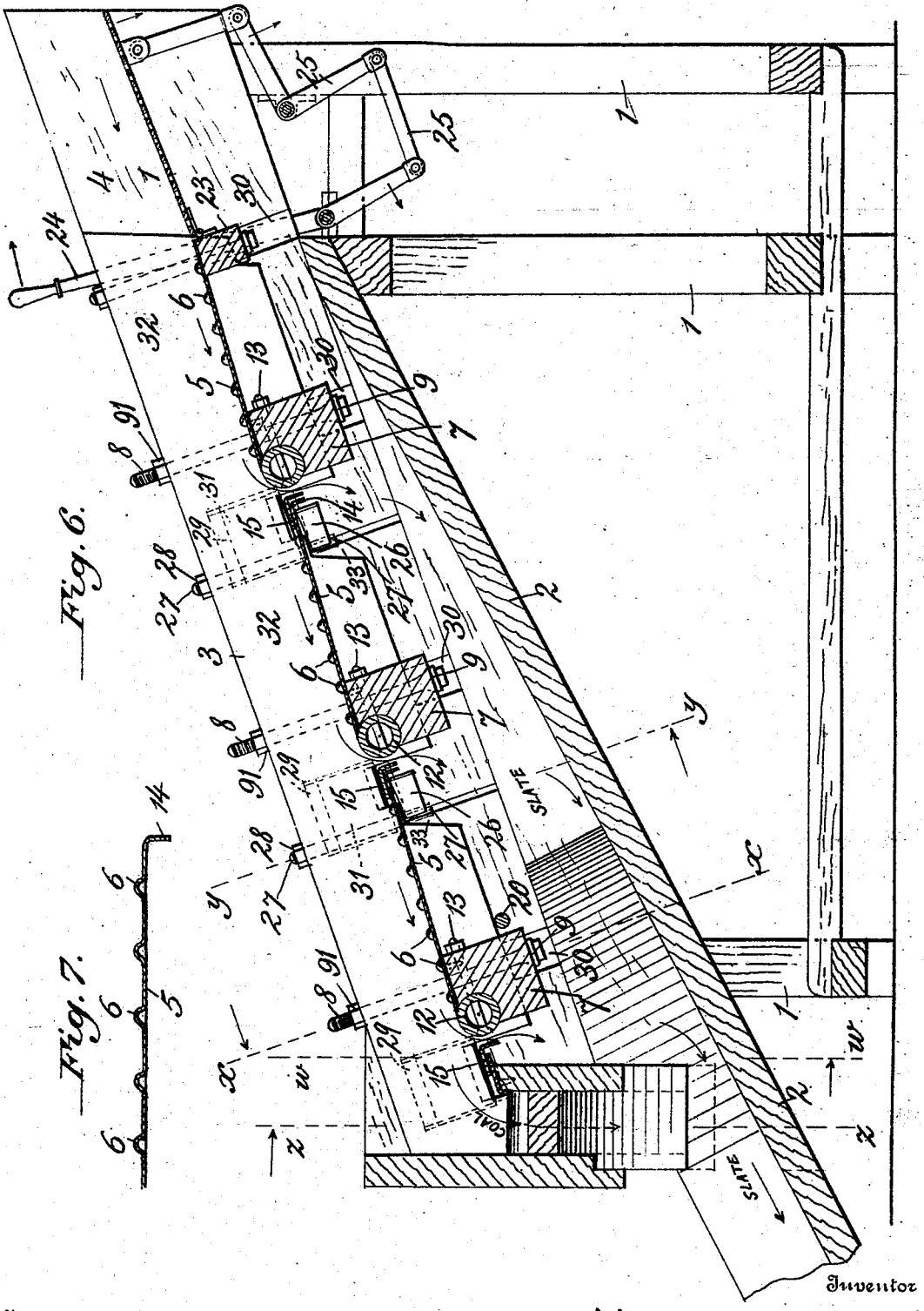

Fig. 7.

Witnesses

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(No Model.)

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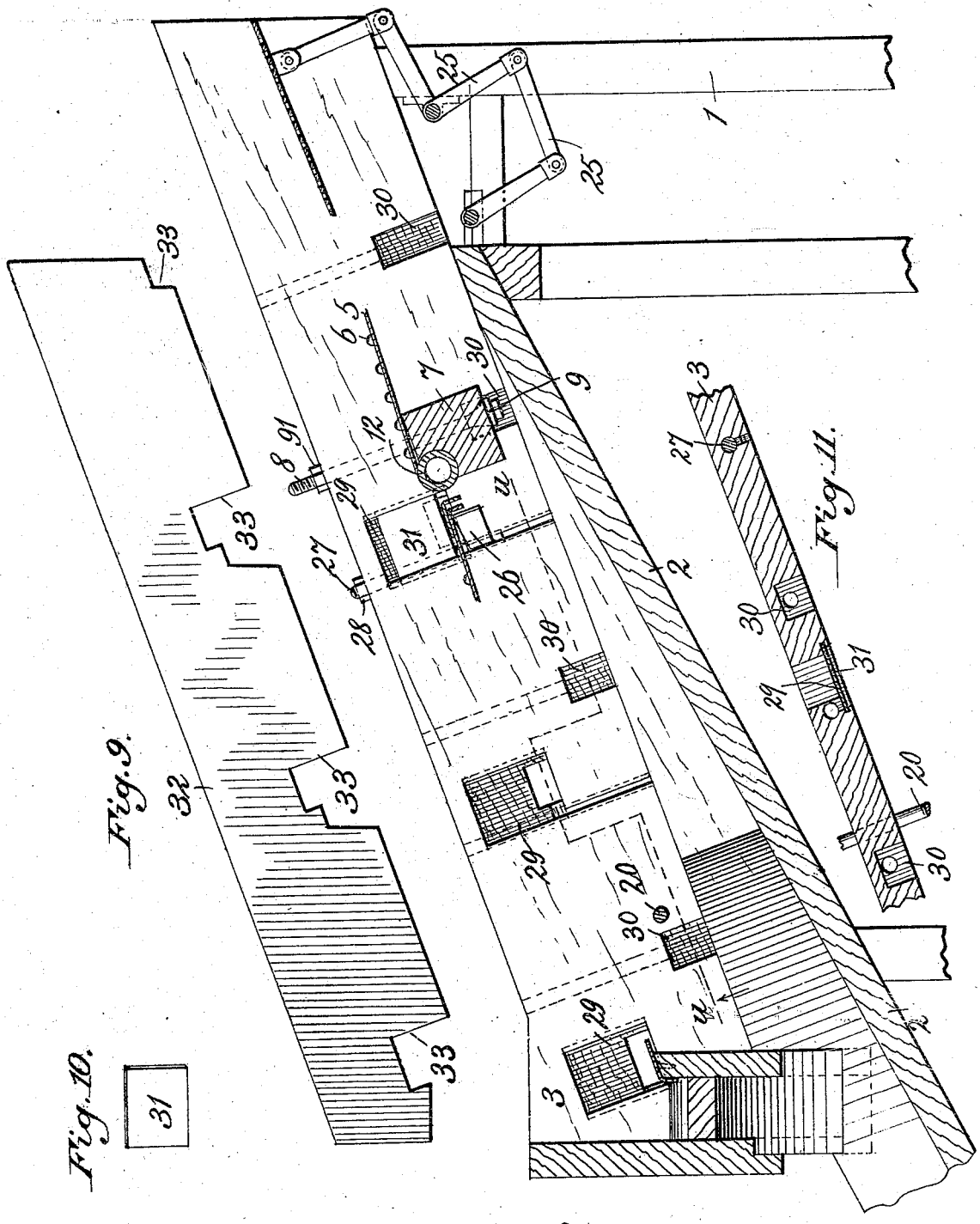

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(No. Model.) 5 Sheets—Sheet 5.

Fig. 12.

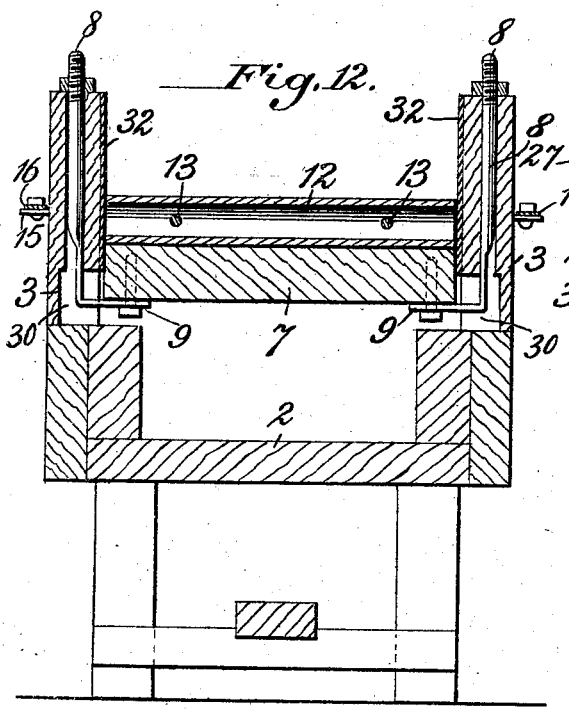


Fig. 13.

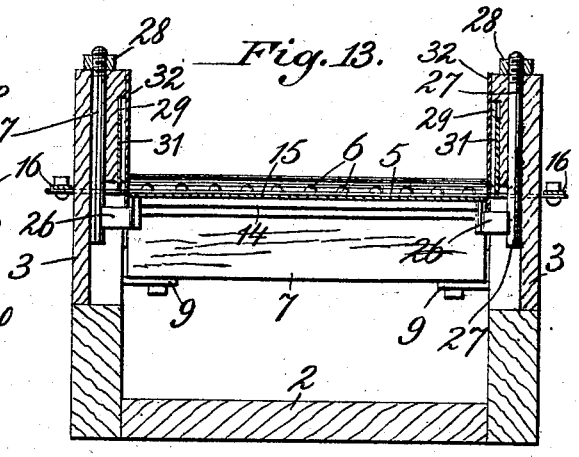


Fig. 16.

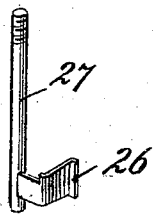


Fig. 14.

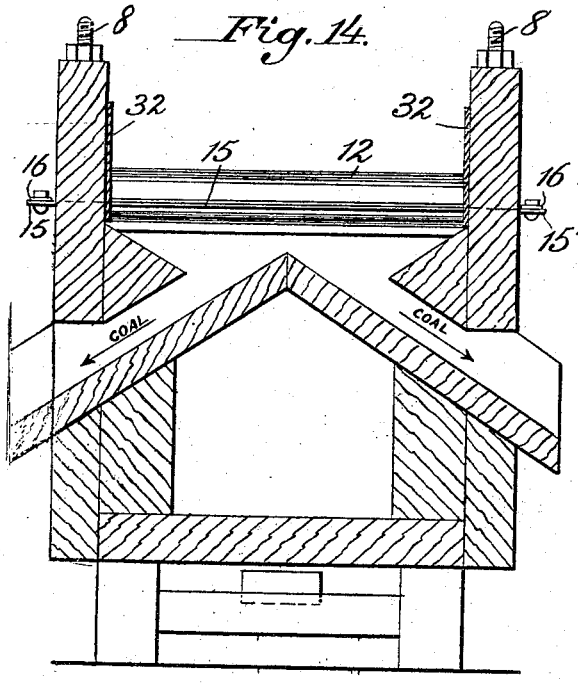
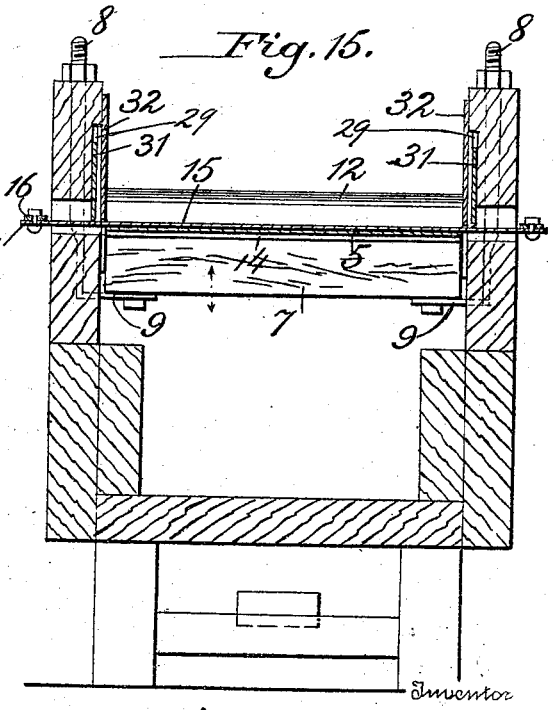


Fig. 15.



Witnesses
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Attorney

UNITED STATES PATENT OFFICE.

CHARLES W. ZIEGLER, OF SCRANTON, PENNSYLVANIA.

COAL-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 650,120, dated May 22, 1900.

Application filed October 9, 1899. Serial No. 733,079. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. ZIEGLER, a citizen of the United States, residing at Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Coal-Separators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to coal-separators adapted for separating slate and other impurities from coal after the latter has been sized by the usual screening process.

The present invention is designed as an improvement upon the apparatus shown and described in Letters Patent of the United States heretofore granted to me as follows, to wit: No. 277,530, dated May 15, 1883; No. 291,123, dated January 1, 1884; No. 380,156, dated March 27, 1888, and No. 570,781, dated November 3, 1896. The same broad principle of operation is involved in all of the patented machines above referred to, the coal containing slate or other impurities being directed along an inclined surface provided with transverse openings through which the slate or other impurities drop to independent troughs or receptacles, the difference in shape and specific gravity of the coal and slate causing the former to travel upon the inclined surface at a greater speed and momentum than the latter, with the result that the slate readily drops when an interruption in the continuity of the surface is encountered, while the momentum of the traveling coal carries it over such point of interruption for delivery into a receiver located in advance of the receptacle into which the slate falls.

The apparatus to be described hereinafter is based upon the same principle of operation, and its objects are to provide an inclined surface of improved construction over which the coal and its contained impurities travel, to provide means for preventing the catching of thin pieces of coal or slate between the gage-plates and the inclined surface, and to combine with the sections or plates of the inclined surface improved adjusting means for regulating the inclination of said plates and for varying the size of the openings between the plates.

The construction of the improvements will be fully described in connection with the accompanying drawings, which constitute a part of this specification, and their novel features will be defined in the appended claims.

In the drawings, Figure 1 is a side elevation of a coal-separator embodying my invention. Fig. 2 is a top plan view of the same. Fig. 3 is a top plan view of the gage-plates and their connecting-bars. Fig. 4 is a section on the line *v v* of Fig. 3. Fig. 5 is a detail perspective view illustrating the means for supporting the plates or sections forming the surface upon which the coal travels. Fig. 6 is a vertical longitudinal section of the apparatus. Fig. 7 is a vertical section of one of the surface plates, showing its convex projections. Fig. 8 is a detail vertical section showing the inner side of the frame of the machine. Figs. 9 and 10 are detail detached views of parts shown in Fig. 8. Fig. 11 is a section on the line *u u* of Fig. 8. Figs. 12, 13, 14, and 15 are sections on the lines *x x*, *y y*, *z z*, and *w w*, respectively, of Fig. 6; and Fig. 16 is a perspective view of one of the rods for supporting the convex-surfaced plates and its projecting bracket.

The reference-numeral 1 designates the supporting-framework of the apparatus, 2 the slate-discharging chute secured to the frame, and 3 the frame within which the separating mechanism is supported.

The incline for the coal, as best shown in Figs. 2 and 6, comprises a plurality of sections or plates, the upper one, 4, of which is preferably perforated to permit of the escape of dirt from the coal as it falls upon the incline. The remaining plates 5 are imperforate and provided upon their upper surfaces with rows of convex projections 6, (see Fig. 7,) which impart to the plates a surface over which the coal freely slides. This special form of plate constitutes one of the important characteristic features of the present invention, as I have found that it is greatly superior to the plates employed in my previous machines above referred to in permitting the advance of the coal over the incline at a speed exceeding that of the travel of the

slate. Below the lower end of each of the plates 5 is arranged a transverse bar 7, supported adjustably by bolts 8, which extend through the frame 3 and are held at their upper ends by nuts, while their lower ends 9 are bent at right angles and secured to the under sides of the bars 7. The lower ends of the plates 5 are secured to these bars 7 by screws 10 or other suitable means, and the upper sides of said bars are longitudinally recessed to form seats 11 for cylinders 12, which are preferably hollow, as shown, and secured to the bars by bolts 13. The upper ends 14 of the plates 5 are bent downward at right angles, and overlapping each of said upper ends is a gage-plate 15, bent at right angles to fit over the plates 6, as shown in Figs. 4 and 6. The ends of these gage-plates project through openings in the sides of the frame 3 and are connected by bars 16, provided with laterally-extending journals 17, which extend through the sides of the frame and are supported in slots 18 in the upper ends of levers 19, secured on the ends of a rock-shaft 20. This shaft 20 is mounted in bearings of the frame, and one of the levers 19 is extended below its connection with the rock-shaft 20 and connected by a link 21 to the lower end of a lever 22, which serves to operate the gage-plates to control the size of the openings between the plates 5.

As shown in Fig. 6, the upper perforated plate 4 of the incline is hinged at its lower end to a cross-bar 23 and is adapted to be operated by a lever 24, connected to the plate 4 by a system of links 25.

The upper ends of the plates 5 rest loosely upon angle-brackets 26, projecting from the lower ends of adjusting-rods 27, which extend vertically through the sides of the frame and are held by nuts 28, engaging the upper threaded ends of said rods.

As shown in Figs. 8 and 11, the side walls of the frame 3 are suitably recessed at the points 29 and 30 to permit of the required vertical movement of the adjusting devices of the plates, and sliding plates 31 protect said recesses from the entrance of dust and dirt or small pieces of coal when the vertical bar is lowered.

At each side of the frame 3 is arranged a guard-plate 32, having edge slots, as 33, to adapt the guard-plates to fit over the plate-supporting devices.

The operation of the apparatus will be readily understood and may be briefly described as follows: The coal, with its contained slate, falls upon the upper plate 4 of the incline (see Fig. 6) and passes by gravity over the successive plates 5. The slate passes over the cylinders 12 and drops into the slate-chute, as indicated by the bent arrows, while the coal is carried by its momentum over the cylinders and finally discharged through the coal-chute at the lower end of the incline.

It will be apparent that the inclination of the plates may be varied for different grades and qualities of coal and that the width of the openings between the plates may be likewise varied to suit the exigencies of the work. It will also be observed that the angular form of the gage-plates prevents the engagement of thin flat pieces of coal or slate under said plates and the consequent clogging of the apparatus.

I claim—

1. In a coal-separator, the combination with a supporting-frame, provided with a coal-chute, and an independent chute for slate; of an incline comprising transverse bars formed with longitudinal recesses, and hollow cylinders secured in said recesses, plates secured at one end to said bars, means for adjusting said bars vertically; means for supporting the free ends of said plates adjustably; and adjustable gage-plates between the plates forming the incline.

2. In a coal-separator, the combination with a supporting-frame and an incline comprising a plurality of imperforate plates formed on their upper surfaces with convex projections; of means for supporting the lower ends of said plates, comprising adjustable transverse bars formed with longitudinal recesses; cylinders secured within said recesses and means for regulating the transverse spaces between said plates.

3. In a coal-separator, the combination with a supporting-frame, and an incline comprising a plurality of imperforate plates, of adjustable transverse bars formed with recesses, hollow cylinders in said recesses and means for supporting and adjusting the upper ends of said plates, consisting of rods adjustably secured to the frame, and angle-brackets projecting from the lower ends of said rods.

4. In an ore-separator, the combination with a supporting-frame, of an incline comprising adjustable transverse bars formed with longitudinal recesses, cylinders secured in said recesses; imperforate plates also secured to said bars; means for adjusting said plates; and means for regulating the transverse space between said plates.

In testimony whereof I have affixed my signature in presence of two witnesses.

CHARLES W. ZIEGLER.

Witnesses:
ROY NICOL,
D. C. SEWARD.