C. J. HUTCHISON.

HYDROCARBON BURNER.

APPLICATION FILED APR. 17, 1915.

1,167,303.

Patented Jan. 4, 1916.

3 SHEETS—SHEET 1.

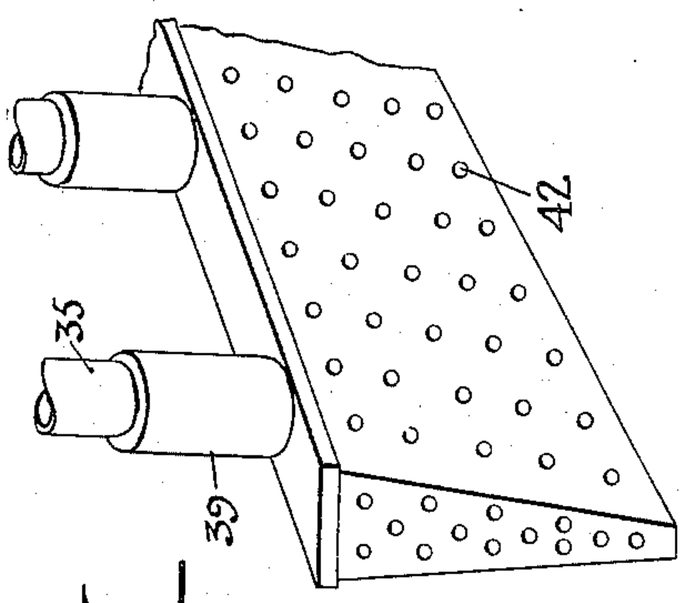

FIG. 2.

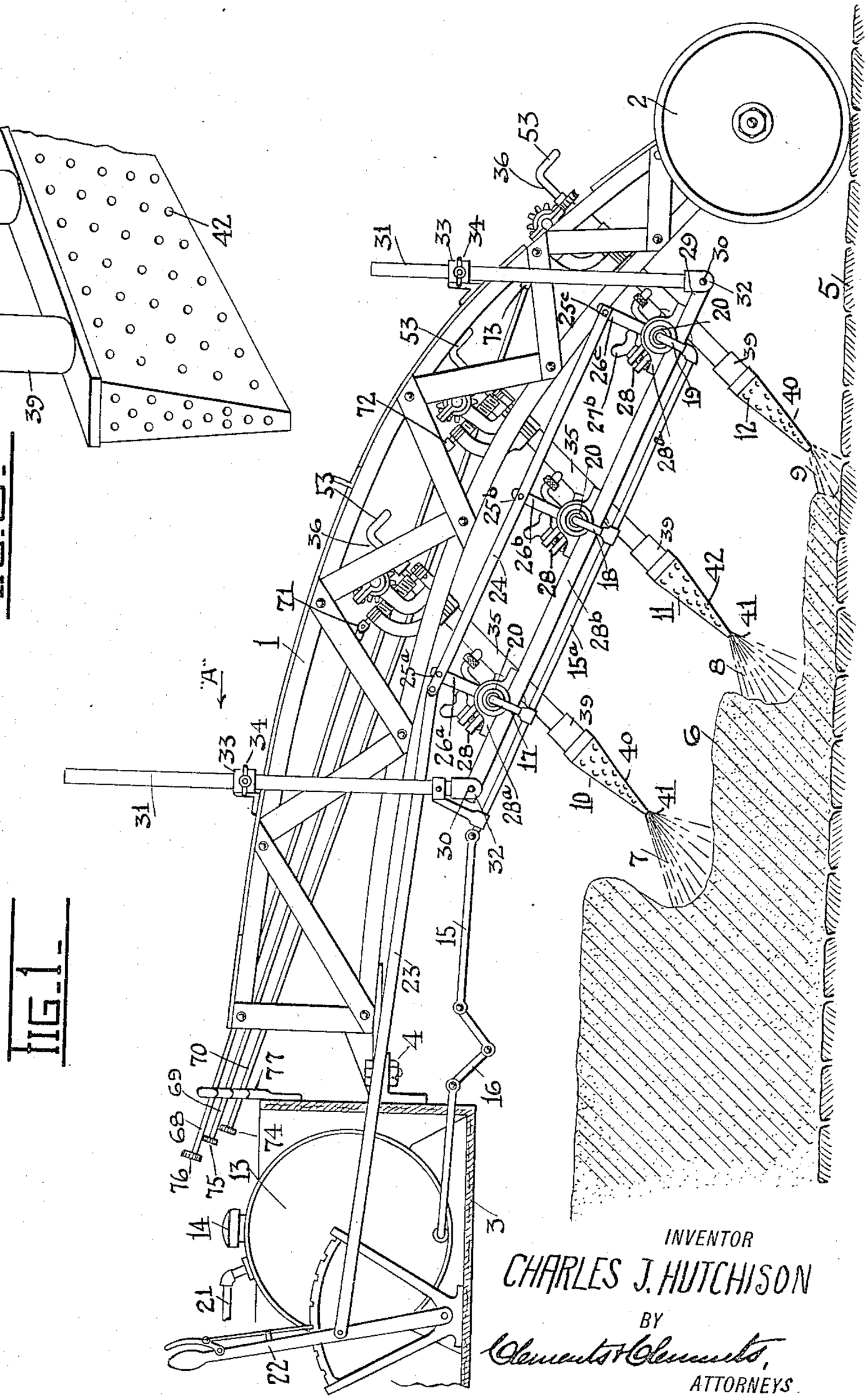

FIG. 1.

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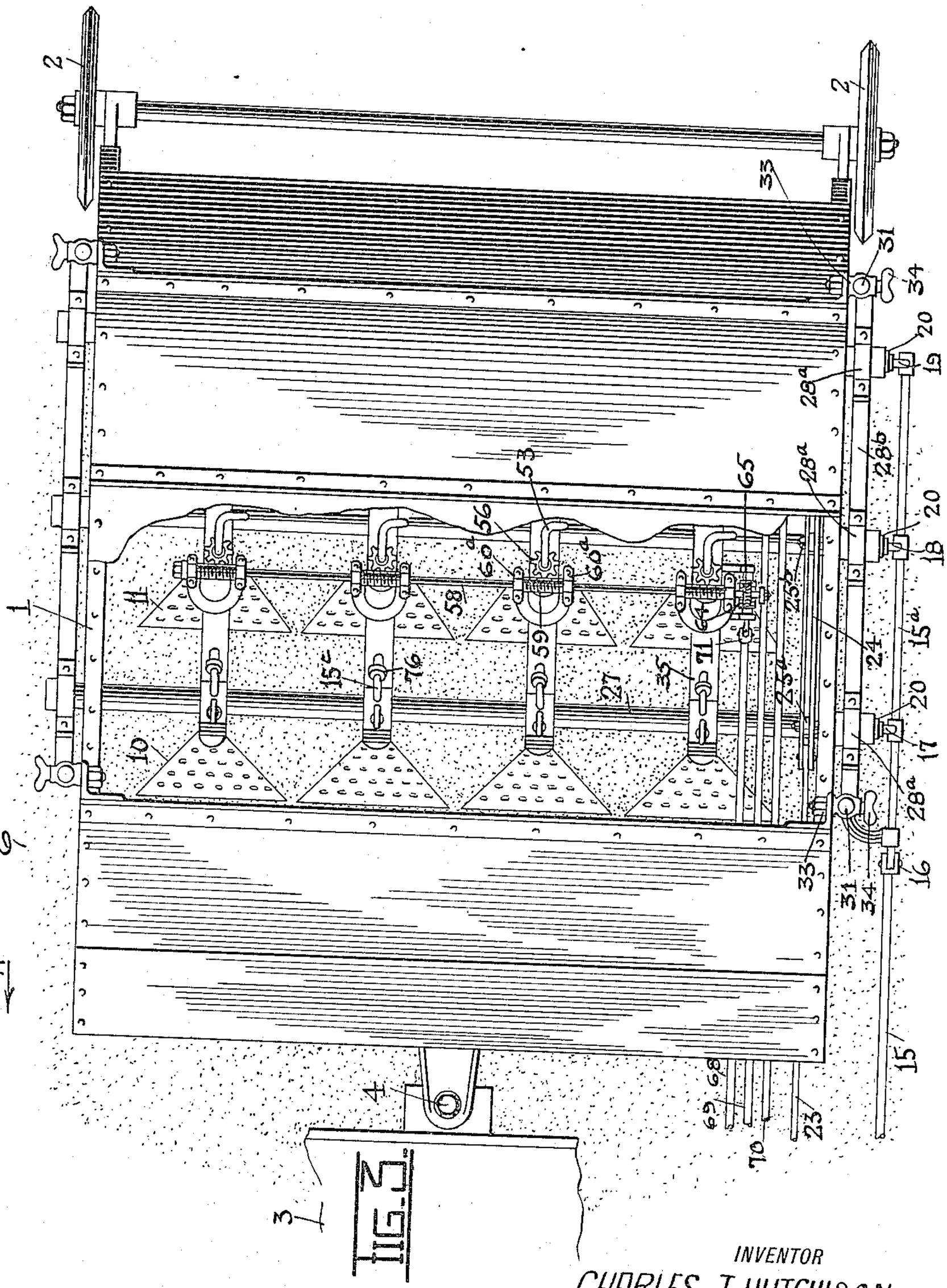

FIG. 2.

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3 SHEETS—SHEET 3.

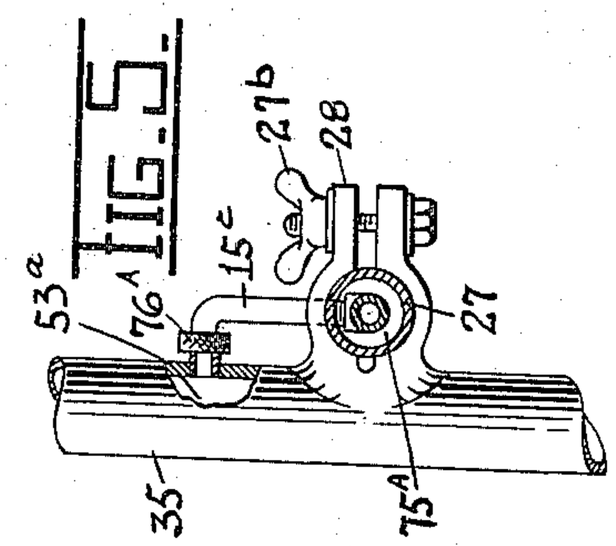

FIG. 5.

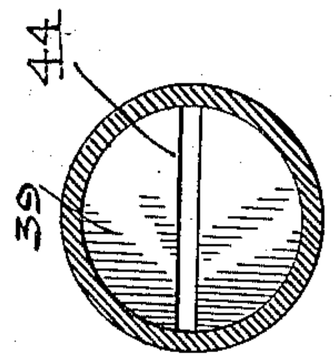

FIG. 6.

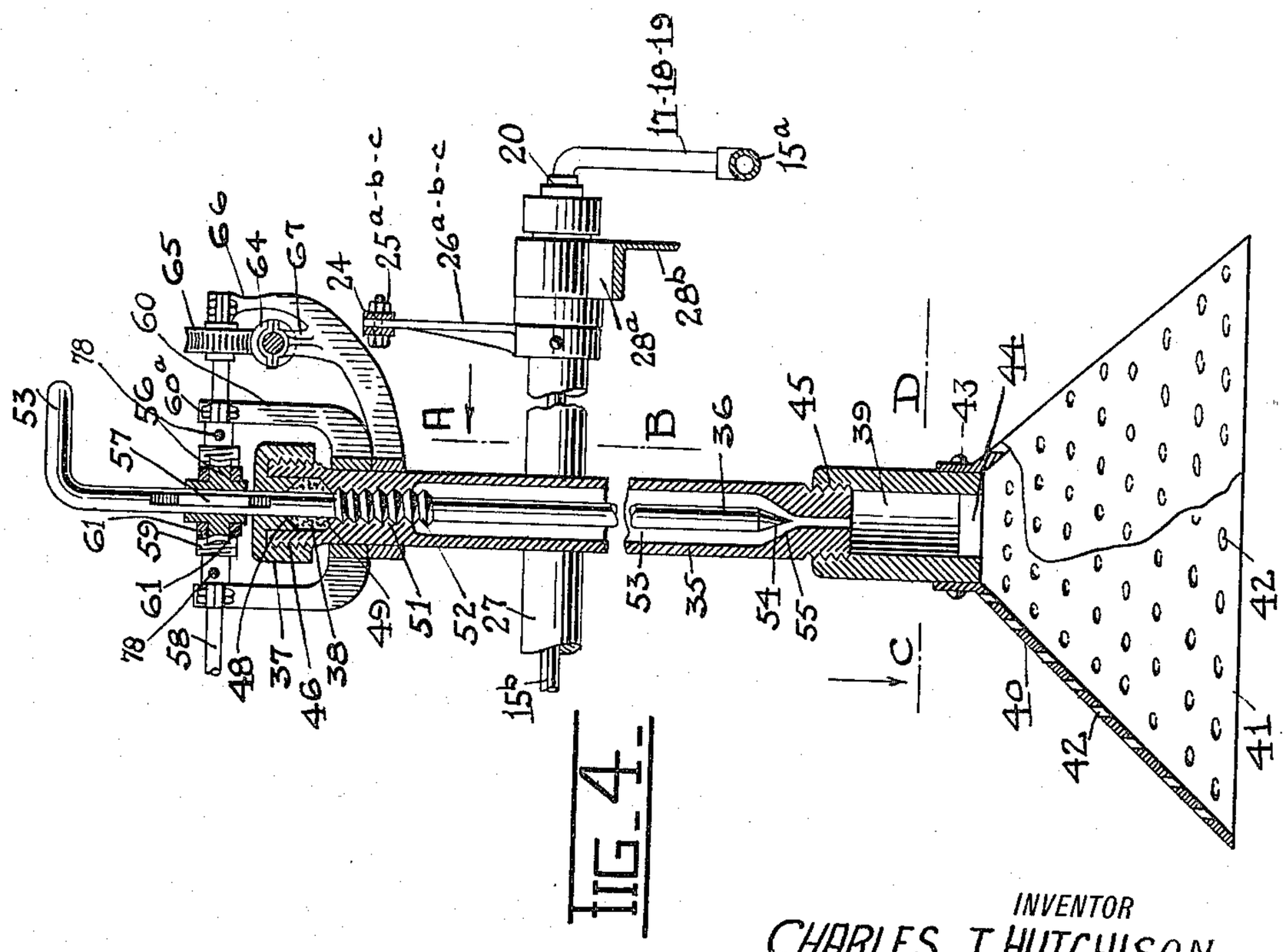

FIG. 4.

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UNITED STATES PATENT OFFICE.

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HYDROCARBON-BURNER.

1,167,303. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed April 17, 1915. Serial No. 22,020.

To all whom it may concern:

Be it known that I, CHARLES J. HUTCHISON, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented an Improvement in Hydrocarbon-Burners, of which the following is a specification.

My invention relates to hydrocarbon burners, and more particularly to a type of hydrocarbon burner wherein a fan-like flame or a plurality of fan-like flames are produced.

The object is to produce a portable heating means wherein a plurality of burners producing the fan-shape flame may be adjustably mounted in a plurality of rows and in a manner so that each row will present a continuous transverse sheet of flame, and in addition mechanism arranged to admit of adjustment of the rows as to elevation.

The improvement consists, broadly, of a portable snow melting device arranged to be secured to the rear or forward end of a horse or power propelled vehicle, street and steam railroad cars, etc.

Referring to the drawings: Figure 1 is a side elevation of a car fitted with my improvement secured to the rear end of a moving vehicle, the several elements being arranged as they would appear when being drawn along a street in actual use. Fig. 2 is a modified form of burner terminal wherein the metal housing or terminal would be carried continuously from side to side of the car instead of a plurality of fan-shaped housings, or burner terminals. Both forms, when properly arranged produce the same results, viz: a continuous fan-like flame from side to side of the car. Fig. 3 is a plan view of the snow melting car in which one of the top plates is broken away to show a part of the mechanism. Fig. 4 is a part-sectional view of one of the burner elements and a portion of the supporting tubing together with a section of the gasolene supply piping and one of the adjusting levers. Fig. 5 is a sectional elevation on the line A B of Fig. 4. Fig. 6 is a sectional view on the line C D of Fig. 4.

Before referring specifically to the several elements, I wish it understood that I only limit myself to the construction herein shown and described in so far as the limitations are specified in the annexed claims. I shall expect to make such alterations as to size, proportion, material and arrangement as may become necessary to meet varying conditions of manufacture, etc. In other words, I have simply shown in these drawings an operative form of the broad principle of the improvement.

Referring specifically to the elements here shown by reference characters in which like characters represent like parts, the numeral 1 represents a steel-framed car having wheels 2, the car being pivotally secured to the vehicle 3, at the point 4. The movement of the car is in the direction indicated by the arrow "A" over the roadway 5, the snow 6 being melted by the continuous rows of transverse flames 7, 8, and 9, from the rows of burners 10, 11, and 12, the said rows being disposed at different elevations from the roadway, the rearward burner being the lowest. A fuel tank 13 is conveniently disposed upon the vehicle 3, being provided with a filling plug 14, and a fuel supply pipe 15. Secured to several points of the fuel supply pipe 15 are flexible metal connections 16. The fuel supply pipe has three branches 17, 18, and 19 leading to the several rows of burners as shown clearly in Figs. 1, 4, and 5.

The numeral 20 represents a commercial swivel-joint which enables the individual burner groups to be rotated without rotating or rocking the supply pipe 15^a. I may conclude to fit an air supply pipe as represented at 21 for the purpose of maintaining an air pressure upon the fuel oil to induce feeding, the air pipe 21 being in turn hooked up to any suitable means of air supply.

At 22 is represented an ordinary adjustable quadrant-lever to which is pivotally secured the connecting-link 23 which in turn is pivotally connected to the link 24 the latter mentioned link being pivotally secured at 25^a, 25^b, and 25^c to the rotating arms 26^a, 26^b, and 26^c, the said arms being fixedly secured to the transverse burner supporting tubing 27. This arrangement is for the purpose of elevating and depressing the burner groups and holding them at the desired angle. The burners 10, 11, and 12 are in turn pivotally mounted upon the said transverse supporting tubing 27 by the split-jaw connection 28, being further provided with a thumb screw 27^b. Suitable bearings 28^a for the tubing 27 are disposed upon two adjustable longitudinal angle-iron side pieces 28^b, the horizontal flanges of the said

angle-iron side pieces being cut back at either end 29, 29 to form a pivotal support 30 for the said angle-iron pieces. Rods 31 having jaw fittings 32, swivel mountings 33, and set screws 34, form the adjustable supporting means for the side rods and burner units.

The burners consist of a body portion 35, an adjustable needle valve stem 36, a stuffing box and gland portion 37, packing means 38, a lower flash-end 39, to which is secured either the fan-shaped perforated metal housing 40 or the continuous housing shown in Fig. 2, in either case the object being to shape the housing from the round diameter of the flash-end 39 to a long narrow rectangular opening 41. The housings in both cases are provided with the perforations 42 to induce combustion. It will be noted that the air perforations are formed at an angle to the sides of the burners. The housing is secured to the flash-end 39 by the connecting means 43. The external and internal walls of the flash-end are preferably parallel, and have an enlarged chamber 39, the lower end of which is a narrow rectangular opening 44, the upper portion having internal threads 45.

The lower external end of the body portion of the burner is threaded and mounted in the threaded portion of the flash-end. The body portion of the burner is further provided with an enlarged externally threaded upper end 46 to which is secured the stuffing-box gland portion 37. The usual tapered walls 48 and 49 are provided to form packing means to secure an oil tight connection around the needle valve-stem 36. The said stem 36 is adjustably mounted in the internally threaded portion 51 of the body portion 35 by the threads 52, the upper portion of the said stem being carried out through the stuffing box end of the burner and turned over at right angles at 53. The portion of the stem below the mounting threads extend downward through an enlarged internal chamber 53ª of the body portion, terminating in the usual pointed end 54 forming a restricting means for the fuel supply when in its lowest position of adjustment, against the inwardly converging walls 55 of the body portion of the burner.

In order that I may make such adjustments to the needle valves as may be necessary to control the amount of gasolene or other fuel supply from a distance, I have mounted worm-wheels 56 upon the stems 36 the said worm-wheels being mounted upon feathers 57 in a manner as to allow the needle-valve stem to have the necessary reciprocating motion to function when opening and closing. Upon the transverse shafting 58 I have mounted worms 59 in a position to engage the above mentioned worm-wheels 56, the worms and the shafting 58 being mounted in the supporting arms 60, the said arms having cup-bearings 60ª. In order to hold the worm-wheel 56 in a proper meshed relation with the worm and not allow the same to follow the reciprocating motion of the needle valve-stem I have mounted forked members 61—61 in a manner to bear upon a hub portion of the worm-wheel. The said forked members may be carried to any convenient fixed portion of the burner body. This forked securing means is shown in Fig. 4. In order to lead this needle valve control to a distance from the burners, say to the vehicle 3, I have mounted at one end of the shafts 58 a worm-wheel 65 and a worm 64 the said worm and worm-wheel being supported by arms 66 and 67 shown clearly in Fig. 4. In order to allow for the different angles at which the operating stems 68, 69, and 70 may be placed at different times I have fitted universal joints 71, 72, and 73, the numerals 74, 75, and 76 representing operating handles, while 77 represents a supporting means for the rods.

The supporting means for the burners are hollow, the fuel-pipe 15ᵇ being led through the center, thus providing a dead-air heat-insulating space 75ª for the protection of the fuel-pipe. The fuel-pipe 15ᵇ is run from end to end of the supporting tube and has connections 15ᶜ leading up to the burner bodies the connections being secured to the latter by the screw-couplings 76ª. In case either of the needle-valves become worn and require resetting individually without disturbing any of the others in the row it is only necessary to unscrew the set-screws 78—78 in the worm 59 as shown in Fig. 4 so as to allow it to slip on the shafting 58. Any adjustment may then be made by rotating the individual worm in the required direction by hand.

The operation of the machine is as follows: After the fall of snow the elevation of the burners may be adjusted to suit the depth thereof. I have found by experience this to be an easy matter, it simply being necessary to arrange the elements about as shown in Fig. 1; that is, to elevate the forward burners a little above the maximum depth of snow and the succeeding ones about as shown. The car may be secured to ordinary street cleaning vehicles and the snow melted away in stages as illustrated in Fig. 1. The device requires very little care after starting so that a driver and his assistant displace the army of snow shovelers and carts usually employed in the old method of snow removing.

Having thus described my improvement, I claim:

1. In a snow melting device the combination of a car, a fuel supply tank, flexible fuel supply piping, a plurality of rows of

adjustable hydrocarbon burners, a plurality of transverse tubes for supporting the said adjustable hydrocarbon burners, adjustable longitudinal angle-iron side pieces for carrying the said transverse tubes, adjustable suspension rods for supporting the said side pieces and swivel supporting means for the said supporting rods.

2. In a snow melting device the combination of a car, a fuel supply tank, flexible fuel supply piping, a plurality of rows of adjustable fan-shaped hydrocarbon burners, a plurality of transverse tubes for supporting the said adjustable fan-shaped hydrocarbon burners, bearings for the said tubing, adjustable longitudinal side supporting means for the said bearings, adjustable suspension rods pivotally suspended from the said car and pivotally secured to the longitudinal supporting means, a split-jaw mounting means integral with the burner body-portion, a thumb-screw tightening means for the said mounting means, a rotating arm for the said tubing, a distant means for operating said arm, a worm-wheel mounted upon the needle-valve stem of the said burner, a worm in operative relation with the said worm-wheel, and a distant means for rotating said worm.

3. In a snow melting device, the combination of a car, a fuel supply tank, fuel supply piping, a plurality of rows of adjustable burners, a plurality of transverse tubes for supporting the burners, bearings for the said tubes, adjustable longitudinal supporting means for the said bearings, and adjustable suspension rods suspended from the car and secured to the said longitudinal supporting means.

4. In a snow melting device, the combination of a car, a fuel supply tank, fuel supply piping, a plurality of rows of adjustable burners, a plurality of adjustable transverse tubes for supporting the said burners, a rotating arm for the said tubes, and means for operating said arm; worm-wheels mounted upon the needle-valve stems of the aforementioned burners, worms in operative relation thereto, and means for rotating said worms.

5. In a snow melting device, the combination of a car, a fuel supply tank, fuel supply piping, a plurality of rows of burners, a plurality of transverse tubes for supporting the burners, longitudinal supporting means for the said transverse tubes, and adjustable suspension rods suspended from the said car and secured to the said longitudinal supporting means.

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Witnesses:
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H. W. KELLER.