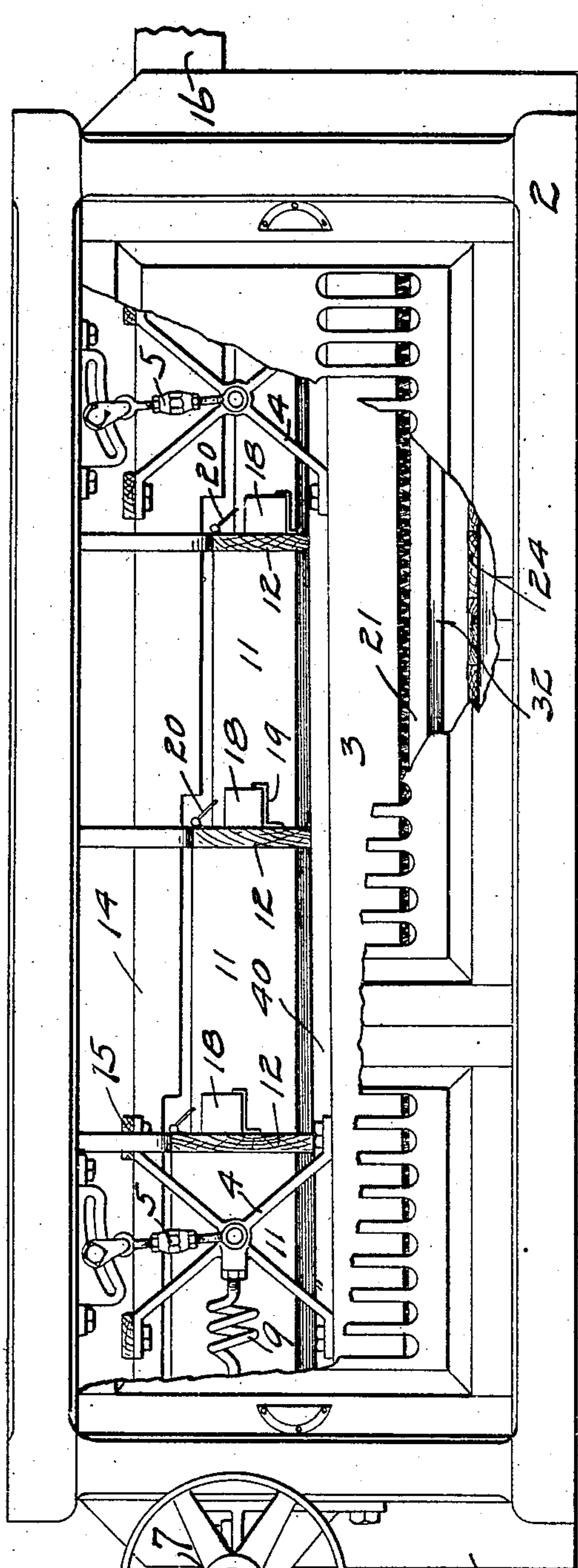


No. 848,404.

PATENTED MAR. 26, 1907.

G. T. SMITH.
MIDDLINGS PURIFIER.
APPLICATION FILED NOV. 29, 1904.

3 SHEETS—SHEET 1.



WITNESSES
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C. G. Hanson

FIG. 1.

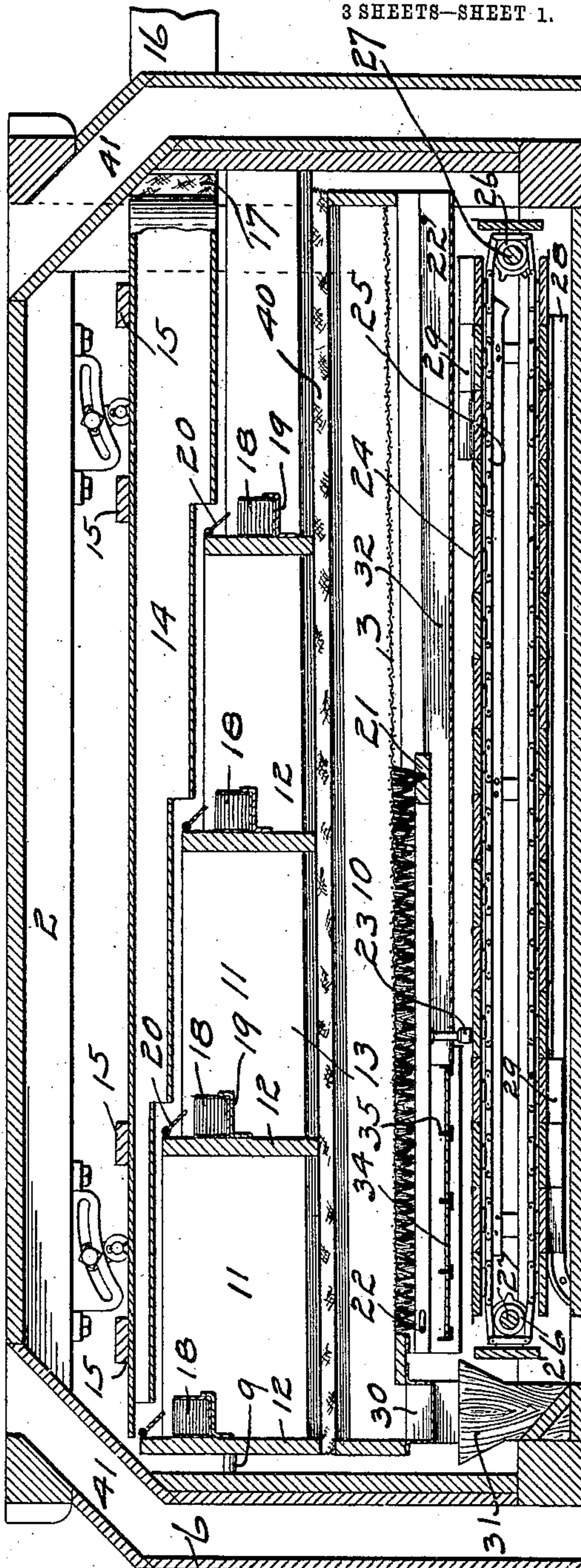


FIG. 2.

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3 SHEETS—SHEET 2.

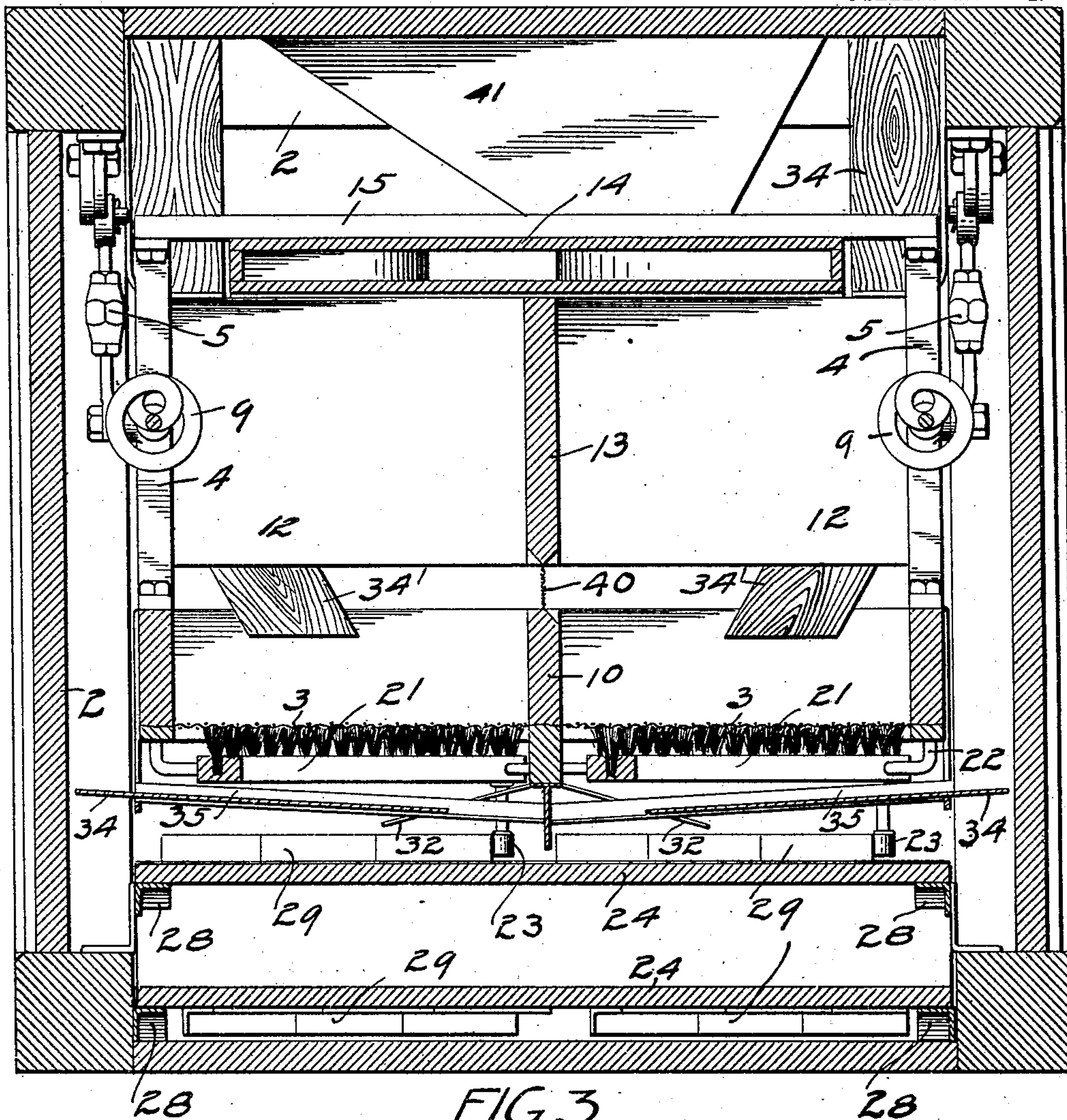
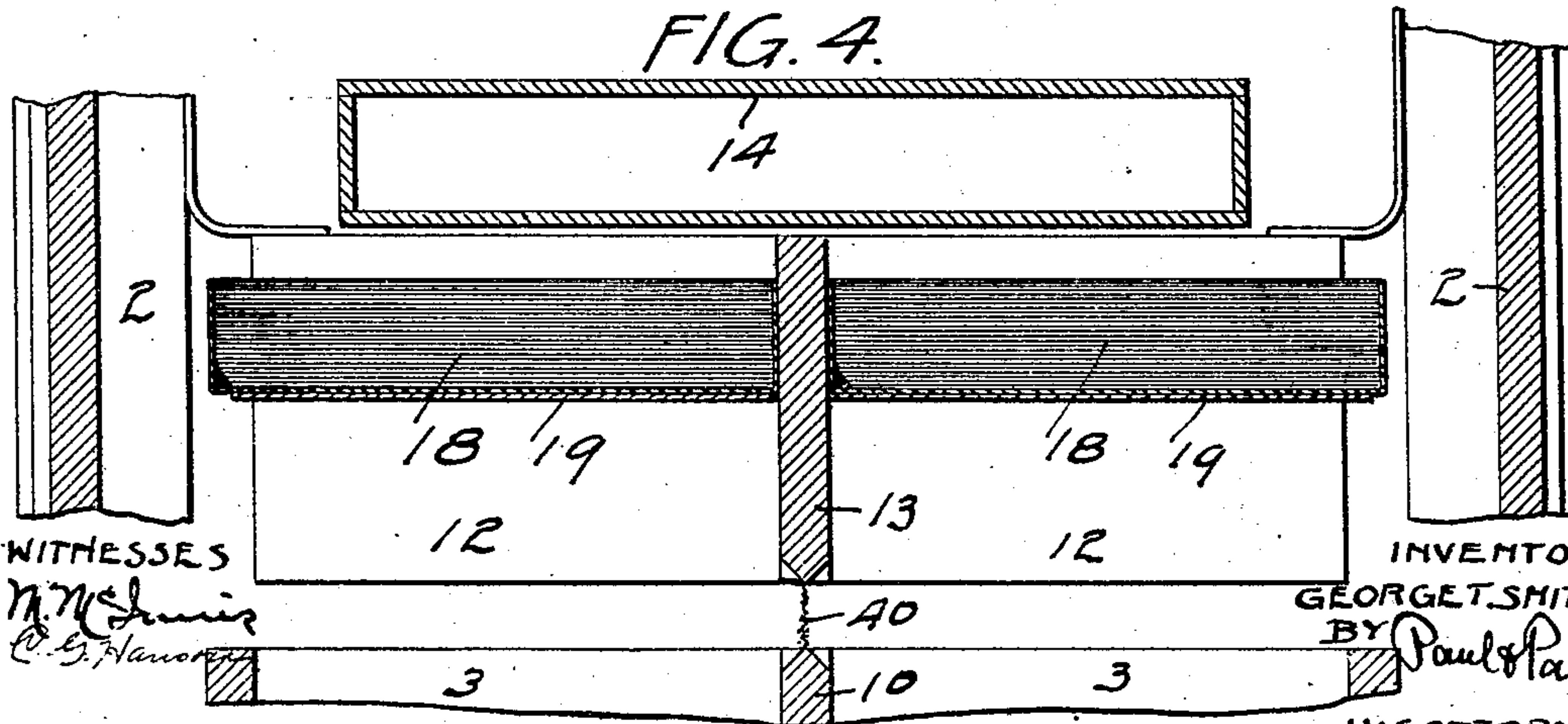


FIG. 3.

FIG. 4.



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3 SHEETS—SHEET 3.

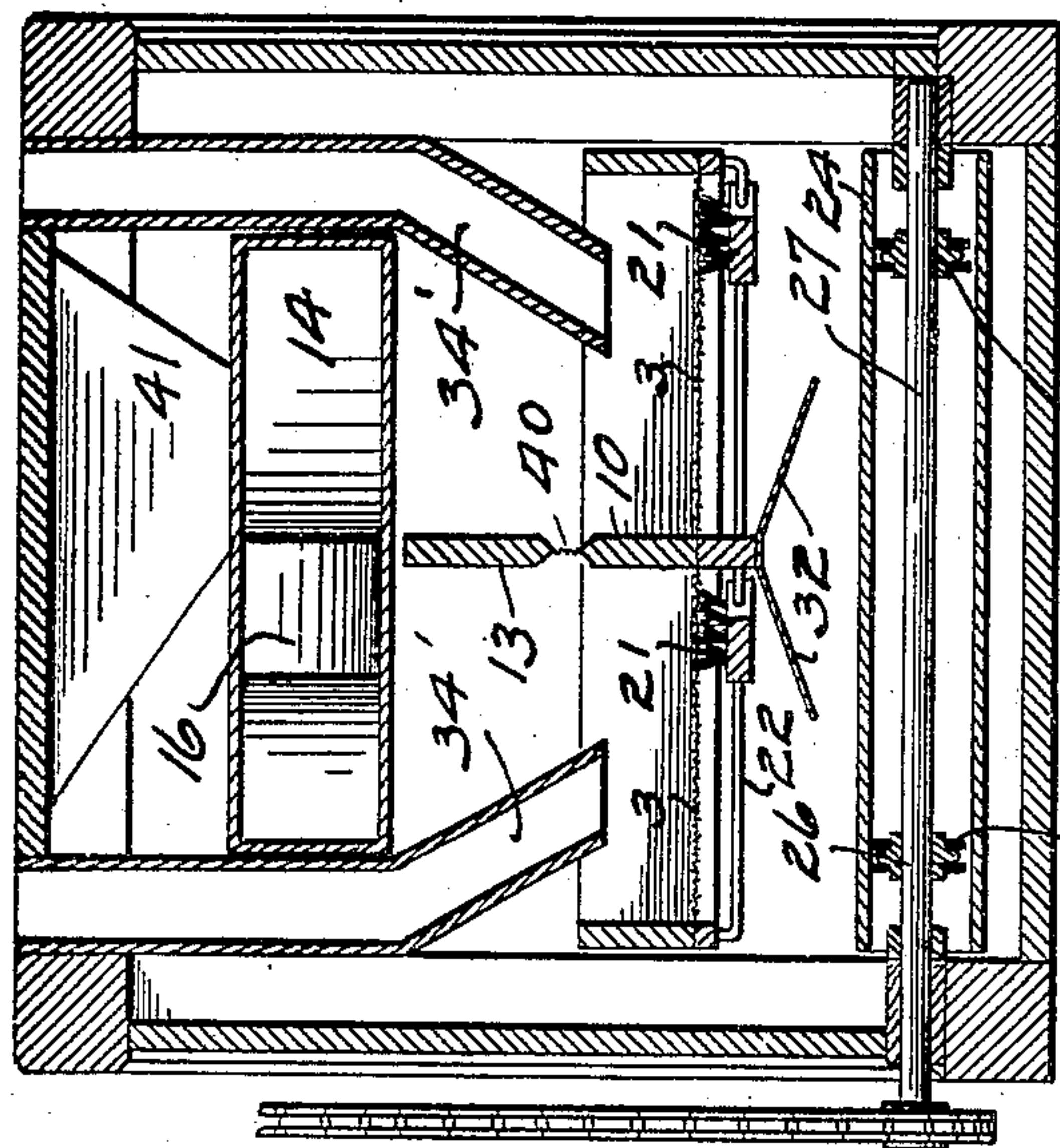
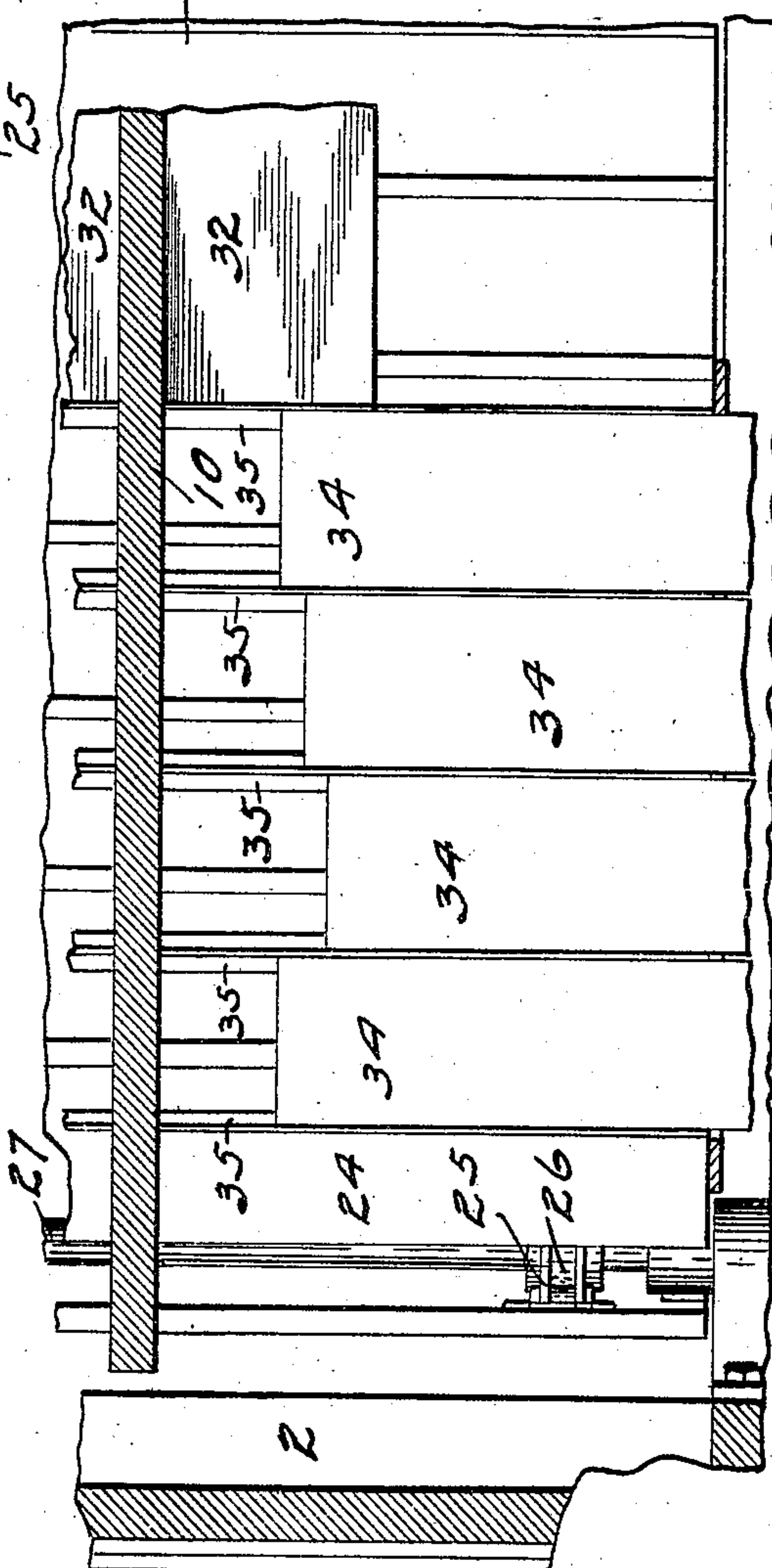


FIG. 5.

FIG. 6.

FIG. 7.



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UNITED STATES PATENT OFFICE.

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MIDDLINGS-PURIFIER.

No. 848,404.

Specification of Letters Patent.

Patented March 26, 1907.

Application filed November 29, 1904. Serial No. 234,700.

To all whom it may concern:

Be it known that I, GEORGE T. SMITH, of Minneapolis, Hennepin county, Minnesota, have invented certain new and useful Improvements in Middlings-Purifiers, of which the following is a specification.

This invention relates to improvements in middlings-purifiers for flour-mills; and the objects I have in view are to provide a purifier that is adapted to receive the middlings from another machine placed thereon without the use of spouts or elevators, that has large capacity and is capable of doing effective work, and in which the light material can be thoroughly removed by graduated air-currents passing through the sieve of the purifier; to provide a machine of this character with a carrier or conveyer by means of which the middlings passing through the sieve can be divided into two or more separate parts or lots which can be discharged separately from the machine.

The invention consists generally in the constructions and combinations hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a side elevation of a machine embodying my invention, one of the side walls being shown partly broken away. Fig. 2 is a longitudinal vertical section of a machine embodying my invention. Fig. 3 is a transverse section on an enlarged scale. Fig. 4 is a detail section on the same scale as Fig. 3. Fig. 5 is a transverse vertical section taken on a plane near the tail of the machine. Fig. 6 is a transverse vertical section taken on a plane near the head of the machine. Fig. 7 is a detail showing a portion of the carrier and a series of the cut-off plates.

In all of the drawings, 2 represents the frame of the machine, which is preferably of rectangular form and has a smooth top having suitable inlet-openings and having a smooth level bottom having suitable exits. This frame or casing adapts the machine for use in a system consisting of a series of machines having similar frames or casings. Arranged in the casing is a suitable sieve 3. This sieve is mounted by brackets 4 upon adjustable hangers 5, that are secured to the casing, and the sieve is adapted to be recip-

rocated by suitable eccentrics 6 upon a shaft 7, that is mounted in bearings upon the end of the machine and is provided with a suitable driving-pulley 8. Suitable eccentric-rods 9 connect the eccentrics 6 with the brackets 4, by means of which said brackets and the sieve may be reciprocated. These rods 9 are preferably made for a portion of their length in the form of coiled springs, so that the rods are capable of yielding as the sieve is reciprocated, thereby preventing any shock or jar to the sieve.

The sieve-frame is preferably divided longitudinally by the partition 10. This makes two independent sections of the sieve. The space immediately above the sieve is divided into a series of compartments 11 by the transverse partitions 12 and the longitudinal partition 13. These partitions divide the air passing through the sieve into a series of separate currents. Arranged above the air-compartments 11 is a horizontal air-trunk 14. This trunk is supported by means of cross-bars 15 upon the brackets 4. The air-trunk 14 is connected to a suitable air-trunk 16, leading to an exhaust-fan (not shown) by means of a flexible conductor 17.

The air-trunk 14 is provided with an opening over each of the air-compartments 11, and said trunk is of progressively-larger area in cross-section as it approaches the fan-conductor 16. Arranged upon the cross-partitions 12, below the openings to the trunk 14, are the open troughs 18, adapted to slide upon the supports 19, secured upon the partitions 12. Valves 20 are secured to said partitions above the troughs 18. Arranged below each section of the sieve 3 is a brush 21, mounted at its ends upon cross-rods 22. A depending lug 23 is secured to each of the brush-bars. Below the sieve I prefer to provide a carrier 24, preferably formed of a series of slats secured to endless chains 25, mounted upon sprocket-wheels 26 upon the cross-shafts 27. The ends of these slats rest and travel upon suitable rails 28. The carrier is provided with the inclined plates 29, which are adapted to engage the lug 23 upon the brush-bar, whereby said brush is alternately moved first in one direction and then in the other below the sieve, thereby keeping the sieve-cloth clear. I provide at the tail end of each section of the sieve a cross-

spout 30, adapted to deliver the material that passes over the tail of the sieve into a suitable spout 31. I also provide a suitable cut-off, by means of which the material, passing through the sieve of the purifier, may be divided and placed in separate positions upon the carrier, whereby said material may be divided into separate parts or lots, which may be maintained separate from one another and be in this way discharged from the machine.

I have shown inclined plates 32, secured to the central division-board of the sieve. (See Figs. 3 and 6.) The material falling upon these boards is directed toward the outside of the carrier. These inclined boards are placed for about two-thirds the length of the sieve, beginning at the head end thereof. All of the material passing through this part of the sieve will be deposited near the outside of the carrier. Under the remaining portion of the sieve I arrange a series of oppositely-inclined sliding cut-off plates 34, supported upon suitable inclined rails 35. These rails are supported upon the sieve-frame and reciprocate therewith, as do also said cut-off plates. These plates may be drawn back to a greater or less extent (see Fig. 7) and the material falling thereon will be deposited in a separate lot near the center of the carrier. I also provide the inlet-conductors 34', that are arranged near the head of the machine with their upper ends flush with the top of the casing and their lower open ends over the sieve-sections near the head thereof. Through these conductors the middlings or stock to be operated upon is conducted from the preceding machine of the system to the head of the purifier-sieve. While passing over the sieve toward the tail thereof, the light, fluffy, and fibrous particles are taken up by the air-currents and drawn into the trunk 14, from which they are drawn into the fan-casing. I have found the reciprocating trunk 14 of decided advantage and of great value in this machine. The reciprocating motion of this trunk prevents the pasty dust and light materials from piling up in and clogging the trunk. The open troughs 18 receive samples of the material taken out by the trunk at each of its openings, and the strength of the air-current through each of said openings may be regulated by the appropriate valve 20. For the purpose of completely dividing one section of the sieve from the other I prefer to provide the flexible partition 40, that is connected to the upper edge of the longitudinal partition 10 of the sieve and the lower edge of the longitudinal partition 13, forming the air-compartments. I prefer also to provide the machine with the conductors 41, arranged at the ends of the casing for the purpose of receiving from the machine above in the system material that is not to be operated upon by the purifier.

Operation: The middlings are fed to the head of the sieves and are caused by the reciprocating motion of the sieves to pass toward the tail thereof. During this operation the lighter material is floated along by the air-current on top of the middlings, and the light, fluffy, and fibrous material is lifted out by the air-current and drawn into the air-trunk and taken away by the fan. The purified middlings pass through the sieve, and the light branny particles that are floated on top of the middlings, but are not lifted out by the air-current, pass over the tail of the sieve.

I claim as my invention—

1. In a machine of the class described, the combination with a suitable casing, of a reciprocating sieve arranged in said casing, a series of partitions above said sieve, and a longitudinally-reciprocating air-trunk having openings arranged above said partitions, said air-trunk being reciprocable in the direction of travel of material over the sieve from the head to the tail end thereof, substantially as described.

2. In a machine of the class described, the combination with a suitable casing, of a reciprocating sieve arranged in said casing, a series of partitions above said sieve, a horizontal longitudinally-reciprocating air-trunk having openings arranged above said partitions, said air-trunk being reciprocable in the direction of travel of material over the sieve from the head to the tail end thereof, substantially as described.

3. In a machine of the class described, the combination with a suitable casing, of a reciprocating sieve arranged in said casing, a series of partitions above said sieve forming a series of compartments, and a longitudinally-reciprocating air-trunk arranged above said partitions, said air-trunk decreasing in size from the head toward the tail end of the sieve and having openings arranged adjacent to said partitions, substantially as described.

4. In a machine of the class described, the combination with a suitable casing, of a reciprocating sieve arranged in said casing, a series of partitions above said sieve forming a series of compartments, and a reciprocating air-trunk arranged above said partitions, said air-trunk having openings adjacent to said partitions, and said openings facing in the direction of the length of the air-trunk, substantially as described.

5. In a machine of the class described, the combination with a suitable casing, of a reciprocating sieve arranged in said casing, a series of partitions of varying heights above said sieve forming a series of compartments of different dimensions, and a reciprocating air-trunk arranged above said partitions and having openings communicating with said compartments, substantially as described.

6. In a machine of the class described, the

combination with a suitable casing, of a reciprocating sieve arranged in said casing, a series of partitions of varying heights above said sieve forming a series of compartments of different dimensions, and a reciprocating air-trunk above said partitions and having openings communicating with said compartments, said air-trunk being of varying dimensions, with its progressively-smaller dimensions above the progressively-larger compartments formed by the partitions, substantially as described.

7. In a machine of the class described, the combination with a suitable casing, of a reciprocating sieve arranged in said casing, a series of partitions above said sieve, a longitudinally-reciprocating air-trunk having openings arranged above said partitions, said air-trunk being reciprocable in the direction of travel of material over the sieve from the head to the tail end thereof, and open troughs supported upon said partitions below the openings in the air-trunk, substantially as described.

8. In a machine of the class described, the combination with a suitable casing, of a reciprocating sieve arranged in said casing, a series of partitions above said sieve, a longitudinally-reciprocating air-trunk having openings above said partitions, said air-trunk being reciprocable in the direction of travel of material over the sieve from the head to the tail end thereof, and valves arranged upon said partitions below said openings, substantially as described.

9. In a machine of the class described, the combination with a suitable casing, of a reciprocating sieve arranged in said casing, a series of partitions above said sieve, a longitudinally-reciprocating air-trunk having openings above said partitions, said air-trunk being reciprocable in the direction of travel of material over the sieve from the head to the tail end thereof, open troughs supported upon said partitions below said openings, and valves arranged upon said partitions between said troughs and said openings.

10. In a machine of the class described, the combination with a suitable casing, of a reciprocating sieve arranged in said casing,

an endless carrier below said sieve, inclined plates below a portion of said sieve, and the oppositely-inclined cut-off plates below the remaining portion of said sieve, substantially as described.

11. In a machine of the class described, the combination with the brackets 4 supported upon swinging hangers 5, of the sieve and the horizontal air-trunk both supported upon said brackets, one on the upper portion and the other on the lower portion of the brackets, said air-trunk having openings above said sieve, a stationary air-trunk and a flexible connection between said horizontal air-trunk and said stationary air-trunk for the purpose set forth.

12. In a machine of the class described, the combination, with a suitable casing, of a reciprocating sieve arranged in said casing, an endless carrier arranged below said casing, a reciprocating brush arranged below and in engagement with said sieve and means carried by said carrier for moving said brush, substantially as described.

13. In a machine of the class described, the combination, with a suitable casing, of a reciprocating sieve arranged in said casing, a reciprocating air-trunk arranged above said sieve reciprocable in the direction of travel of material over the sieve from the head to the tail end thereof and having a series of openings, a stationary air-trunk and a flexible connection between said air-trunks, substantially as described.

14. In a machine of the class described, the combination, with a suitable casing, of a reciprocating sieve arranged in said casing, a series of vertical partitions arranged above said sieve, a reciprocating air-trunk having openings arranged above said partitions, a stationary air-trunk, and a flexible connection between said reciprocating air-trunk and said stationary air-trunk, substantially as described.

In witness whereof I have hereunto set my hand this 15th day of November, 1904.

GEORGE T. SMITH.

Witnesses:

A. C. PAUL,
C. G. HANSON.