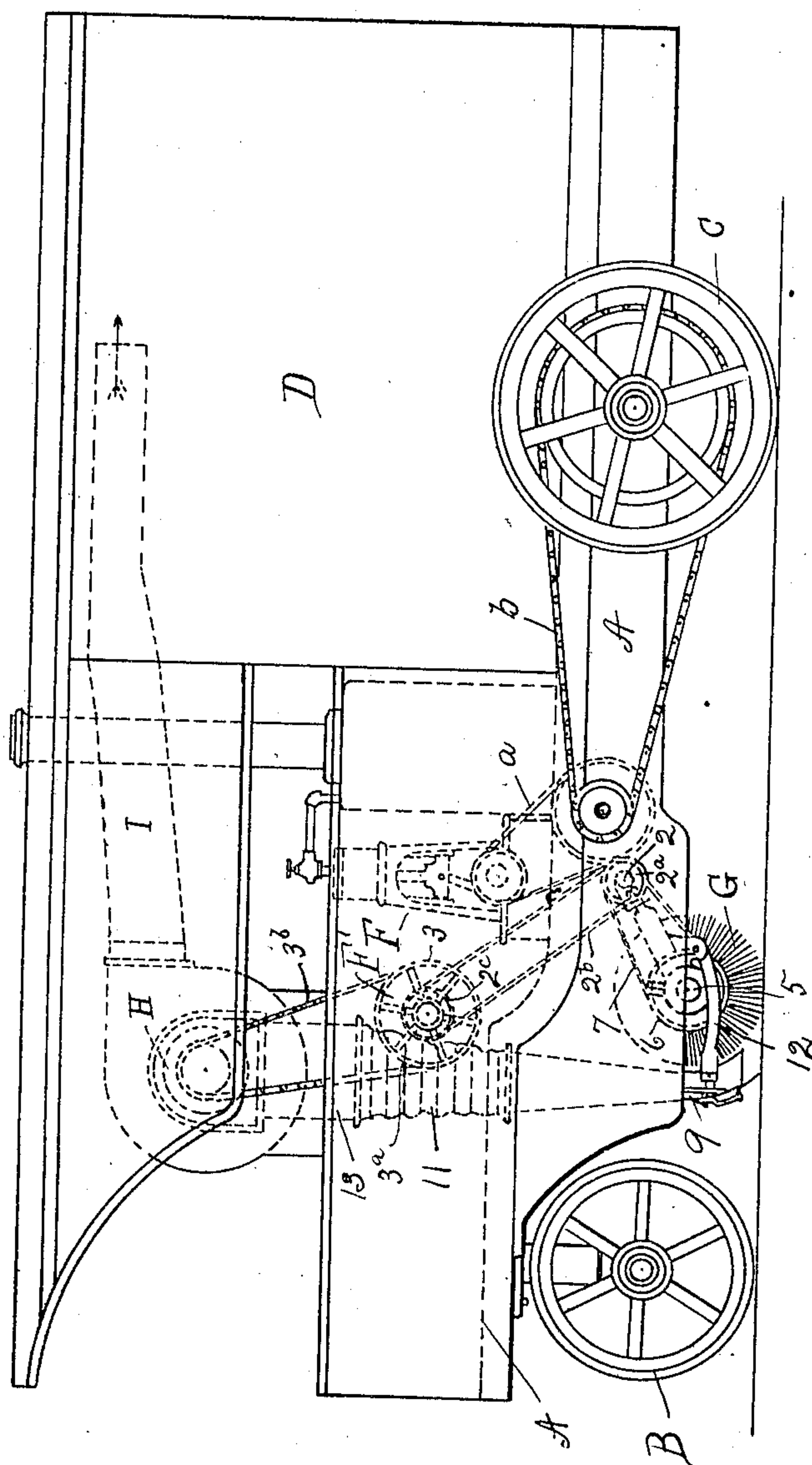


943,881.

B. KERN, JR.
STREET SWEEPING MACHINE.
APPLICATION FILED JAN. 27, 1905.

Patented Dec. 21, 1909.
4 SHEETS—SHEET 1.

Fig. 7



WITNESSES
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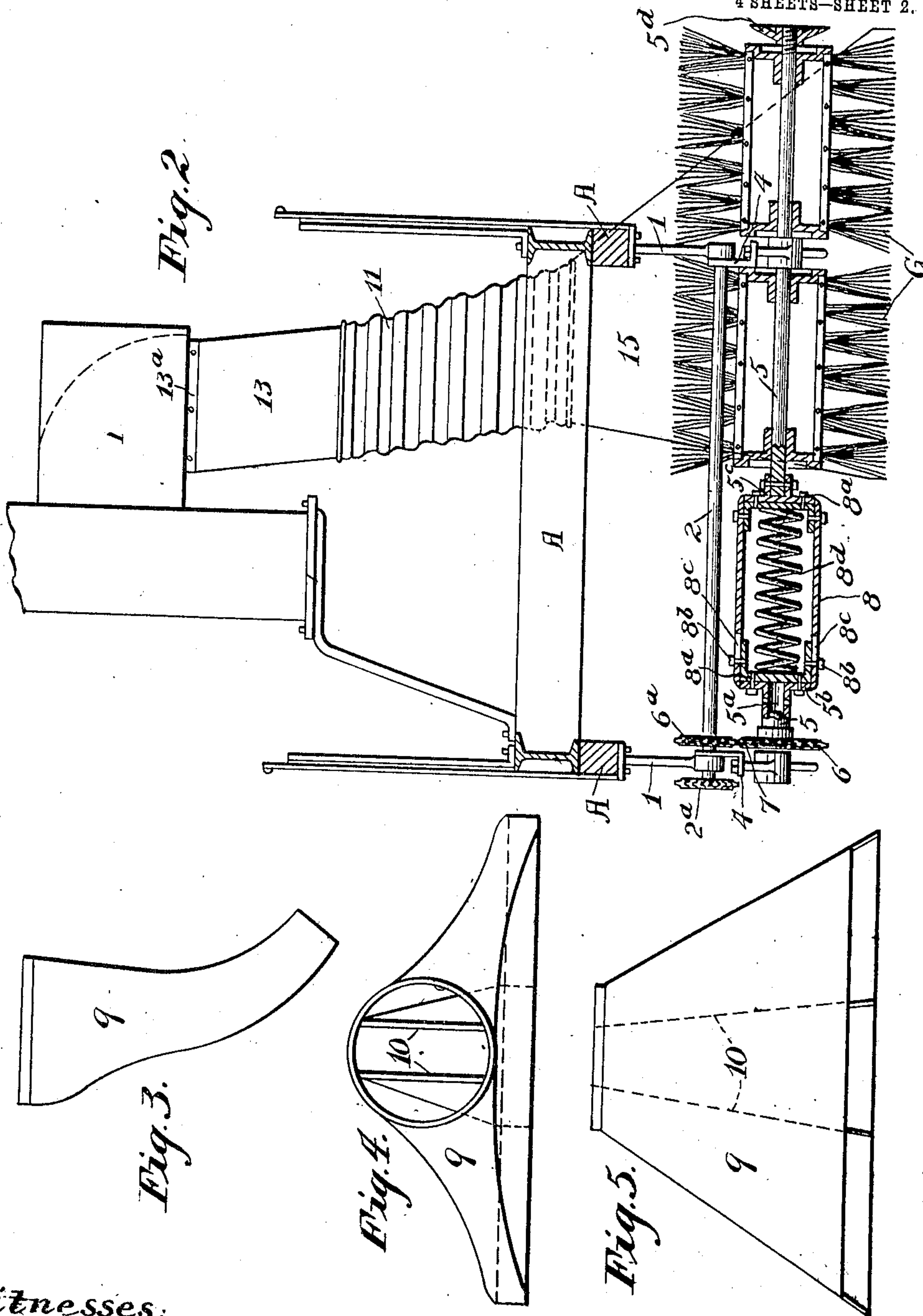
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4 SHEETS—SHEET 2.



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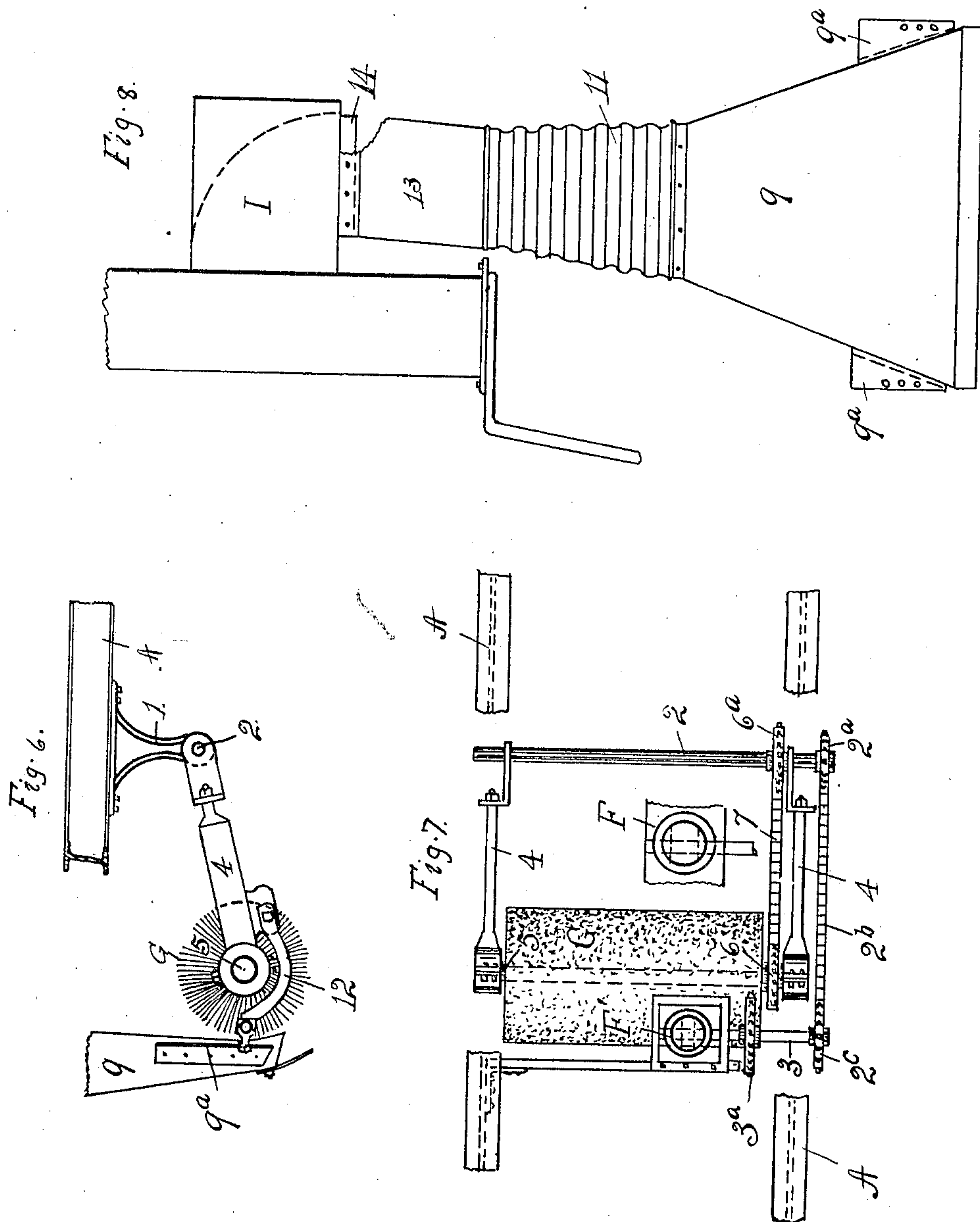
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4 SHEETS—SHEET 3.



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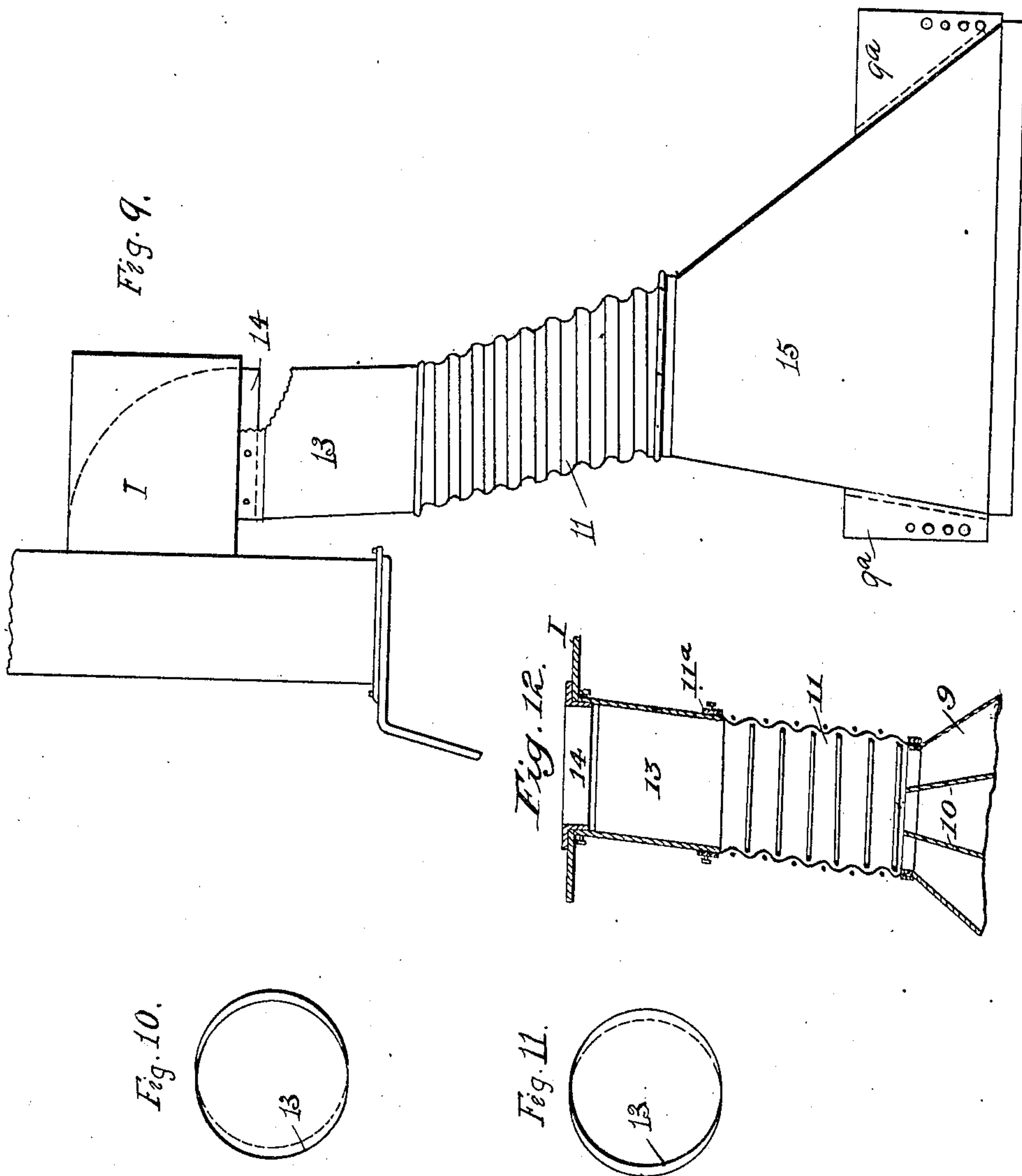
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943,881

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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

BERNARD KERN, JR., OF TOLEDO, OHIO, ASSIGNOR TO KERN AUTO STREET SWEEPER CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

STREET-SWEEPING MACHINE.

943,881.

Specification of Letters Patent. Patented Dec. 21, 1909.

Application filed January 27, 1905. Serial No. 242,831

To all whom it may concern:

Be it known that I, BERNARD KERN, JR., a citizen of the United States, and resident of Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Street-Sweeping Machines; 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in the class of street sweeping machines in which a force draft is employed in conjunction with a revolving brush or broom to remove the dust and dirt from the surface of the street and deposit the same in a suitable receptacle associated with the machine.

In the use of pneumatic street cleaners employing an air-conduit having its inlet or mouth piece widened to substantially the width of the broom or other cleaning medium, difficulty has arisen in equalizing the air suction throughout the width of the inlet for the reason that the air draft does not expand sufficiently at the widened mouth of the conduit to include the outer extremities thereof, thus permitting a greater or less quantity of the dust and dirt set in motion by the brushes to remain in the outer air or fall to the surface again after the machine has passed.

An object of my invention is to obviate this difficulty by the provision of means within the mouth-piece of the air-conduit whereby the air draft is equalized and evenly distributed throughout the width of the inlet.

It is also the purpose of my invention to provide an air-conduit the inlet end of which is made laterally adjustable with respect to the machine to enable it to follow the position of the broom should it be of a character adapted to be extended laterally of the machine to form a gutter cleaning broom.

The construction, operation and arrangement of the parts comprising my invention are fully described in the following specification, and shown in the accompanying drawings, in which,—

Figure 1 is a side elevation of a street-

sweeping-machine embodying my invention, showing in dotted lines the various internal operative parts thereof. Fig. 2 is a rear end view of the dust collecting conduit and associated broom, showing the broom in central longitudinal section and adjusted for cleaning a gutter and the conduit equipped with a mouth-piece of the construction employed when the broom is so adjusted. Fig. 3 is a side elevation, Fig. 4 a top plan view, and Fig. 5 a rear elevation of the main mouth-piece of the air-conduit. Fig. 6 is a detail of the broom-hanger means and broom and mouth-piece connecting member. Fig. 7 is a fragmentary plan view of the broom and fan operating mechanism. Fig. 8 is a rear elevation of the air-conduit and associated broom, with the broom shown in central longitudinal section and in normal position and the conduit equipped with the main mouth-piece. Fig. 9 is a rear elevation of the air-conduit adjusted for and having the gutter mouth-piece secured thereto. Figs. 10 and 11 are diagrammatical views showing the relative degree of adjustment of the connecting section of the conduit when it is adjusted as shown in Figs. 9 and 8, respectively, and Fig. 12 is a central vertical section of the adjustable portion of the air-conduit.

Referring to the drawings, A represents the frame or body of a machine containing my invention, which is supported upon and made portable by two front wheels B and two rear wheels C. The frame or body A is provided at the rear thereof with a dirt receptacle D into which the sweepings are discharged. The forward portion of the frame or body A is shown as being equipped with an engine F which communicates power to the rear drive-wheels C through the medium of the sprocket-chains *a* and *b* and connected sprocket wheels, as shown, for the purpose of propelling the machine. A second engine or motor F', shown in Fig. 7, is mounted in advance of the engine F and is intended to communicate motion to the broom or brush G and fan H, which latter receives its power through the medium of the sprocket-wheel 3^a, on the engine shaft 3, and the sprocket-chain 3^b, and causes a forced draft within the air-conduit I for the purpose of carrying to the receptacle D the dust and sweeping set in motion by the operation of the brush or broom G.

Beneath the forward portion of the frame A and at either side thereof is secured a bracket 1. In these two brackets are journaled the ends of a shaft 2, carrying a sprocket-wheel 2^a upon which runs a chain 2^b, which is driven by a sprocket-wheel 2^c on the engine-shaft 3, as shown in Fig. 7 and by dotted lines in Fig. 1. Journaled or pivoted loosely upon each end of the shaft 2 is a forwardly-projecting arm 4, both of which arms have bearings provided at their forward extremities in which are mounted the ends of the shaft 5, which carries the brushes or brooms G. The shaft 5 carries a sprocket-wheel 6, which is driven by a chain 7, said chain receiving its motion from a sprocket wheel 6^a, carried by the shaft 2.

The broom shaft 5 is made longitudinally extensible to enable it to be extended laterally of the machine to carry a gutter broom, as shown in Fig. 2. The manner shown of accomplishing this is to form the shaft 5 into two sections having their point of connection adjacent to the sprocket 6, which is mounted on the shorter section. The short shaft section has its inner end enlarged and axially bored as at 5^a to receive the inner end of the long shaft section when in normal position and is also formed flush with its inner end with an annular flange 5^b. When the shaft is extended the long section thereof is released from the socket in the short section and moved longitudinally in its bearing until its outer end extends the desired distance laterally of the machine. This being done an annularly flanged member 5^c, corresponding in size to the flange 5^b, is secured to the inner end of the long shaft section, as shown in Fig. 2, and a cylindrical shell or spacing-member 8 then placed axially between the contiguous ends of the shaft sections with its end castings abutting the faces of the flanges 5^b and 5^c thereon to which they are rigidly secured by pins or bolts 8^a. The cylindrical casing of the shell 8 is adapted to have a limited longitudinal movement with respect to one of its end castings by reason of the retaining pins 8^b therein operating within elongated slots 8^c provided in said casing. A coiled compression-spring 8^d is mounted within the spacing-member 8 with its ends abutting the end castings thereof, and is adapted to permit of a longitudinally-yielding movement of the extended portion of the shaft when the flanged-nut 5^d at the outer end thereof comes in sliding contact with the curbing or other obstacle at the side of the machine. As the hanger-arm 4 at the extended end of the shaft 5 is mounted between the broom sections as shown, when the shaft is extended, it is necessary to so mount said arm as to enable it to have a movement with the shaft and broom sections when the spring 8^d is compressed. This is accomplished by

loosely mounting the inner end of said arm 4 to have a sliding movement on the shaft 2.

The mouth-piece 9, which leads from the ground in advance of the brushes or brooms G to and communicates with the air-conduit I below the fan H has its lower edges or inlet end broadened out to a width substantially equal to the combined length of the broom sections employed and its upper part contracted and shaped to connect with the conduit I. The broadened and contracted ends of the mouth-piece are so proportioned that their areas are approximately equal. It has been found by experimenting that where a mouth-piece having a broadened inlet is employed the lifting power or draft of the air is not evenly distributed throughout the width of the mouth-piece, but is confined more to the central portion thereof, or in substantial alinement with its contracted upper portion. In order to cause the air draft to be deflected and equally distributed to the outer edge of the mouth-piece inlet as well as to the central portion thereof, I provide a series of vertically disposed partitions 10 therein which lead from the lower to the upper contracted portion of the mouth-piece and divide it into a series of channels thereby causing the main air-conduit to draw its supply of air from two or more diverging conduits and preventing a stagnation of the air at the outer flared ends of the inlet. The partitions 10 are so positioned that the areas of the compartments or channels formed thereby are substantially equal throughout their length, thereby causing the air-draft created in the conduit I by the fan H to be equally apportioned to the several channels of the mouth-piece.

The mouth-piece 9 is retained in proper relation to the broom section G by means of a link 12 being rigidly secured to the forward end of each arm 4 and having its forward end hinged or pivotally connected to the flange or web 9^a projecting from the side of the mouth-piece as shown in Fig. 6. To enable the mouth-piece to rise and fall with the brushes G as they pass over uneven surfaces, the upper or contracted end thereof is removably secured by set screws or other suitable means to the lower end of the flexible conduit section 11, the upper end of which section connects with a rotatable conduit section 13 to which it is secured by a clamping-ring 11^a, which is adjustably secured to the section 13 by set-screws or in any other suitable manner, as shown in Fig. 12. The section 13 has its upper end cut on a slight slant and adjustably secured by means of set-screws or the like to the flange or nipple 14 of the stationary portion of the conduit I to cause the lower end thereof, when turned relative to the conduit and section 11, to be thrown to the right or left to suit the positions of either mouth-piece 9

or 15, as shown in Figs. 8 and 9. The lateral throw of the lower end of the section 13 is also illustrated in Figs. 10 and 11.

As it would be impossible to employ a mouth-piece of the same shape as the mouth-piece 9 when the sections 11 and 13 are thrown to the right to follow the extended position of the brushes, I provide for this purpose a substitute mouth-piece 15, which is similar in its construction to the main mouth-piece 9, having its upper end shaped to connect with the flexible conduit section 11, its inlet end broadened to substantially the combined length of the broom sections, and its interior provided with partitions running lengthwise thereof and converging from bottom to top to divide the mouth-piece into a series of channels of substantially equal area, but is slightly changed in shape from said mouth-piece, as shown in Figs. 2 and 9, to enable the inlet end thereof to remain on a plane parallel to the surface of the pavement when the conduit sections 11 and 13 are shifted from the position shown in Fig. 8.

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

1. In a street-sweeper, the combination with the dust conduit, of a mouth-piece at the receiving end thereof, said mouth-piece having its inlet end broadened to form an elongated opening of greater length than the diameter of the conduit, and a plurality of partitions in the mouth-piece for causing an equalization of the air current throughout its width, said partitions extending from top to bottom of the mouth-piece and having their lower ends spaced farther apart than their upper ends, substantially as described.

2. A mouth-piece of the class described having a substantially round upper end and a broad, flat lower or inlet end provided with a long, narrow inlet opening, the cross-sectional area of the mouth-piece remaining substantially the same throughout its length, and partitions extending through the mouth-piece for the purpose of dividing it into a plurality of channels of substantially equal cross-sectional area throughout its length.

3. In a street sweeper, in combination, a rotary-broom mounted for adjustment transversely of the machine, a dust conduit having a part shiftable to suit the position of adjustment of the broom, and a mouth-piece for the conduit having a broad, inlet or lower end provided with a long, narrow inlet opening, substantially as described.

4. The combination in a street-sweeper, of a shaft having a portion of its length extended beyond the side of the machine, bearing-arms carrying the shaft, means for extending the shaft and permitting a yield-

ing movement thereof, a broom carried by the shaft between its bearings and a second broom carried by the extended end thereof, a dirt receptacle, a conduit leading thereto from the brooms and having its outer or inlet end laterally adjustable to suit the position of the brooms, and a mouth-piece at the inlet end of the conduit having its mouth or intake broadened and in juxtaposition to the brooms.

5. In a street sweeper, a broom, a shaft on which said broom is mounted, means for longitudinally adjusting said shaft whereby a portion of said broom may be positioned at the side of the machine, a fan, a conduit leading from the broom to the fan, said conduit having its outer or broom end laterally adjustable to suit the position of adjustment of the broom, and a mouth-piece for the conduit.

6. In a street-sweeper, the combination of a longitudinally adjustable shaft, a series of broom sections mounted on the shaft and adjustable therewith, a dirt receptacle, a conduit leading from the brooms to the dirt receptacle, the broom end of the conduit being adjustable to suit the adjusted position of the broom sections; and a mouth-piece for the conduit having its inlet end broadened and disposed in position to receive the sweepings.

7. In a street sweeper, an adjustable broom, a conduit having a part shiftable to suit the position of adjustment of the broom, and a mouth-piece for said part having its inlet end broadened and formed with a plurality of channels which have their mouths at the inlet end of the mouth-piece and their inner ends disposed adjacent the point of connection of the mouth-piece to the conduit.

8. In a street-sweeper, a longitudinally adjustable shaft, a broom section mounted on the shaft and adjustable therewith, and a dust conduit having a part shiftable to suit the position of adjustment of the broom, and a mouth-piece for the conduit.

9. In combination, a shaft, arms pivotally secured to said shaft and having bearings formed in their free ends one arm being permitted to have a sliding movement longitudinally of said shaft, a rotary brush carrying shaft mounted in the bearings in said arms and being separable at a point between the arms and means disposed between the separable portions of the shaft for yieldingly extending the shaft section carried by the sliding arm.

10. In combination, a shaft, two arms pivotally carried by said shaft, a second shaft carried by said arms and adapted to be separated and longitudinally extended so that a portion projects beyond one of said arms, a plurality of broom sections mounted on said separable shaft and adapted to be posi-

tioned thereon so that all are disposed between said arms or one or more mounted on the extended portion thereof, and means for retaining said second shaft in yieldingly
5 extended position.

11. In a street-sweeper, a longitudinally adjustable shaft having a part capable of permitting a yielding longitudinal movement thereof, a broom section mounted on
10 the shaft and adjustable therewith, and a dust conduit having a part shiftable to suit the position of adjustment of the broom, and a mouth-piece for the conduit.

12. In a street-sweeper, an adjustable
15 broom, a fixed conduit part, a part rotatably carried by the fixed part and fashioned to cause a rotary movement thereof to shift the position of its outer end, a flexible conduit part attached to the outer end of said
20 rotary part, and a mouth-piece carried by the flexible part.

13. In combination, a driven-shaft, means

for driving said shaft, spaced arms pivotally carried by said shaft, one arm being movable longitudinally of the shaft, a broom shaft 25 journaled in the outer ends of said arms, said shaft being separable at a point intermediate said arms to permit one section to be extended laterally of the machine, means for yieldingly spacing the sections of the 30 shaft, means for driving the broom-shaft from the driven-shaft, a broom carried by the broom-shaft, a dust conduit having a part shiftable to suit the adjusted position of the broom, and a mouth-piece carried by 35 said conduit part, substantially as described.

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

BERNARD KERN, JR.

Witnesses:

CORNELL SCHREIBER,
C. W. OWEN.