

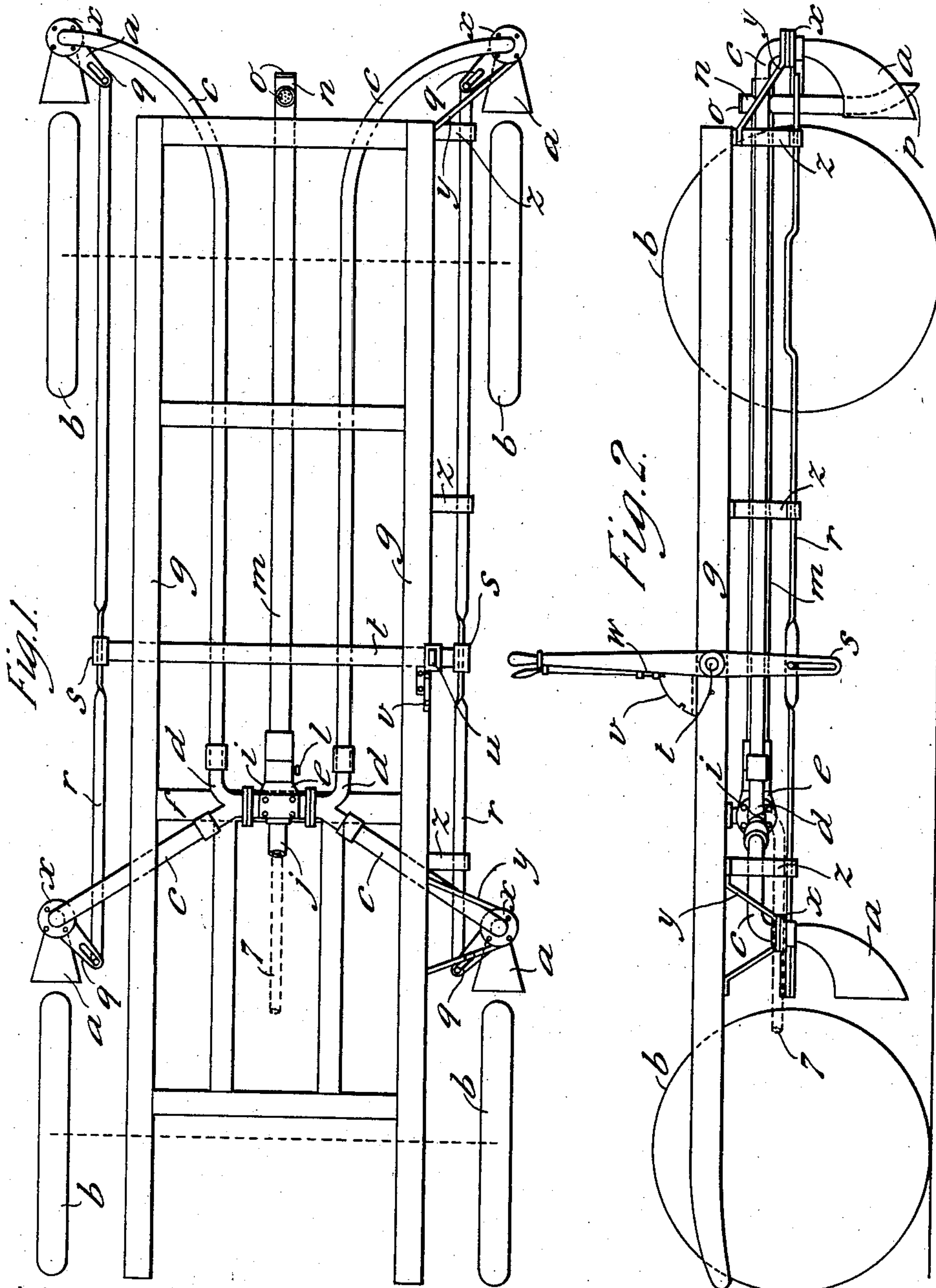
No. 891,714.

PATENTED JUNE 23, 1908.

E. H. MORGAN.
DUST COLLECTOR FOR MOTOR VEHICLES.

APPLICATION FILED JUNE 14, 1907.

2 SHEETS—SHEET 1.



Witnesses:

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J. B. Keeler

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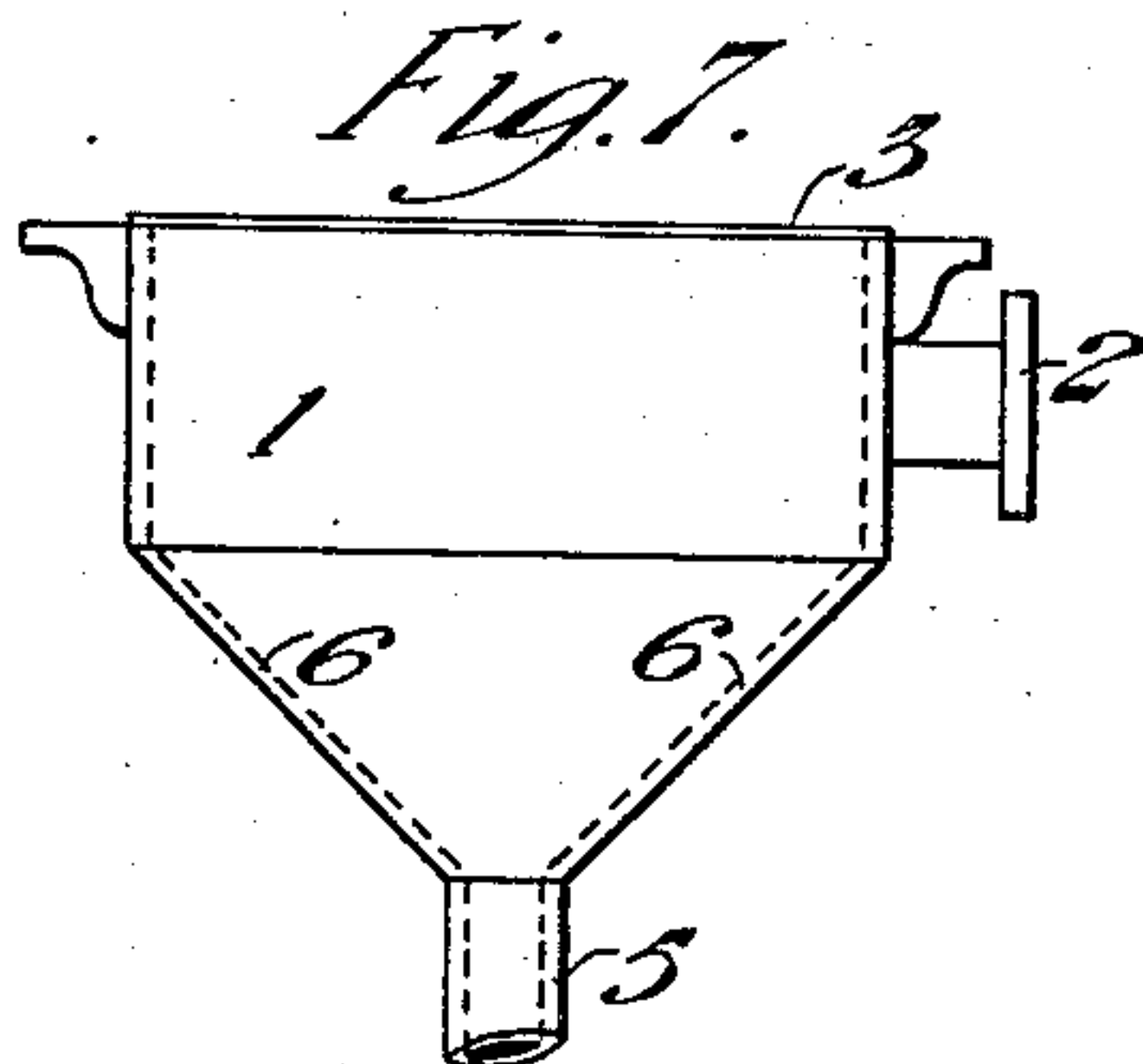
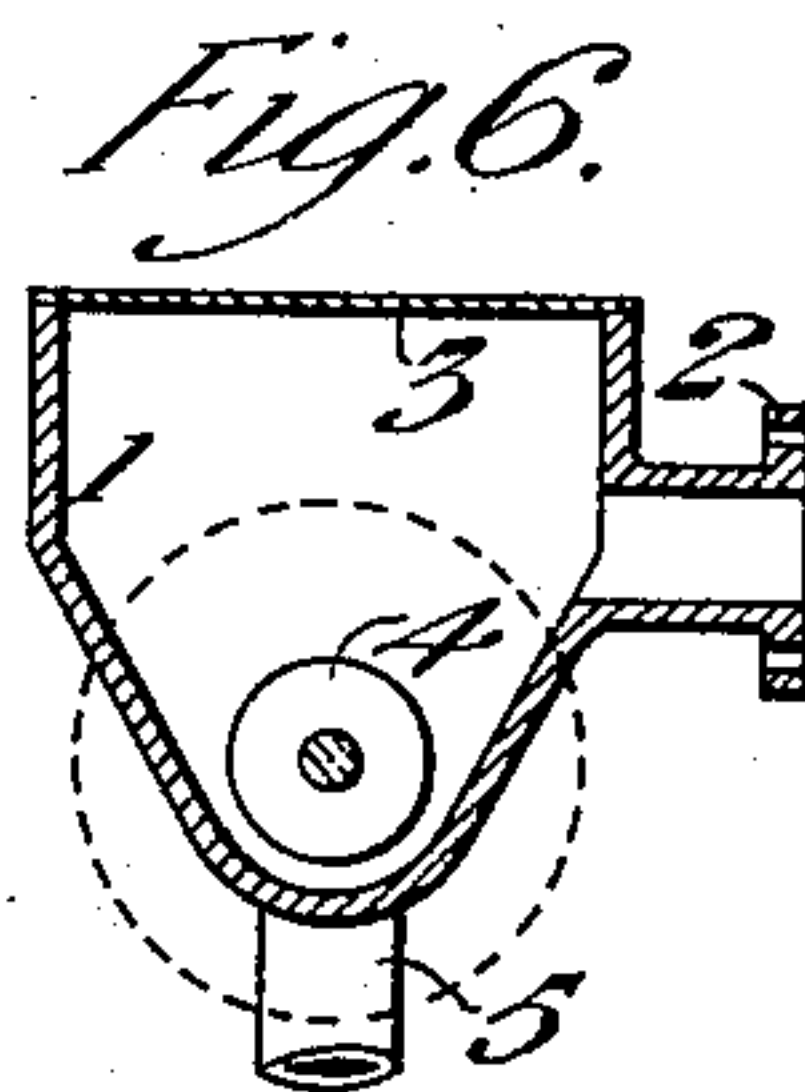
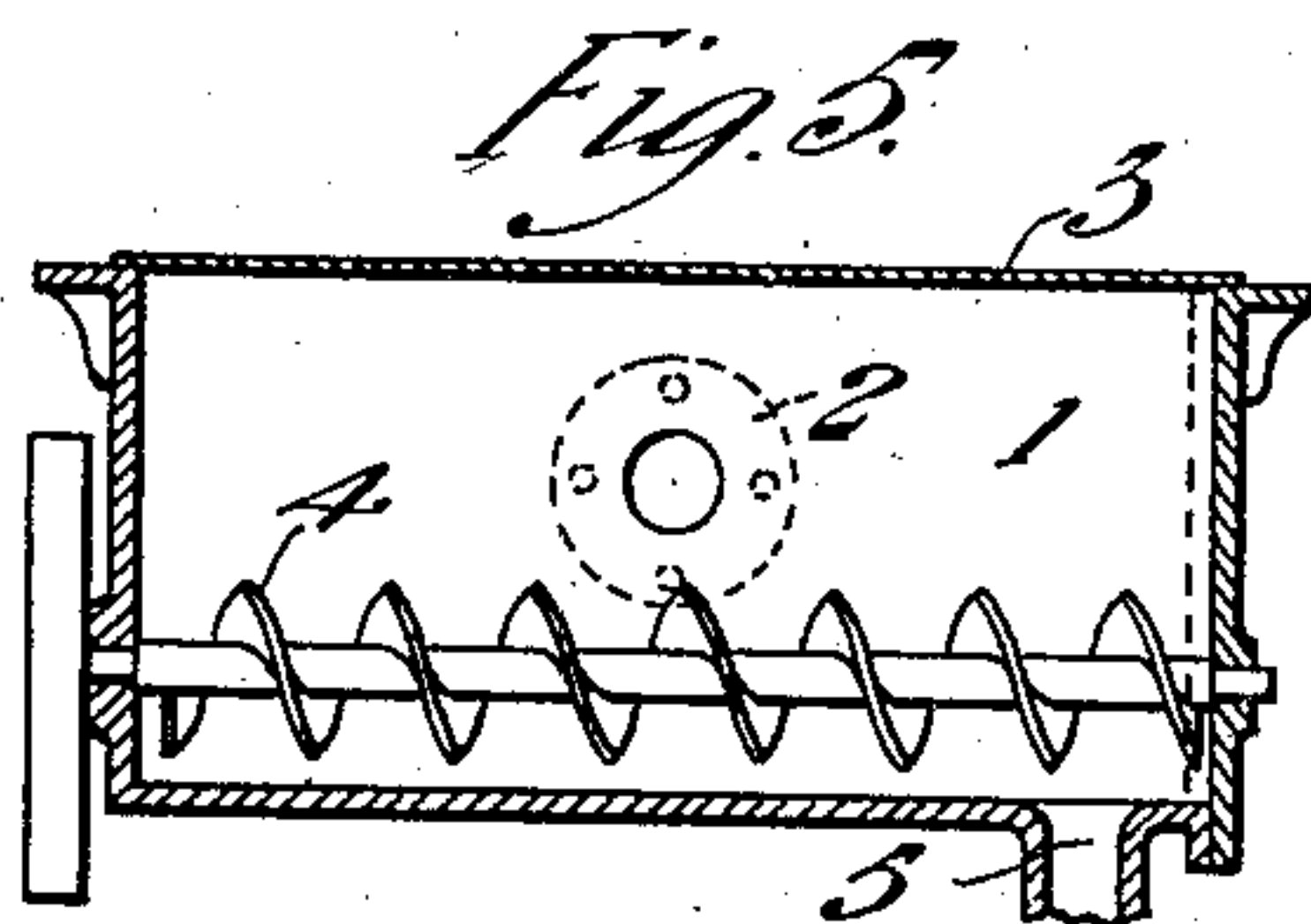
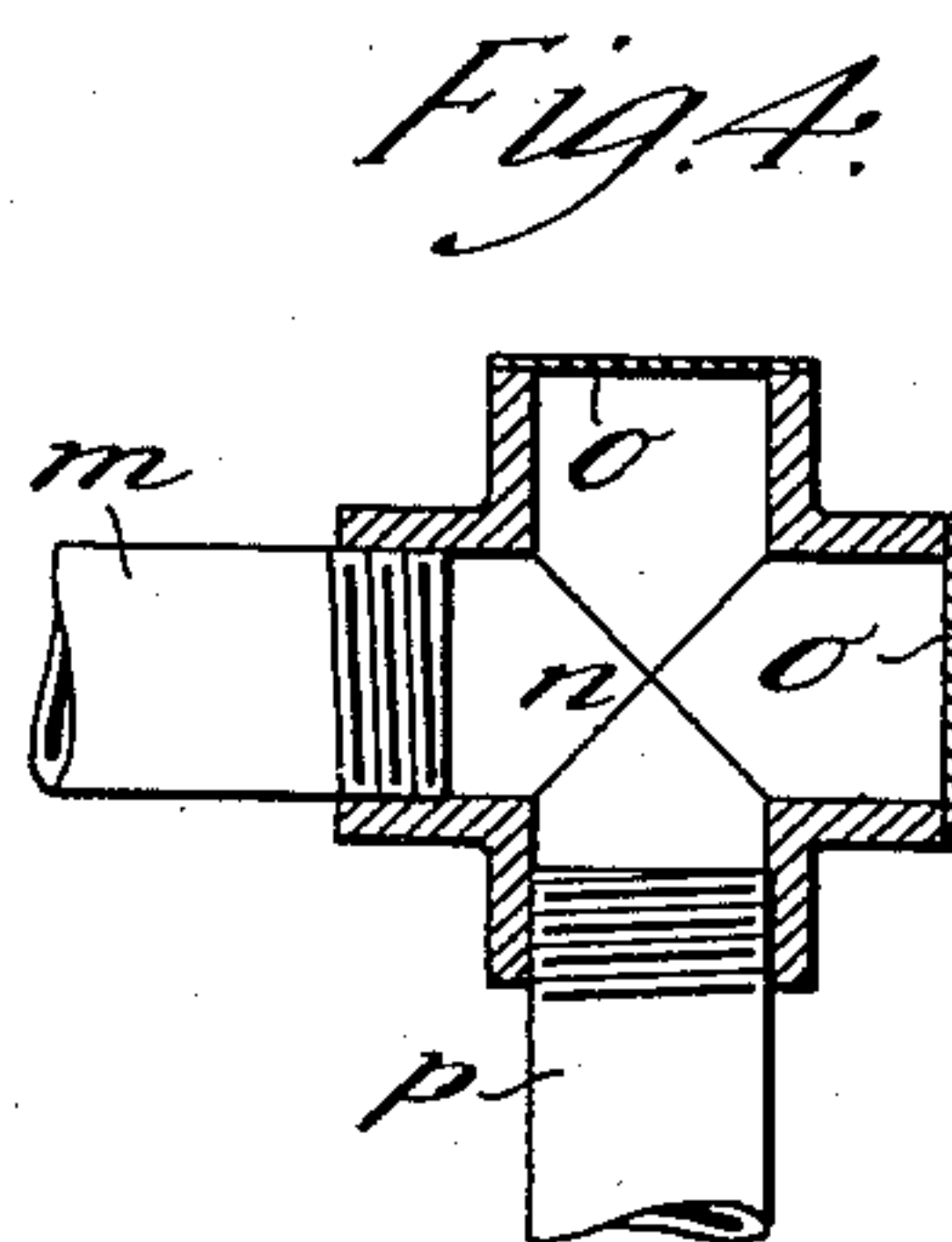
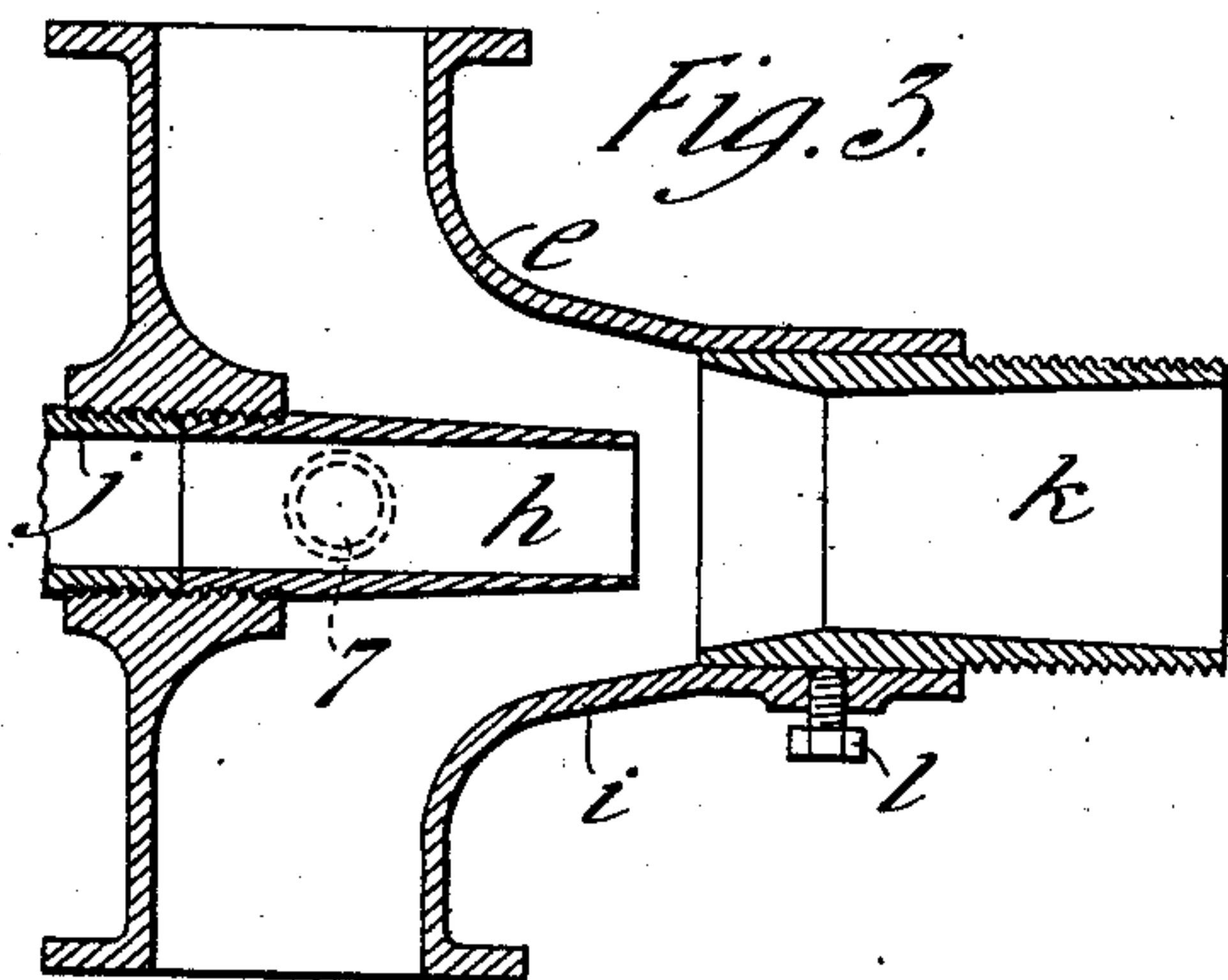
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2 SHEETS—SHEET 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

EVERARD HOME MORGAN, OF DIDSBURY, ENGLAND.

DUST-COLLECTOR FOR MOTOR-VEHICLES.

No. 891,714.

Specification of Letters Patent.

Patented June 23, 1908.

Application filed June 14, 1907. Serial No. 379,051.

To all whom it may concern:

Be it known that I, EVERARD HOME MORGAN, a subject of the King of Great Britain and Ireland, residing at 41 Bamford road, Didsbury, in the county of Lancaster, England, engineer, have invented certain new and useful Improvements in Dust-Collectors for Motors and other Vehicles, of which the following is a specification.

10 The principal object of this invention is to collect dust raised from roads by the wheels of motor-vehicles and to discharge it forthwith in such a way, and in such condition that it shall not cause nuisance or inconvenience but tend to improve road surfaces.

15 A further object of this invention is to deodorize the products discharged from the cylinders of motor-vehicles driven by internal-combustion motors.

20 According to this invention a motor-vehicle driven by means of an internal combustion motor is provided with pipes, casings or collectors, and an air ejector or air ejectors in connection therewith by means of which
25 the exhaust products discharged from the internal combustion motor may be made to induce air to enter into such pipes, casings or collectors, and carry with it dust raised by the wheels from the roads. The said
30 pipes, casings or collectors are connected to a receptacle or receptacles with partitions or screens or sieves or any other device or devices enabling dust to be separated from air. The receptacle may be provided with an
35 Archimedean screw or Archimedean screws or spiral or other conveyer or conveyers or other means for discharging dust separated from the air continuously.

40 The products discharged from the internal combustion motor in being used to induce the current of air to carry dust into the receptacle or receptacles provided as aforesaid will be deodorized by mixture with the air in the said current and by contact with the
45 dust collected. These products by depositing moisture and other products on the particles of dust will tend to render them more or less adhesive and so make the dust more capable of remaining where it may be deposited than when raised by the wheels of the motor-vehicle and so in course of time to improve the surface of roads by the passage of
50 motor vehicles.

In any case in which it may be desirable,

means such for example as a pipe may be 55 provided to convey steam or water vapor from the radiator cooling jacket or vessel containing cooling liquid used with the internal-combustion-motor to the air ejector so that the steam or water-vapor may be condensed or deposited on the dust passing 60 through or out of the collecting apparatus in order to aid in rendering such dust more or less adhesive.

The bottom of the receptacle or receptacles in which the dust is separated from the air may be inclined or otherwise and of a semi-circular or other shape as may be convenient to facilitate the discharge of the dust 65 therefrom by gravity to the ground through a pipe or opening or pipes or openings conveniently placed and always open. The receptacle may be connected to a container or containers from which the dust may be allowed to escape continually by any means 70 such for example as openings or conveyers analogous to those already mentioned herein.

In the accompanying drawings in all the figures of which the same letters of reference are employed to indicate corresponding 75 parts, are illustrated by way of examples some of the appliances which may be employed in carrying this invention into effect.

In Figures 1 and 2 of the said drawings which are respectively a plan and a side elevation, the "chassis" of a motor-driven-vehicle with this invention applied to it is shown in so far as is requisite to enable this invention and its application to motor-driven-vehicles to be readily understood and 80 accomplished. Fig. 3 is a horizontal section through the air-ejector or device employed in the apparatus shown as applied to the motor-driven-vehicle illustrated in Figs. 1 and 2 to enable the products discharged 85 from the motor to induce currents of air, Fig. 3 being drawn upon a larger scale than Figs. 1 and 2. Fig. 4 is a vertical section drawn upon a larger scale than Figs. 1 and 2, and illustrating the construction of the device 90 used in the apparatus illustrated in Figs. 1 and 2 to allow the air to escape from the dust collected. Figs. 5 and 6 are respectively a longitudinal section and a transverse section illustrating the application of a 95 spiral conveyer to discharge dust collected by means of apparatus provided according to this invention after separation from the 100 105

air used to convey it through such apparatus. Fig. 7 is a side elevation illustrating another way somewhat different from that illustrated in Figs. 1 and 2 in which the dust collected by apparatus provided according to this invention may be separated from the air by means of which it has been conveyed into the said apparatus and be allowed to fall by its own weight from such apparatus.

10 In Figs. 1. and 2, *a* are collecting bells at the rear of the wheels *b* of the motor-driven-vehicle of which part is illustrated in such figures. The wheels *b* are indicated diagrammatically in Fig. 1 and only by dotted lines 15 in Fig. 2.

The collecting bells *a* which ordinarily are made to present their openings towards the wheels *b* respectively adjacent to them although mounted so that as will be herein- 20 after further mentioned, they may be turned aside, are connected by pipes *c c* to branch-pipes *d d* secured at opposite sides of the casing of an air-ejector *e* shown as connected by bolts to a cross-rail *f* secured to the side 25 frames *g g* of the motor-driven-vehicle. The air-ejector *e* shown is provided with a central nozzle *h* secured in one end of the casing *i* of the said air-ejector *e* and placed in communication with the exhaust pipe *j* of the 30 internal-combustion-motor so that the products discharged from the internal-combustion-motor shall be discharged through the nozzle *h*. At the end opposite to that at which the nozzle *h* is secured the casing *i* is 35 provided with a delivery nozzle *k* formed internally with a passage tapering from the ends of the delivery nozzle *k* towards one part of the interior thereof so that the passage through the said part of the interior of 40 the nozzle *k* is smaller than the orifices at the ends. The delivery-nozzle *k* is made capable of being adjusted lengthwise in the casing *i* in order that the discharge through the nozzle *k* of the products discharged from 45 the internal-combustion-motor may be made most effective in inducing currents of air to flow through the pipes *c* into the casing *i* and out through the nozzle *k* and a set-screw *l* screwed into the casing *i* is provided in order 50 that the nozzle *k* may be secured in position when adjusted.

The delivery nozzle *k* is connected to one end of a pipe *m* connected at its other end to a box *n* with four arms of which one serves 55 for the attachment of the pipe *m*, two are provided with openings with covers *o o* of wire gauze of a mesh sufficiently fine to prevent dust of any importance passing through, while permitting the escape of air or gaseous 60 products and the fourth is connected to a discharge-pipe *p* provided for the discharge of dust and extending downwards and curved somewhat towards the rear of the motor-driven-vehicle. When the internal-combus- 65 tion-motor of the motor-driven-vehicle is

working the products discharged therefrom through the pipe *j* issuing from the nozzle *h* and passing through the delivery-nozzle *k* and along the pipe *m* will induce currents of air to enter the bells *a a* and flow along the pipes *c* 70 into the casing *i* of the ejector *e* and out through the delivery nozzle *k* and pipe *m* to the box *n* from which air and gaseous products may issue through the wire gauze coverings *o* as well as through the discharge-pipe 75 *p*. The currents of air entering the bells *a* and flowing through the pipes *c* to the ejector *e* and thence through the pipe *m* to the box *n* will carry with them dust which may be raised by the action of the wheels *b* in 80 front of the bells *a a* and as the air and gaseous products are discharged principally through the wire-gauze coverings *o* the dust carried along the pipe *m* therewith, will with the residue of air and gaseous products be 85 discharged from the box *n* through the discharge pipe *p* with but little velocity. In passing through the ejector *e* the dust carried by the air currents entering the bells *a* is mixed with the products discharged from the 90 internal-combustion-motor and is moistened or influenced by the condensation of the water-vapor and other products and thereby made less liable to float in air after issuing from the discharge pipe *p* than it was when 95 it entered the bells *a* and so when allowed to fall from the discharge-pipe *p*, it will lie or settle quickly upon the road behind the motor-driven-vehicle and the products discharged from the motor being mixed with 100 the air and dust entering the casing *i* are deodorized thereby and furthermore smoke in the products issuing from the pipe *j* is prevented from issuing as smoke from the pipe *m* and discharging pipe *p*. 105

In the case illustrated in Figs. 1 and 2 the bells *a* are mounted to swivel upon the parts by which they are supported and are connected by arms *q* to rods *r* with studs to engage slots in arms *s* upon a shaft *t* mounted 110 to oscillate in bearings provided in the frame work of the motor-driven-vehicle and provided with a hand lever *u* by which it may be oscillated to turn the bells *a* either into the position in which they are shown in Fig. 2 for 115 use or inwards from the position in which they are shown in Fig. 2 if it be considered necessary at any time to prevent mud from being thrown into them by the wheels *b*, a quadrant *v* carried on one side frame *g* and a detent *w* carried by the hand lever *u* being provided to enable the bells *a* to be locked in 120 either of the positions into which they may be turned.

In the case illustrated, the sockets *x* in 125 which the bells *a a* are mounted to turn are carried in part by the pipes *c* and in part by stays or brackets *y* secured to convenient parts of the side-frames *g* of the motor-driven-vehicle and brackets *z* to support and 130

guide the rods *r* are provided upon the side frames *g*, one of the brackets *y* at each side of the vehicle being shown as secured to the adjacent side-frames *g* by the bolts serving to secure to such side-frame *g* the adjacent one of the brackets *y* at the rear of the vehicle. Of the brackets *y* and *z* only those at one side of the motor-driven-vehicle are shown, those at the other side being omitted so that other parts may be better shown.

In the apparatus shown in Figs. 5 and 6, 1 is a box to be carried by a motor-driven-vehicle and connected by means of the flange 2 shown as provided on it to a pipe corresponding to the pipe *m* shown in Figs. 1 and 2. The box 1 is provided above with a covering 3, of wire-gauze of a mesh sufficiently fine to prevent dust of any importance passing through, while permitting the escape of air and gaseous products, and internally with a spiral-conveyer 4 made to revolve by any suitable means as, for example, by a belt or chain applied to a wheel upon it and driven in any suitable way continually while the internal-combustion-motor of the motor-driven vehicle is working.

At its lower part the box 1 is provided with a discharge-pipe or opening 5 and is curved to correspond somewhat to the lower part of the conveyer 4 so that such conveyer may be enabled better to push to the discharge-pipe or opening 5 dust deposited in the box 1 after it has been carried thereto by the current of air induced by means of the products discharged from the internal-combustion-motor and the air and gaseous products from the internal-combustion-motor have escaped from the box 1 through the wire-gauze-covering 3.

In Fig. 7 is shown a box 1 corresponding to and provided at the top with a wire-gauze-covering 3 like the box 1 shown in Figs. 5 and 6 but closed below simply by an inclined surface or inclined surfaces 6 in the form either of an inverted hollow cone or inverted hollow pyramid and with a discharge-pipe or opening 5 at its lowest point so that dust carried into it by air and gaseous products from an internal-combustion-motor in the manner hereinbefore described being deposited on the inclined surface or surfaces 6 as the air and gaseous products which have carried it into the box 1 escape through the wire-gauze-covering 3 may fall to the discharge-pipe or opening 5 and so be discharged gently from the box.

The dotted lines 7 in Figs. 1, 2, and 3, indicate one way in which a pipe connected to the radiator cooling jacket or vessel containing cooling liquid used with the internal-combustion-motor may be connected to the air-ejector *e* so that steam or water-vapor from the cooling liquid may be led to the air-ejector to be condensed or deposited on the dust passing through the pipe *m*.

The wire-gauze or other material used in partitions or screens or sleeves or other similar devices for separating dust from air which may be employed according to this invention must be fine enough to allow air and gaseous products to pass through it but prevent dust of any importance from passing through it.

It will be obvious that the pipes or like appliance employed in apparatus provided according to this invention may be carried in any positions convenient on the motor-driven-vehicles on which they are employed so as not to interfere with the operation of any parts of the mechanism thereof and that when desirable the bells or openings of the pipes, casings or collectors employed may be fixed so as to remain in one position relative to the wheels with which they are used instead of being made capable of being turned aside therefrom.

It is obvious that instead of an air-ejector such as the air-ejector *e* illustrated in Figs. 1, 2, and 3 of the accompanying drawings, any other form of apparatus may be employed by means of which the discharge of products from an internal-combustion-motor used in a motor-driven-vehicle may be enabled to induce the flow of air along the pipes, casings, or collectors employed, in the manner hereinbefore described.

It is obvious that there is such possibility of variation in the details of apparatus which may be employed in carrying this invention into effect that it is only possible herein to describe some forms of apparatus by way of example.

The application of this invention to a motor-driven-vehicle driven by an internal-combustion-motor enables any dust raised by the wheels of such vehicle to be caught and collected and put back on to the road so gently and in such condition by reason of the admixture with it of the products discharged from the internal-combustion-motor that it is able to fall and to remain on the road behind the motor-driven-vehicle, so obviating the production of dust-clouds by the passage of the motor-driven-vehicle along a road and also enables the products discharged from the internal-combustion-motor to be deodorized and prevented from causing any appearance of smoke on issuing into the external air.

If it be thought desirable in any case the ejector or injector or other means by which as hereinbefore described, the products discharged from the internal-combustion-motor of a motor-driven vehicle may be made to induce the flow of air through pipes, casings or collectors into a discharge-pipe or channel may be employed without the bells or other means hereinbefore described as used to enable dust raised by the wheels of the vehicle to enter the pipes, casings or collectors and

without the partitions, screens or sleeves used to separate dust from air as hereinbefore described and in such case the air induced to flow along the said pipes, casings or collectors, mixing with the products discharged from the internal-combustion-motor will deodorize such products and prevent them from causing any appearance of smoke when discharged into the atmosphere. Furthermore the admixture of air with the exhaust products discharged from the internal combustion motor which takes place in the air-ejector or air-ejectors employed according to this invention cools the exhaust products and thereby partially condenses them into water.

In the case of a motor-driven-vehicle driven otherwise than by an internal-combustion-motor or in any case in which it may not be desirable to employ the products discharged from an internal combustion-motor in the manner hereinbefore described currents of air to be employed like those hereinbefore described may be induced by means of any apparatus which it may be convenient to employ and in any such case will enable the collection and disposal of dust to be effected with much of the advantage derivable from the employment in the manner hereinbefore described of products discharged from an internal-combustion-motor.

Although hereinbefore described with reference to motor-vehicles for ordinary roads this invention is also applicable to tramway-cars and other vehicles whether driven by internal-combustion-motors or otherwise and whether made to travel on ordinary roads or on rails or tracks of any kind.

The pipes, casings or collectors employed according to this invention should be made as large in transverse section as may be permissible for use in the motor-driven-vehicles in which they are to be employed and it is particularly important that the branch-pipes or equivalent parts connecting the pipes, casings or collectors to the ejector or the place in which the action inducing the flow of air through such pipes casings or collectors occurs shall be larger in transverse section than the aggregate of the pipes, casings or collectors connected to them, in order that air may pass freely from the said pipes, casings or collectors into such branch-pipes or equivalent parts.

An air-ejector of the dimensions indicated in the case of Fig. 3 by the scale provided in connection with such figure has been found efficient in conjunction with four circular pipes of a diameter of one inch and a half.

Having thus described the nature of my said invention and the best means I know

of carrying the same into practical effect, I claim:—

1. In a vehicle driven by an internal combustion engine, the combination of a dust collector having an inlet situated in rear of the vehicle wheels with an ejector correlated with the said collector and operatively connected with the exhaust pipe of the engine in such manner that the exhaust products induce an inward flow of air into the said dust collector.

2. In a vehicle driven by an internal combustion engine, the combination of dust and air collectors with an ejector correlated with said collector and operatively connected with the exhaust pipe of the engine, a delivery pipe connected with said ejector and common to all said collectors, and a dust separating receptacle connected with said delivery pipe, with means for discharging the collected air and dust, substantially as described.

3. In a vehicle driven by an internal combustion engine, the combination of dust and air collectors with an ejector connected with said collectors and with the exhaust pipe of the engine, a delivery pipe connected with said ejector and common to all said collectors, and a dust separating receptacle connected with said delivery pipe and provided with means for discharging the collected air and dust and for deodorizing said air and products discharged from the exhaust pipe of the engine.

4. In a motor driven vehicle of any type operated by an internal combustion motor, the combination with an air ejector arranged to receive exhaust products from the said internal combustion motor and to induce the flow of air through pipes, casings or collectors, of a connection with a radiator cooling jacket of said motor, whereby vapor discharged from said radiator may be led to said air ejector to be deposited on dust carried by the air passed through the said air ejector and to aid said air in deodorizing the exhaust products discharged by the internal combustion motor, substantially as described.

5. In a motor driven vehicle, a pivotally mounted dust collector with means operable by the driver for placing said collector into operative and inoperative positions.

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

EVERARD HOME MORGAN.

Witnesses:

JOSEPH WILLARD,
W. I. SKERTEN.