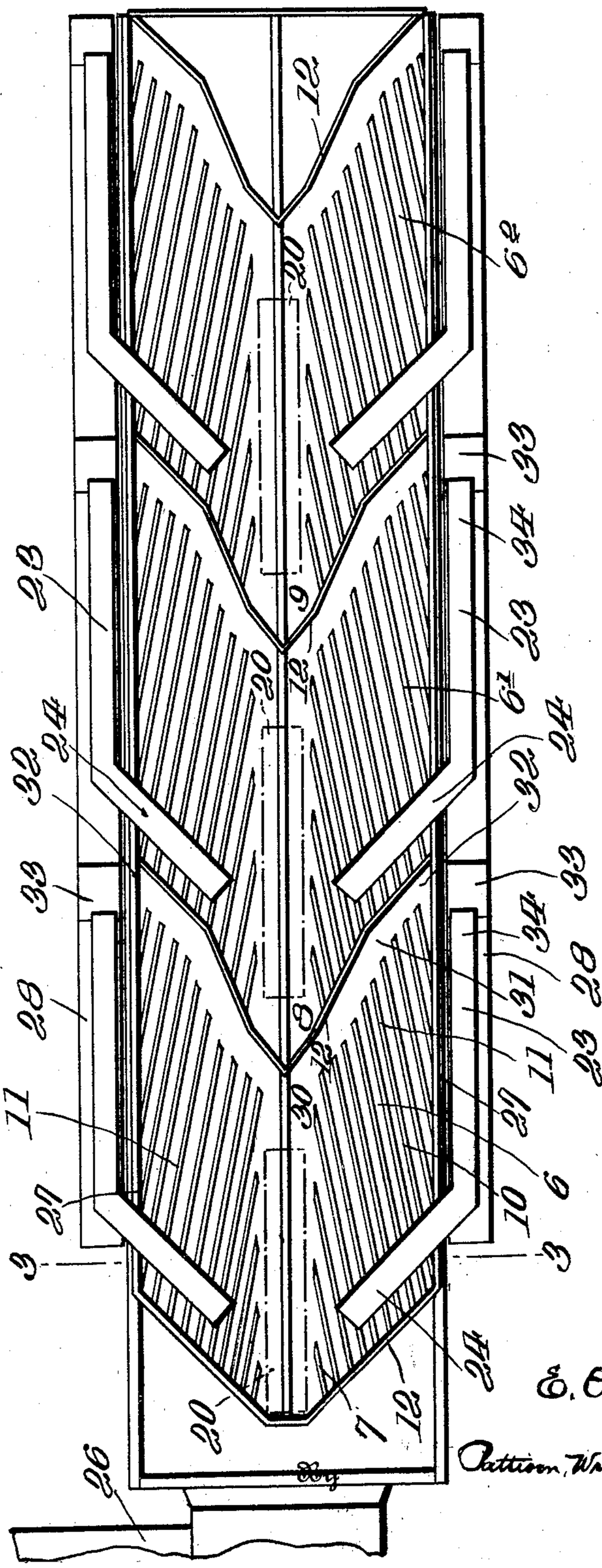
July 23, 1935. E. O'TOOLE, SR 2,009,273

APPARATUS FOR DRY CLEANING OF COAL

Original Filed March 19, 1931 3 Sheets-Sheet 1

Fig. 2.



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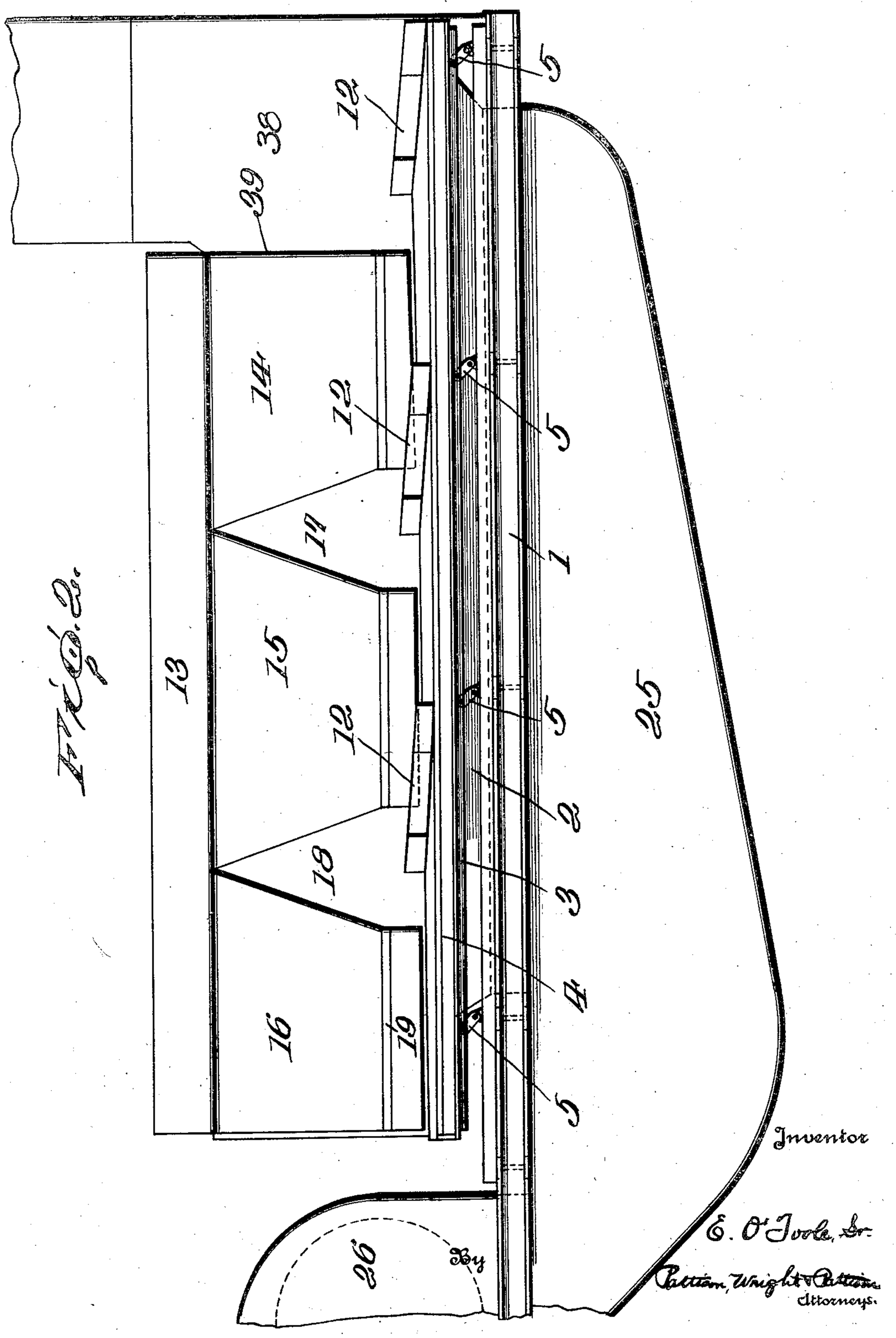
APPARATUS FOR DRY CLEANING OF COAL

Original Filed March 19, 1931 3 Sheets-Sheet 2



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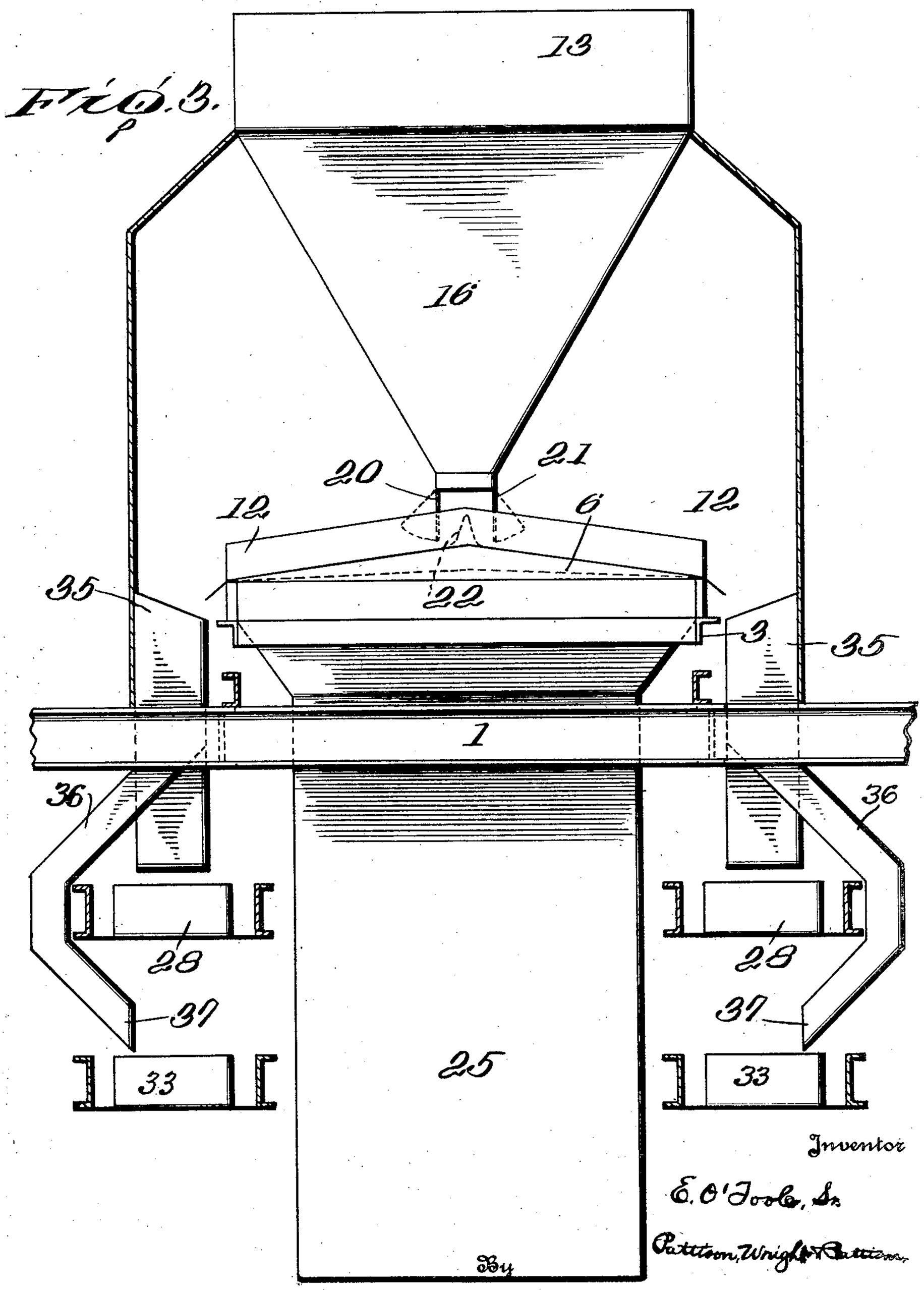
APPARATUS FOR DRY CLEANING OF COAL

Original Filed March 19, 1931 3 Sheets-Sheet 3

Fig. 3.



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2,009,273

APPARATUS FOR DRY CLEANING OF COAL

Edward O'Toole, Sr., Gary, W. Va.

Application March 19, 1931, Serial No. 523,904
Renewed August 25, 1933

2 Claims. (Cl. 209—467)

This invention relates to improvements in apparatus for dry cleaning of coal which will be fully explained hereinafter.

One object of the present invention is to provide an elongated longitudinally vibrating member on which is mounted a deck that is divided into several sections, whereby all of the sections vibrate in unison together.

A further object of this invention is to so shape the feed and delivery ends of these several sections that the feed end of one section telescopes the delivery end of the adjacent section throughout a plurality of sections, whereby the said sections are arranged in close relation and are supported by a single vibrating member.

Another object of this invention is to arrange a bin extending longitudinal the several sections and substantially throughout the whole length of the several sections.

A further object of the present invention is to so construct said longitudinally extending bin that its bottom forms the top of a dust hood for the several separating sections, and to extend from the top of the bin a depending flange portion that embraces all of the said sections.

Another object of my invention is to provide this longitudinal bin with a plurality of longitudinally extending passageways, said passageways being located over the said sections and each passageway of a length substantially equal to the length of its section, whereby several streams of coal to be separated are fed from the single bin.

Another object of the present invention is to incline these several sections from their outer edges substantially to their center and to locate the several streams of coal to be separated passing from the bin through these elongated passageways substantially at the centers of the several sections.

Other objects of the invention will be understood from the following description.

In the accompanying drawings:

Figure 1 is a top plan view of my present improvement, the feed bin being omitted in order to disclose the specific construction of the several sections of the apparatus.

Fig. 2 is a side elevation of Fig. 1, shown partly in section.

Fig. 3 is a cross-section of Fig. 1, taken on the dotted line 3—3.

Referring to the apparatus disclosing the present improvements, 1 is a suitable frame and supported on this frame is a suitable supporting member and an elongated longitudinally vibrating member 3, on which is supported a pervious deck 4, by means of links 5. These links 5 incline from their lower ends towards the feed ends 7 of the several sections which comprise the separating portions of the deck. These sections 6 have their feed ends 7, 8 and 9 tapered as shown. Each of these deck portions 6 is provided on opposite sides of its center with forwardly and inwardly extending riffles 10 and 11. The feed ends also are provided with upwardly extending board members 12, which keep the coal on each section from flowing off. In the arrangement here shown, these board portions 12 of the sections 8 and 9 follow the outline of the tapered feed ends and the opposite sides of these boards also form a banking bar for the pervious deck section. The board 12 of the section 6 also extends upwardly and follows the tapered outline of the feed end 7. The board 12 for the section 7 forms means to hold the coal fed to that section thereon, but it does not form a banking bar since it has no following separating section. However, in both the succeeding sections 6′, 6^2, board 12 does perform the function of a banking bar. The operation of these bars 12 will be described when reference is herein made to the operation of the apparatus.

Located above the deck sections is a bin 13 that extends substantially from end to end of the apparatus. This bin has depending portions 14, 15, and 16. One depending portion for each of the deck sections. These depending portions form spaces 17 and 18 between them and the object of these spaces will be referred to further on.

The lower ends 19 of the several depending portions 14, 15, and 16 of the bin 13, are open, thus forming passageways 20 for the flow of coal from the bins onto the several sections 6, 6′ and 6^2 to be separated. These passageways 20 extend longitudinally and are located in the middle of said sections, whereby the coal flowing through these passageways 20 is in the form of a plurality of elongated streams. These passageways may be provided with doors 21, depending from the lower ends of the sections 16 as shown in dotted lines Fig. 3, and projecting upwardly from the center of the deck sections 6, 6′, and 6^2 may be elongated perforated portions 22. The doors 21 and the perforated portion 22 are fully described in my pending application Serial No. 523,903, filed March 19, 1931, and need not be further here described as it forms no part of the present invention. When these doors 21 and the perforated portion 22 are omitted, then the depending portion 16 may extend nearer to the deck sections 6, 6′ and 6^2.

When it is desired to retreat the middlings, I provide the trough members **23** which are located at opposite sides of the deck portions and these trough portions have their forward ends **24** extending inward over the several deck portions. The object of these middlings return trough members **23** and **24** is fully described in my pending application Serial No. 523,901, filed March 19, 1931, and no attempt is made to fully illustrate or describe it as it forms no part of the present improvement.

The operation of this apparatus is that the coal fed to the bin **13** is divided into several elongated streams and it passes to the longitudinal center of each of the deck portions **6**, **6'** and **6²**, the same spreading in opposite directions by gravity from the passageways **20**. While this coal is being fed, the deck sections are longitudinally vibrating and owing to the inclination of the links **5** as the deck moves forward the links lift and when it moves backward the deck in part leaves the said coal and hence it is fed step by step forward. Air is at the same time fed into the air chamber **25** from a suitable air blower **26** and this air under suitable pressure flows through the pervious decks to the coal above. This air has a tendency to lift the coal and its reciprocation or agitation due to the vibration of the deck causes a stratification of the mass of coal. This stratification causes the heavy particles of the mass or those having the greatest specific gravity, such as slate or refuse, to settle downwardly and the slate is caught between the riffles **10** and **11**, while the lighter particles are lifted upward, which operation is well known to those skilled in this art. The slate, therefore, is at times in contact with the pervious deck and at all times is between the riffles **10** and **11**. Owing to this stratification of the particles of the mass the slate is moved forward step by step and the riffles causes it to move forward and upward while the lighter particles of coal, which are above the riffles, flows by gravity substantially at right angles to the forward movement of the slate and the coal flows over the edges **27** of said deck portions. This coal therefore falls from the edges of the deck into suitable chutes or receptacles **28**, from which it is removed by any mechanical means. Some of the slate that is positively projected in the manner described reaches the unobstructed central portion **30** and when it reaches this unobstructed portion **30**, it is further projected forward to the unobstructed portion **31** that is located back of the banking bars **12**, until it reaches the outlet ends **32** of the unobstructed portions **31**, at which point it flows into a refuse receptacle or trough **33**, from which it may pass or be conveyed to any desired point.

As described in my application Serial No. 523,901, filed March 19, 1931, the end **34** of that part **23** of said middlings return device is lower than the surface of the deck at that point and from this point it gradually inclines upward until the end **24** is located above the said deck. All of this is fully described in my said application.

It is well known that the middlings contain a very small part of coal and by providing means to receive the middlings at **34** and to return them to the deck for retreatment this coal can be largely reclaimed and saved. This, however, forms no part of the present invention. No attempt is made to show here the manner of supporting and reciprocating the middlings return members, as this is fully shown and described and also claimed in my said application. Any desired reciprocative means can be provided for reciprocating the deck and no attempt is made here to show it.

In the section, Fig. 3, the coal flows from the opposite edges of the deck into suitable chutes **35**, and from these chutes it flows into the clean coal trough or other device **28**, from which it can be conveyed to any desired point. A suitable chute **36** has its upper end connected with the refuse receiving member **33** and this chute is bent around the clean coal receiving trough **28** and has its lower end **37** adapted to feed the refuse into the receiving refuse receptacle **33**.

Attention is also directed to an extension **38** of the dust hood. This extension embraces the end **39** of the dust hood and a suitable exhaust (not shown) communicates with the upper end (not shown) of said extension by means of which the dust laden air is withdrawn from the apparatus and preferably conveyed to a dust cleaner (not shown) and afterwards cleaned of its dust, the cleaned air is allowed to escape. As will be seen from Fig. 2, this extension **38** embraces the discharge end of the deck portion **6²**.

I have described with considerable detail the present improvement, but I wish it to be understood that it may be varied without departing from the scope of the invention so long as such variation comes within the liberal construction of the appended claims.

It will be understood from the foregoing description that this invention is adapted to separate all kinds of granular material which comprise elements having different specific gravity characteristics and to operate upon either sized or unsized masses of coal or other material.

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

1. An apparatus for the dry cleaning of coal and the like including particles having different specific gravity characteristics comprising a plurality of deck sections supported one behind the other, means connected with all of said sections for longitudinally vibrating them and a single bin arranged above the said sections and feeding coal to be cleaned thereto, and flanges depending from the upper edges of said bin downward and embracing the said sections forming dust laden chambers for each of said sections, said chambers all connected whereby the dust laden air of all the sections may be withdrawn therefrom.

2. An apparatus for the dry cleaning of coal including particles having different specific gravity characteristics comprising several deck sections arranged one behind the other, said sections having their feed and discharge ends tapered in the same direction and a combined banking and holding bar acting to bank the heavy refuse particles on one section and to hold the coal on the feed end of the adjacent section, said tapered ends of one deck section telescoping the adjacent end of the other deck section, and means for longitudinally vibrating said sections.

EDWARD O'TOOLE, SR.