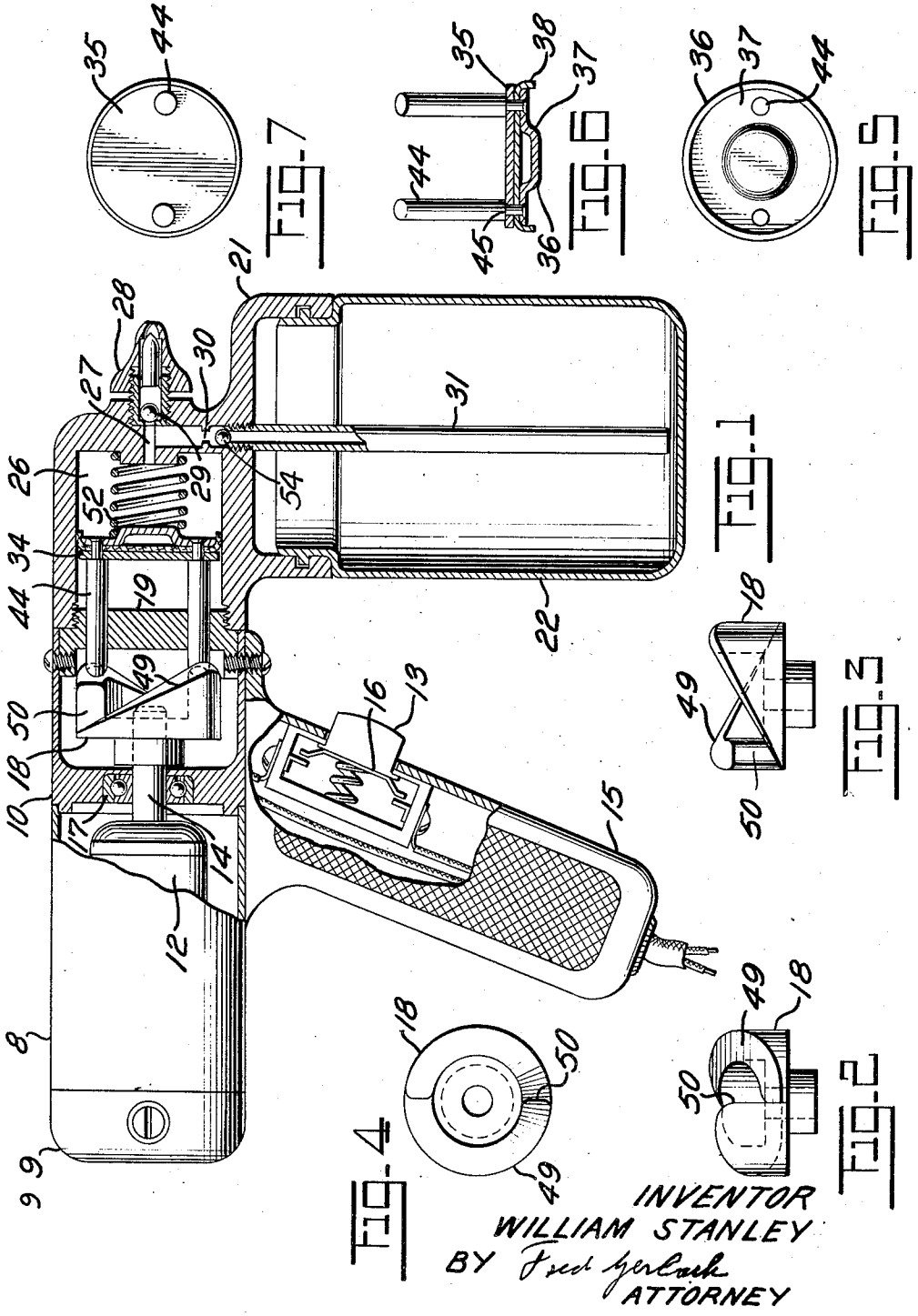
Feb. 6, 1951 W. STANLEY 2,540,357

SPRAY GUN

Filed March 18, 1946



INVENTOR
WILLIAM STANLEY
BY Fred Gerlach
ATTORNEY

Patented Feb. 6, 1951

2,540,357

UNITED STATES PATENT OFFICE

2,540,357

SPRAY GUN

William Stanley, Chicago, Ill.

Application March 18, 1946, Serial No. 655,050

3 Claims. (Cl. 299—97)

1

The invention relates to spray guns.

One object of the invention is to provide an improved spray gun which functions as a portable self-contained unit for operating a reciprocating piston for discharging fluid carrying the material to be sprayed through a nozzle.

Another object of the invention is to provide a self-contained spray gun including an electric motor and a reciprocating pumping mechanism which is efficient in operation and simple in construction.

Other objects of the invention will appear from the detailed description.

The invention consists in the several features hereinafter set forth and more particularly defined by claims at the conclusion hereof.

In the drawings:

Fig. 1 is a vertical section of a spray gun embodying the invention, parts being shown in elevation.

Figs. 2 and 3 are plan views of the rotary cam which imparts compression strokes to the piston, viewed from different angles.

Fig. 4 is a face view of said cam.

Fig. 5 is a face view of the piston.

Fig. 6 is a section of the piston.

Fig. 7 is an opposite face view of the piston.

The invention is exemplified in a unit comprising a cylindrical casing section or shell 8 which is closed at one end by a removable head 9. An electric motor 12 with a shaft 14 is housed in section 8 and head 9. A casing section 10 has one of its ends secured in casing section 8 and is provided with a cross-wall in which is mounted an anti-friction bearing 17 for the motor-shaft 14. A pistol grip 15 is suitably secured to the casing sections 10 and 8 for manipulating the unit. A self-opening switch 16 is mounted in the grip 15, electrically connected to the motor 12 for controlling its operation, in manner well understood in the art, and includes a button 13, which can be easily pressed by the hand of the operator.

A rotary cam 18 is disposed in casing section 10 and fixedly secured to the end of motor-shaft 14 and is adapted to impart rectilinear compression strokes in one direction to the piston hereinafter described.

A wall 19 is secured by screws in one end of the casing section 10. A cylinder 26 is formed coaxially with the motor-shaft 14 in a casing section 20 and the inner end of the cylinder-forming portion of said section is screw-threaded to the wall 19 which constitutes a head for one end of said cylinder. Casing section 20 is also

2

provided with a depending flange 21 in which the upper end or neck of a receptacle 22 for the liquid to be sprayed is detachably secured in any suitable manner.

A discharge nozzle 28, which is provided with a check-valve 29, is connected by a port 27 with cylinder 26. A branch port 30 has its upper end communicating with the port 27 inwardly of valve 29 and communicates with a tube 31 which extends to a point adjacent the bottom of receptacle 22. Check-valve 29 is adapted to close the discharge through nozzle 28, during the suction stroke of the piston hereinafter described and to open for the outflow of fluid during compression strokes. A check valve 54 in port 30 is adapted to cut off flow of air to tube 31 during the compression strokes.

A piston which as slidably mounted in the cylinder 26 comprises a head 35, a plate 37 and a packing ring 36 clamped upon head 35. The packing-ring 36 is cup-shaped and includes a peripheral flange 38 which engages the periphery of cylinder 26.

A pair of diametrically opposite stems 44 are secured to the piston for operation in one direction by the rotary cam 18. Stems 44 extend through and are slidably guided in cylinder head 19. Each stem 44 is provided with a shoulder 45 against which the piston head 35 seats, extends through openings in head 35, packing 36 and plate 37, and is riveted to clamp packing ring 36 between head 35 and plate 37. The rotary cam 18 is provided with cam surfaces on one of its faces which engages the stems 44 for imparting compression strokes to piston 34. Preferably the stems are provided with inclined end faces 50 for engaging the cam surfaces 48. A coil spring 52 of the compression type is interposed between the outer end wall of cylinder 26 and the plate 37 of the piston for imparting suction strokes to the piston and holding the ends 50 of the stems 44 in contact with cam surfaces 48. The rotary cam 18 is provided with cam surfaces on one of its faces which engage the stems 44 for imparting compression strokes to the piston. These cam surfaces have circumferentially and somewhat gradually inclined or helical surfaces 49 and abrupt surfaces 50 between the high and low points of the portions 49. The helical cam-surfaces 49 will impart relatively gradual compression strokes to the piston, and the abrupt surfaces 50 will permit more rapid suction strokes to be produced by spring 52.

The operation of the spray gun will be as follows: assuming the receptacle 22 to be loaded

with liquid to be sprayed, the operator will hold the entire unit from the grip 14 and manipulate the unit in whichever direction may be desired. The operator presses the button of switch 16 to close the circuit for the operation of motor 12; whereupon rotary cam 18 will be continuously and uni-directionally rotated as long as the switch is held closed. Outstrokes will be imparted to the piston by stems 44 and cam surfaces 48 against the force of spring 52. Spring 52 will impart alternate suction strokes to the piston and hold stems 44 engaged with the cam surfaces 48.

During the instrokes imparted to the piston by spring 52, check-valve 29 will close and fluid will be quickly drawn by the suction of the piston into the cylinder 26. During the outstroke of the piston, the vapor in the cylinder will be compressed and discharged in a directed stream through nozzle 27 by compression of the fluid in the cylinder. The compression strokes will be relatively gradual while the suction strokes will be rapid. This relative variation in the speed of the piston causes the fluid to be effectively drawn into the cylinder and discharged in the form of a spray.

The invention exemplifies a portable spray gun unit of simple construction in which the pump-piston and cylinder are coaxial with the electric motor and the rotary cam is utilized for imparting pressure strokes to the piston and a spring is used for imparting suction strokes to the piston. The entire unit is compact so it can be easily handled and manipulated. The discharge of the vaporized liquid from the cylinder is effected directly from the cylinder through the nozzle. The invention is adapted for spraying insecticides, paints and other liquids. The rotary cam operated directly from the motor-shaft for imparting compression strokes to the piston provides a simple high speed construction which is efficient in spraying. The unit is also light in weight to facilitate its manipulation in directing the spray to the work.

The invention is not to be understood as limited to the details described, since these may be modified within the scope of the appended claims without departing from the spirit and scope of the invention.

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

1. A portable gun for spraying material from a receptacle through a nozzle, comprising: a casing, an electric motor mounted in the casing, a cylinder in the casing communicatively connected with the receptacle and the nozzle, a piston slidable in the cylinder for producing pressure therein, a motor-driven rotatable member coaxial with the piston and having a side face confronting the piston provided with a plurality of oppositely disposed cams having side faces for imparting axial thrust, a fixed wall in the casing between the rotatable member and the piston and closing the inner end of the cylinder, a plurality of oppositely disposed stems extending through and slidable in said wall, each having one of its ends fixedly secured to the piston and its opposite end engaging and receiving direct axial thrust from the side faces of the cams for imparting compression strokes to the piston, and a spring for slidably retracting the piston and urging the ends of the stems in engagement with the side faces of the cams.

2. A portable gun for spraying material from a receptacle through a nozzle, comprising: a casing, an electric motor mounted in the casing, a cylinder in the casing coaxial with the motor and communicatively connected with the receptacle and the nozzle, a piston slidable in the cylinder for producing pressure therein, a motor-driven rotatable member coaxial with the piston and having a side face confronting the piston provided with a plurality of oppositely disposed cams having side faces for imparting axial thrust, a fixed cross-wall in the casing between the rotatable member and the piston and closing the inner end of the cylinder, a plurality of oppositely disposed stems extending through and slidable in said wall, each having one of its ends fixedly secured to the piston and to its opposite end engaging and receiving direct axial thrust from the side faces of the cams for imparting compression strokes to the piston, and a spring for slidably retracting the piston and urging the ends of the stems in engagement with the side faces of the cams.

3. A portable gun for spraying material from a receptacle through a nozzle comprising: a casing, an electric motor mounted in the casing, a cylinder in the casing communicatively connected with the receptacle and the nozzle, a piston slidable in the cylinder for producing pressure therein, a motor-driven rotatable member coaxial with the piston and having a side face confronting the piston provided with a plurality of oppositely disposed cams having side faces for imparting axial thrust, a fixed cross-wall in the casing between the rotatable member and the piston and closing the inner end of the cylinder, a plurality of oppositely disposed stems extending through and slidable in said wall, each having one of its ends fixedly secured to the piston and to its opposite end engaging and receiving direct axial thrust from the side faces of the cams for imparting compression strokes to the piston, and a spring for slidably retracting the piston and urging the ends of the stems in engagement with the side faces of the cams, the casing comprising a section in which the cylinder is formed, and a separable section around the rotatable member, to both of which sections the cross-wall is detachably connected.

WILLIAM STANLEY.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
165,027	Riley	June 29, 1875
236,747	Wood	Jan. 18, 1881
480,068	Bullard	Aug. 2, 1892
639,208	Masterson	Dec. 17, 1901
1,783,940	Trumble	Dec. 2, 1930
2,013,639	Steinhart et al.	Sept. 3, 1935
2,195,929	Klett	Apr. 2, 1940
2,321,828	Lane	June 15, 1943