Jan. 12, 1971 G. K. AUSTIN, JR 3,553,841

AMALGAM CONDENSER

Filed Oct. 23, 1967

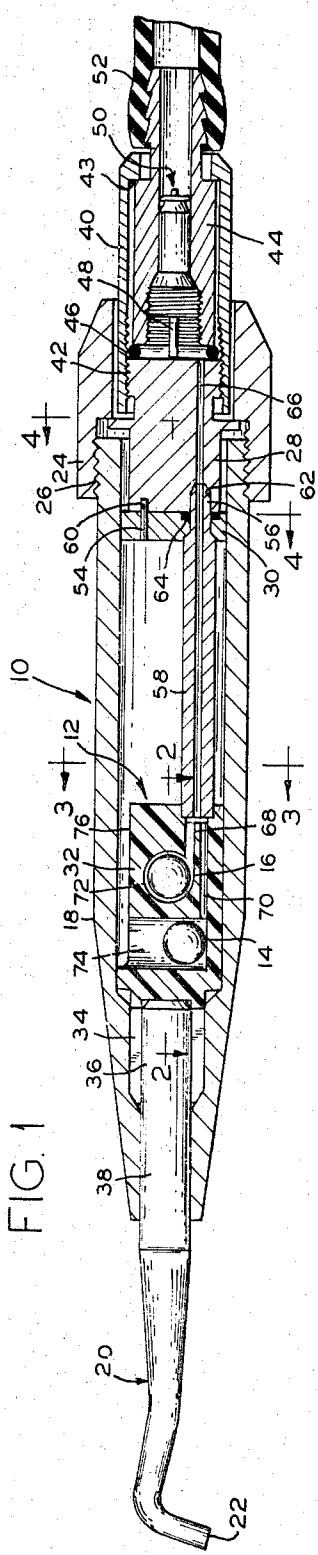


FIG. 1

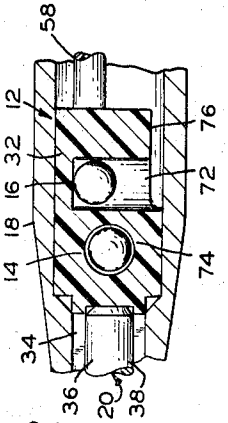


FIG. 2

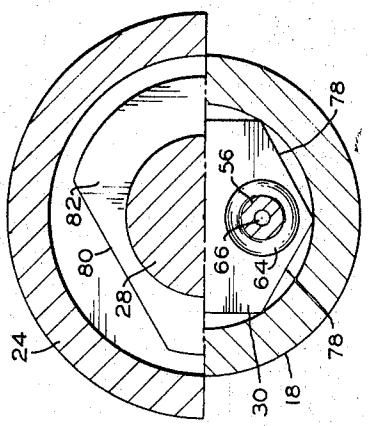


FIG. 4

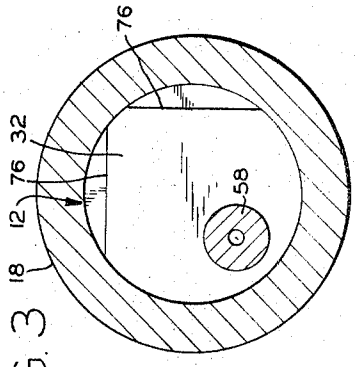


FIG. 3

GEORGE K. AUSTIN, JR.
INVENTOR

BY

BUCKHORN, BLORE, KLARQUIST & SPARKMAN
ATTORNEYS

United States Patent Office 3,553,841 Patented Jan. 12, 1971

3,553,841

AMALGAM CONDENSER

George K. Austin, Jr., 604 Holly Drive, Newberg, Oreg. 97132

Filed Oct. 23, 1967, Ser. No. 677,377
Int. Cl. A61c 3/08
U.S. Cl. 32—56 12 Claims

ABSTRACT OF THE DISCLOSURE

An amalgam condenser includes a dual motion vibrator which revolves balls and in planes at right angles to each other to vibrate a sleeve-like housing and a condenser point to move a working end spherically. A nut screwed onto a threaded portion presses an adapter against a disc of the vibrator to press a vibrator body and a collet forwardly of the housing to cause frustoconical portion of the housing to cam the fingers of the collet inwardly against shank of the condenser point to grip the shank tightly. A manually adjustable valve control sleeve presses a connector against a resilient O-ring to open a valve to the extent that the O-ring is compressed. The O-ring acts both as a seal and as a spring holding the connector firmly against the shoulder. Air travels from the valve through passage in the adapter, the tube and parallel passages and to circular chambers or races. The air is exhausted to the atmosphere from the chambers and along flats on the cylindrical body, flats on the periphery of the disc and flats on circular flange of the adapter.

This invention relates to an improved amalgam condenser, and more particularly to a dual motion amalgam condenser.

Amalgam condensers of one type known hitherto have included a housing having a manually operable chuck at one end to grip a condenser point and a manually actuated coupling at the other end which is adapted to shut off or fully open a valve from a supply of air under pressure and have included an air operated vibrator in the housing which vibrates the housing circularly in a plane extending longitudinally relative to the housing. Such tools have only an orbital vibration in a single plane, are complex in structure which makes them expensive to manufacture and maintain, and have no speed adjustment on the tools themselves.

An object of the invention is to provide an improved amalgam condenser.

Another object of the invention is to provide a dual motion amalgam condenser.

A further object of the invention is to provide an amalgam condenser having a spherical vibration.

Another object of the invention is to provide a vibrator producing spherical vibratory motion.

Another object of the invention is to provide a tool having a chuck actuated simultaneously with actuation of a connector structure connecting the tool to an airline.

Another object of the invention is to provide an amalgam condenser which can be easily assembled and disassembled.

A further object of the invention is to provide an amalgam condenser having a minimum number of parts.

The invention provides an improved amalgam condenser including a housing carrying a condenser point at one end and housing a vibrator therein driven by compressed air supplied by a connector at the other end. Preferably the vibrator includes two balls revolved in circular chambers at right angles to each other to impart a spherical motion to the condenser point. Also, the amalgam condenser also preferably includes a manually operable nut which detachably secures the vibrator in the housing, pushes a collet into a tapered portion of the housing to close the collet on a shank of the condenser point and secure the adapter to the vibrator. Also, there preferably is provided a threaded adjustment sleeve which is screwed onto the adapter to secure the connector to the adapter and press a valve toward the adapter to regulate air flow to the vibrator to vary the speed of vibration of the vibrator.

A complete understanding of the invention may be obtained from the following detailed description of an improved amalgam condenser forming a specific embodiment of the invention, when read in conjunction with the appended drawings, in which:

FIG. 1 is a longitudinal sectional view of an amalgam condenser forming one embodiment of the invention;

FIG. 2 is a fragmentary, longitudinal sectional view taken along line 2—2 of FIG. 1; and

FIGS. 3 and 4 are vertical sectional views taken respectively along lines 3—3 and 4—4 of FIG. 1.

Referring now in detail to the drawings, there is shown therein an amalgam condenser **10** forming one embodiment of the invention. The amalgam condenser **10** includes a dual motion vibrator **12**, which revolves balls **14** and **16** in planes at right angles to each other to vibrate a sleeve-like housing **18** and a condenser point **20** to move a working end **22** spherically. A nut **24** screwed onto a threaded portion **26** presses an adapter **28** against a disc **30** of the vibrator **12** to press a vibrator body **32** and a collet **34** forwardly of the housing. This causes a frustoconical portion **36** of the housing **18** to cam the fingers of the collet **34** inwardly against shank **38** of the condenser point **20** to grip the shank tightly. A manually adjustable valve control sleeve **40** screwed on threaded portion **42** of the adapter has an internal shoulder **43** which presses a connector **44** against a resilient O-ring **46** and presses a valve stem **48** of a valve **50** against the adapter to open the valve **50** to the extent that the O-ring is compressed. The O-ring acts both as a seal and as a spring holding the connector **44** firmly against the shoulder **43**. The valve **50** is threaded into the tapped interior of the connector.

A hose **52** connected to the connector **44** leads from a source of air under pressure. An alignment pin **54** and an end portion **56** of a tube **58** of the vibrator enter a hole **60** and a counterbore **62** in the adapter. An O-ring **64** forms a seal around the end portion **56** at the exit end of the counterbore **62**. Air travels from the valve **50** through a passage **66** in the adapter, the tube **58** and parallel passages **68** and **70** somewhat tangentially into circular or cylindrical chambers or races **72** and **74** in the body **32**, to revolve the balls **14** and **16** in the chambers. The chambers are closed at one end of each and are open at one end of each for the insertion of the balls into the chambers. This construction also permits ease of insertion of the balls into the chambers after the body has been removed from the housing through the right-

hand end of the housing, as viewed in FIG. 1. The air is exhausted to the atmosphere from the chambers **72** and **74** along flats **76** on the cylindrical body **32**, flats **78** on the periphery of the disc **30** and flats **80** on a circular flange **82** of the adapter. To cause the path of the working end **22** to be spread over a sphere or spheroid as it is revolved, it is desirable that the balls be revolved at somewhat different frequencies rather than at identical frequencies. This is effected by making the passages **68** and **70** of such sizes relative to the diameters of the chambers that the balls are revolved at different frequencies.

The housing **18** serves as the handle for the tool and preferably is roughened as by knurling, for example, exteriorly at the portions to be gripped. The body **32** of the vibrator **12** and the collet **34** are disclosed as integral, but, of course, may be separate elements. The body and the collet may be molded or machined and preferably are composed of a tough, dimensionally stable plastic compound having a low frictional characteristic. The tube **58** is press fitted into a counterbore in the body and in communication with the passages **68** and **70**.

The working end **22** of the condenser point **20** of the above-described amalgam condenser **10** is vibrated over a generally spherical surface, and very effectively condenses amalgam. The nut **24** serves to hold the vibrator **12** and connector **44** in assembled positions and also to actuate the collet **34**. The collet may be released merely by unscrewing the nut **24** slightly, and the vibrator may be removed for repair or replacement simply by unscrewing the nut and pushing the vibrator to the right, as viewed in FIG. 1, by means of the condenser point **20**. To vary the extent of vibration, the air flow may be varied merely by screwing the sleeve **40** farther on or farther off the adapter **28**.

What is claimed is:

1. In an amalgam condenser,
a tool member,
handle means carrying the tool member, and three dimensional motion vibrator means carried by the handle means and connected to the tool member for revolving the tool member with a generally three-dimensional motion.
the vibrator means including a motor housing connected to the tool member, first eccentric weight means revolved in said housing in a first plane and second eccentric weight means revolved in said housing in a second plane forming an angle with the first plane.

2. The amalgam condenser of claim **1** wherein the planes are at right angles to each other.

3. In an amalgam condenser,
a tool member having a shank, handle means including a hollow tubular housing having a camming sleeve at a forward end thereof and open at the other end.
collet means movable longitudinally in the camming sleeve means for gripping the shank,
motion vibrator means including a block-like housing member slidable in the tubular housing and engaging the rear end portion of the collet means,
and manually operable means adapted to close said other end of the housing means and press the collet means into the camming sleeve to grip the shank.

4. The amalgam condenser of claim **3** wherein the manually operable means comprises a nut screwed onto the housing means and having a flange pressing against the vibrator means.

5. In an amalgam condenser,
a tool member,
handle means carrying the tool member,
motion vibrator means carried by the handle means and connected to the tool member for vibrating the tool member,
the handle means comprising a tubular housing containing the vibrator means and the vibrator means being drivable by compressed air,
an adapter in the tubular housing and having a passage therethrough and a threaded end portion,
means for securing the adapter in the housing,
a tubular connector member,
a valve having a projecting valve stem actuator and mounted in the tubular connector member,
and a threaded sleeve carrying the valve and screwed onto the threaded end portion of the adapter for pressing the valve stem actuator adjustably against the adapter to adjustably open the valve.

6. In an amalgam condenser,
tubular housing means having internal camming means at the forward end portion thereof and open at the rear end thereof and having coupling means at the rear end portion thereof.
a tool member having a shank extending into the forward end portion of the housing means,
collet means in the forward end portion of the housing means adapted to be pressed forwardly into the camming means and closed on the shank by the camming means,
vibrator means in the housing means,
means for transmitting vibrations from the vibrator means to the shank of the tool member,
and manually adjustable retaining means engaging the coupling means and retaining the vibrator means in the housing and pressing the collet means into the camming means.

7. The amalgam condenser of claim **6** wherein the vibrator means is a thrust member transmitting thrust from the retaining means to the collet means.

8. The amalgam condenser of claim **7** including air coupling means engaged by the retaining means and pressed thereby against the vibrator means.

9. In an amalgam condenser,
a compacting tool,
a tubular housing holding the tool,
vibrator means in the tubular housing for vibrating the compacting tool,
an adapter member having a threaded end portion at one end and a passage opening on said end inwardly of the periphery thereof,
a tubular connector member connected to the housing and in longitudinal alignment with the adaptor member and having an annular shoulder and a longitudinal passage,
a threaded sleeve surrounding the connector member having an inward projection engaging the shoulder and screwed onto the threaded end portion to hold the connector member and the adapter member against movement away from each other,
and a resilient O-ring compressed between the adjacent ends of the adapter member and the connector member and surrounding the passages in the adapter member and the connector member to form a sealed passage.

10. The amalgam condenser of claim **5** including an adjustable valve in the passage in the connector member and including a valve stem actuator projecting beyond the connector member and engaging the adapter member and serving to open the valve as the valve is moved by the threaded sleeve toward the adapter member.

11. The amalgam condenser of claim **5** wherein the threaded sleeve is adjustable along the adapter member against the action of the resilient O-ring to adjust the extent to which the valve stem actuator is actuated.

12. In an amalgam condenser,
tubular means,
a body fitting in the tubular means and having a circular chamber opening at a predetermined side of the body and closed by the tubular means and also having air passage means leading tangentially into the chamber,

a ball member in the chamber and adapted to be revolved therein,

the body having a second circular chamber opening at a side of the body different from said predetermined side and air passage means leading tangentially into the second circular chamber,

a second ball in the second circular chamber and adapted to be revolved therein,

the chambers being disposed at an angle relative to each other so that the balls effect three dimensional vibrations when the balls are revolved, and

exhaust means adapted to exhaust air from the chambers at said sides of the body.

References Cited

UNITED STATES PATENTS

726,074	4/1903	Kotten	32—56
3,082,529	3/1963	Mills	32—56
3,444,622	5/1969	Mills et al.	32—56

ROBERT PESHOCK, Primary Examiner