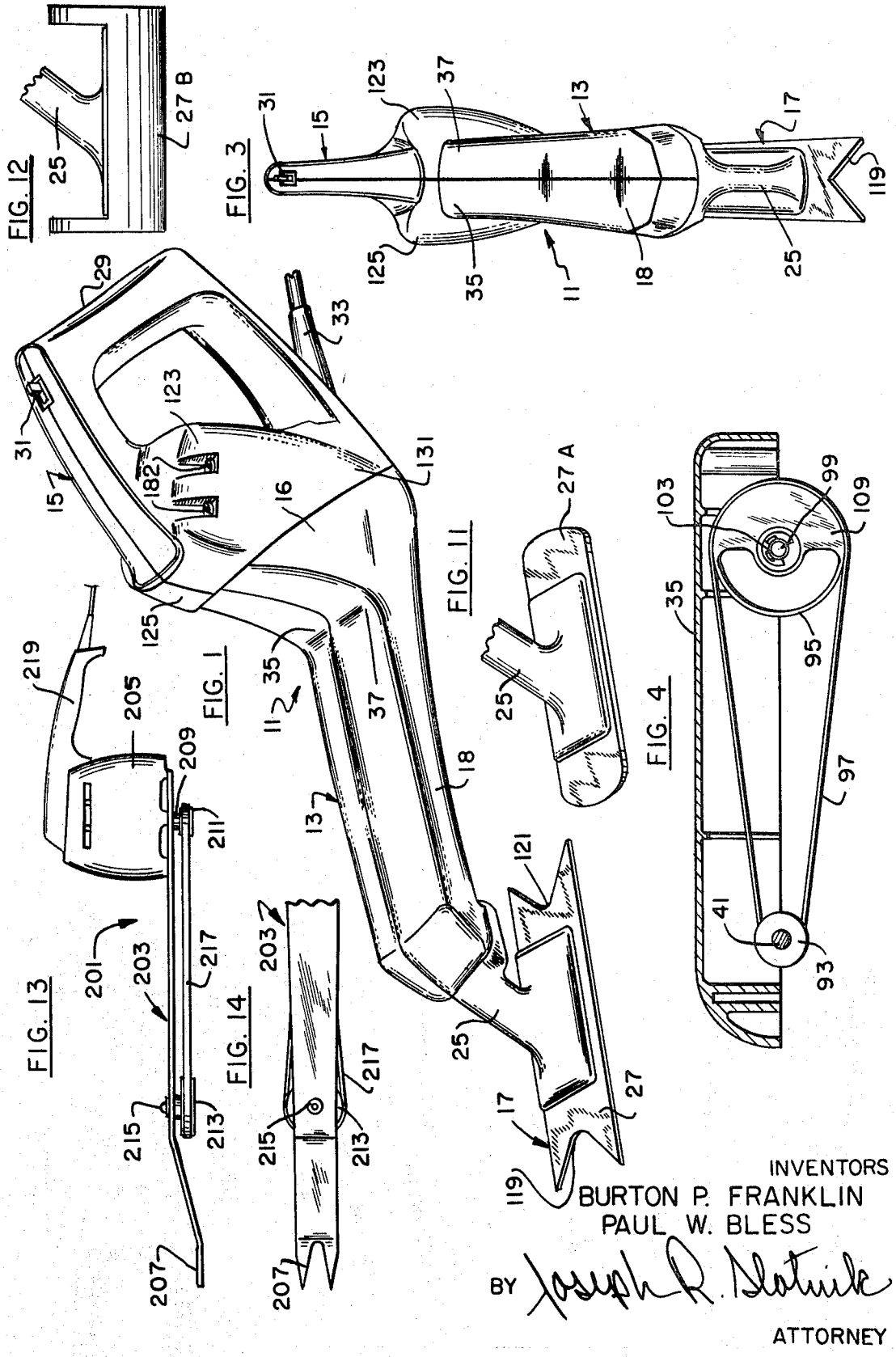
Sept. 29, 1970 B. P. FRANKLIN ET AL 3,530,577

VIBRATING TOOL CONSTRUCTION

Filed July 25, 1967 2 Sheets-Sheet 1



INVENTORS
BURTON P. FRANKLIN
PAUL W. BLESS

BY Joseph R. Stalnaker

ATTORNEY

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VIBRATING TOOL CONSTRUCTION

Filed July 25, 1967 2 Sheets-Sheet 2

FIG. 2

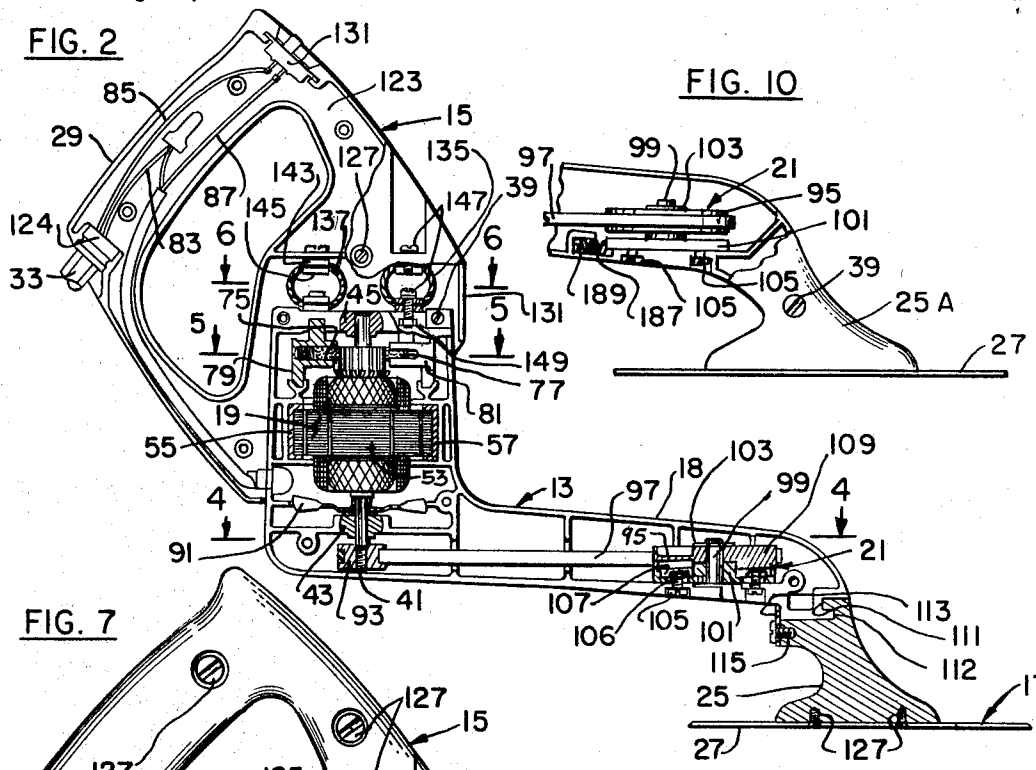


FIG. 10

FIG. 7

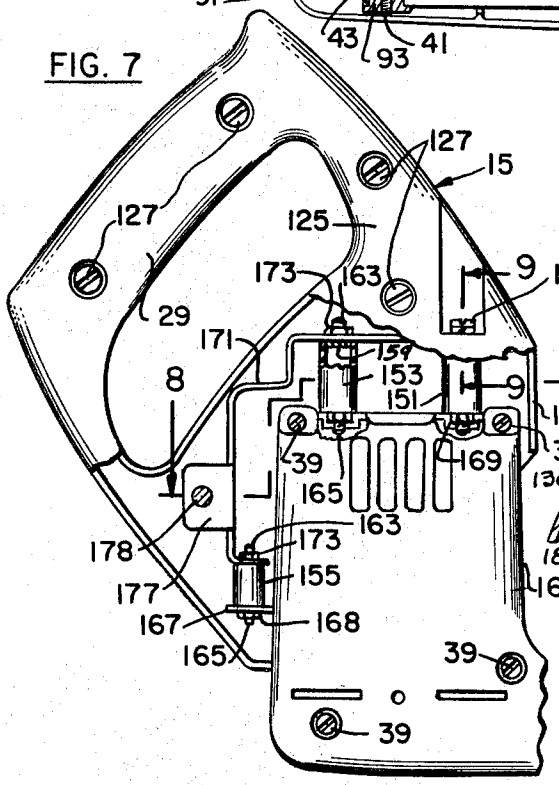


FIG. 6

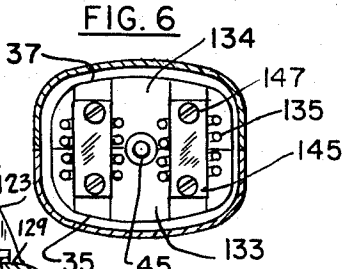


FIG. 9

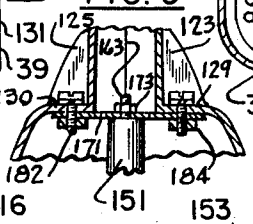


FIG. 8

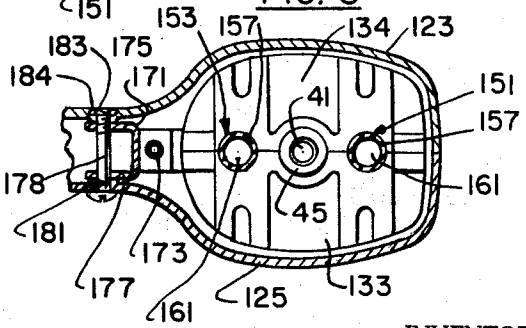
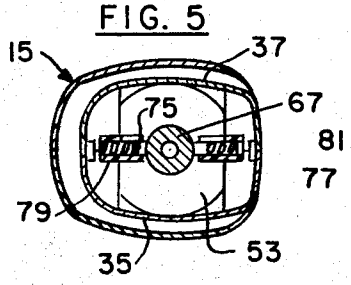


FIG. 5



INVENTORS

BURTON P. FRANKLIN

PAUL W. BLESS

BY Joseph R. Slotcuk

ATTORNEY

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3,530,577

VIBRATING TOOL CONSTRUCTION

Burton P. Franklin, Danville, Va., and Paul W. Bless, Durham, N.C., assignors, by mesne assignments, to The Black and Decker Manufacturing Company, Towson, Md., a corporation of Maryland

Filed July 25, 1967, Ser. No. 655,852
Int. Cl. B27g 17/04; E02d 7/18
U.S. Cl. 30—169 20 Claims

ABSTRACT OF THE DISCLOSURE

The device disclosed herein is a portable, motor powered vibrating tool for use in performing such tasks as soil cultivation and aeration, paint scraping, stirring or agitating solids and fluids, etc. The device includes a frame having an interconnected motor and vibratory source supported thereon. An implement is also supported by the frame and is controllably vibrated by the vibratory source upon energizing the motor. A handle is attached to the frame for control and manipulation of the device.

SUMMARY OF THE INVENTION

The present invention relates to a portable, motor powered vibrating tool construction which includes a frame having a remotely disposed, interconnected drive motor and vibratory source supported thereon. An implement is supported upon the frame and is disposed relative to the vibratory source so as to be controllably vibrated when the motor is energized. A handle is secured to the frame remote from the vibratory source and the component tool parts are constructed and related for optimum balance and operator control.

An important object, therefore, of the present invention is to provide a novel portable, motor powered, tool construction including a handle, a frame, and a vibrating implement, which construction is adapted for highly efficient and effective operation in performing a variety of tasks such as soil cultivation and aeration, paint scraping, fluid and solid matter agitation and the like.

Another important object of the present invention is to provide a novel portable tool construction of the above character which provides for easy operator handling and control by employing an overall lightweight and well balanced assembly.

Still another important object of the present invention is to provide a novel, portable, vibrating tool construction of the above character which employs a construction adapted to isolate the tool handle from the vibrating forces to further ease handling thereof and reduce operator fatigue.

Further objects of the present invention include the provision of a novel, portable, vibrating tool construction of the above character which is relatively compact and presents a neat and aesthetically pleasing appearance.

Still another object of the present invention is to provide a novel vibratory tool construction of the above character which employs a detachable implement adapted for easy change, removal and/or replacement.

Additional objects include the provision of a novel portable, vibratory tool construction of the above character which is relatively inexpensive to manufacture, rugged in construction and reliable in use.

Other objects and advantages of the present invention will become more apparent from a consideration of the detailed description to follow taken in conjunction with the appended drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a motor powered, vibrating tool embodying the present invention;

FIG. 2 is a longitudinal, vertical sectional view of the structure of FIG. 1 and illustrating a preferred form of the present invention;

FIG. 3 is an end view of the structure of FIG. 1;

FIG. 4 is a sectional view of FIG. 2 taken along the line 4—4 thereof;

FIG. 5 is a sectional view of FIG. 2 taken along the line 5—5 thereof;

FIG. 6 is a sectional view of FIG. 2 taken along the line 6—6 thereof;

FIG. 7 is an enlarged, fragmentary view, similar to FIG. 2, and illustrating a modified form of handle isolator;

FIG. 8 is a sectional view of FIG. 7 taken along the line 8—8 thereof;

FIG. 9 is a sectional view of FIG. 7, taken along the line 9—9 thereof;

FIG. 10 is a fragmentary view, similar to FIG. 2, illustrating a modified form of belt tensioning construction;

FIG. 11 is a partial perspective view illustrating a modified form of implement;

FIG. 12 is a partial elevational view illustrating a further form of implement;

FIG. 13 is a side elevational view illustrating a modified form of vibrating tool embodying the present invention; and

FIG. 14 is a partial plan view illustrating the frame and implement of the tool of FIG. 13.

BROAD STATEMENT OF THE INVENTION

Broadly described, the present invention relates to a novel, portable, motor powered, vibrating tool construction and comprising a frame, a motor supported upon said frame and including an output rotatable shaft having a drive pulley fixed thereto, vibration inducing means including a rotatable unbalanced weight carried upon a driven pulley supported upon said frame remote from said motor, an endless belt interconnecting said drive and driven pulleys whereby energization of said motor is effective to vibrate said frame adjacent said inducing means, implement means interconnected with said frame for vibratory movement in response to action of said vibration inducing means, handle means interconnected with said frame adjacent said motor, and vibration isolating means between said handle means and said frame.

In another aspect, the present invention relates to a portable, motor powered, vibrating tool construction comprising a motor, an elongated frame extending away from said motor, vibration inducing means including a rotatable member supported in cantilever fashion upon said frame remote from said motor and adapted to be activated upon energization of said motor, implement means interconnected with said frame on the side of said inducing means remote from said motor for vibration in response to activation of said inducing means, said inducing means imparting components of vibratory translation to said frame generally in the plane of rotation of said inducing means and generally in a plane extending longitudinally of said frame.

In still another aspect, the present invention relates to a portable tool comprising frame means, an electric motor supported upon said frame means and having an output shaft rotatable about an axis, vibration inducing means supported upon said frame means at an area laterally spced from said axis and adapted to set up vibrations in a plane generally transverse to said axis, implement means rigidly fixed to said frame means at an area spaced laterally from said axis and said inducing means, transmission means interconnecting said output shaft and said inducing means whereby energization of said motor effects vibration of said implement through said induc-

ing means and said frame means, and handle means interconnected with said frame means adjacent said motor.

DETAILED DESCRIPTION

As used herein, the term "tool construction" refers to that class of hand held power driven devices for performing such tasks as soil cultivation, paint scraping, material agitation, etc. The terms "implement," "tool means" or "blade" refer to that part of the overall tool construction which actually contacts the work during operational use.

Referring now more particularly to the drawings, a vibrating tool construction embodying a preferred form of the present invention is illustrated generally at **11** in FIGS. 1–3 and is seen to include an elongated frame **13** having a handle **15** secured to one end and a tool means **17** secured to the other end thereof. The frame **13** includes a hollow portion of L-shaped configuration having first and second legs **16**, **18**, and a solid shoe member **25** which depends from the leg **18** and is secured thereto remote from the leg **16**. A drive motor **19** is housed and supported in the frame leg **16** and vibration inducing means **21** is supported within the frame leg **18** at the end thereof remote from the leg **16** and is connected to the motor **19** by a transmission **23**, the latter being entirely encased within the leg **18** (FIG. 2). The tool means or implement **17** includes a blade **27** secured to the outer end of the shoe **25**. The handle **15** loosely embraces a portion of the frame leg **16** and is provided with a hand grip **29** having an on-off control switch **31** adjacent thereto and a conventional line cord **33** dependent therefrom.

The frame **13**, in the embodiment of FIGS. 1–6, is seen to include a pair of mating, generally concave, frame members **35**, **37** constructed of cast aluminum, magnesium or other suitable material and secured together in clam shell fashion along a longitudinal parting plane by screws **39**. The motor **19** is provided with a rotatable armature shaft **41** supported fore and aft by bearings **43**, **45** which are trapped between the frame members **35**, **37**. The motor **19** also includes stationary field laminations **53** which likewise are trapped between the frame members **35**, **37**. Preferably, insulating caps **55**, **57** insulate the laminations **53** from the housing members **35**, **37**. A commutator **67** is fixed upon the armature shaft **41** and is engageable by a pair of electrical brushes **75**, **77** carried by insulating brush holders **79**, **81** each of which is trapped between the frame members **35**, **37**. The brushes **75**, **77** and the motor field are energized by way of electrical leads **83**, **85** carried by the line cord **33** and another lead **87** interconnected therewith through the on-off switch **31** so that upon connecting the line cord **33** to an electrical source and closing the switch **31**, the motor **19** is energized and the armature shaft **41** rotated. A fan **91** is pressed on and rotates with the armature shaft **41** to cause cooling air to move past the motor during operation of the device.

The armature shaft **41** extends through the bearing **43** into the frame leg **18** and has a drive pulley **93** threaded or otherwise secured thereon for rotation therewith. The drive pulley **93** forms a part of the transmission **23** and is connected by an endless belt **97** to a driven pulley **95** located near the other end of the leg **18**. The driven pulley **95** is rotatably disposed on a stub shaft **99** and the latter is pressed into a bearing block **101** which supports the pulley **95**. A retaining ring **103** holds the pulley **95** in place on the shaft **99** and bearing block **101** is detachably secured to the frame leg **18** by bolts **105** which are trapped between the frame members **35**, **37** and trapped nuts **107**. As shown in FIG. 2, the bearing block **101** has elongated apertures **106** through which the bolts **105** extend so that the block and therefore the pulley **95** are adjustable toward and away from the pulley **93** to adjust the tension in the belt **97**.

As shown in FIGS. 2 and 4, the driven pulley **95** has an integral weighted portion **109** disposed eccentrically

to its axis of rotation so that as the pulley **95** rotates upon the stub shaft **99** and the bearing block **101**, it imparts an orbital vibratory force to the bearing block **101** and therefore to the supporting frame leg **18**. This causes the frame leg **18** to vibrate orbitally, particularly at that portion of the frame leg **18** adjacent the pulley **95**. The shoe member **25** is detachably secured to the end of the frame leg **18** adjacent the vibration inducing device **21** by interfitting tongue-like projections **111**, **112** on the shoe **25** and the frame leg **18**, respectively, and by a strap **113** and screws **115** (only one of which is shown). The shoe **25** therefore vibrates under the action of the rotating eccentric weighted pulley **95** as does the implement or blade **27** which is detachably secured to the shoe **25** by screws **117**.

Manifestly, because of the orbital vibratory force induced by the eccentric weighted pulley **95**, the implement **27** undergoes a horizontal orbital mode or, stated another way, has a component of motion in an orbital path defined by a plane generally parallel to the plane of the pulley **95**.

In addition, the blade or implement **27** suffers or undergoes a vertically nodding mode or moves alternately through a path lying in a plane which intersects the previously described plane.

The implement **27** is spaced appreciably from the pulley **95** both radially of its axis of rotation as well as axially of its plane of rotation. The forward, terminal portion of the frame leg **18** and the shoe member **25**, which interconnect the vibration inducing pulley **95** and the implement, possess some degree of inherent flexibility, particularly because of their length so that when the pulley **95** rotates, this flexibility results in a vibratory component of movement of the implement **27** in a plane which intersects the plane of the pulley **95**. Furthermore, the frame leg **18** is relatively long and is flexible to some extent. The eccentric weighted pulley **95** is supported upon the frame leg **18** in cantilever fashion by the stub shaft **99** and bearing block **101**. The mass of the eccentric portion **109** of the pulley **95** is concentrated toward the upper, unsupported end thereof so that during pulley rotation, the shaft **99** flexes and a force couple is set up on the frame leg **18** during pulley rotation. This couple tends to flex or bend the leg **18** in alternate directions in a plane which intersects the plane of the pulley **95**. The cantilever arrangement of the motor shaft allows it to flex in sympathy to flexing of the shaft **99** so as not to inhibit the latter.

Desirably, a plane which geometrically bisects the frame leg **18** along its length also bisects the shoe member **25** and the pulley **95** and is perpendicular to the plane of the latter so that the flexing action of the frame leg **18** coincides substantially with and reinforces the movement of the implement resulting from flexing of the shoe member **25**. The result is that both flexing actions contribute to the nodding mode of the implement **27**.

It will be understood that the amplitude of this nodding mode is a function of the length and inherent flexibility of the frame leg **18** and the shoe member **25**. However, the total, resultant vibratory translation of the implement **27** is a complex path which is the vectorial sum of individual vibratory components occurring in mutually intersecting planes.

The implement or blade **27** illustrated in FIGS. 1–3 is shaped in a fashion particularly adapted for soil cultivation and aeration purposes. Thus, the blade **27** is generally rectangular and has relatively deep, V-shaped recesses **119**, **121** formed in its forward and rearward ends, respectively, so that it presents a plurality of exposed edge surfaces. In use, the blade **27** is imbedded in the ground with the exposed edge surfaces confronting the adjacent soil. The motor **19** is energized thereby rotating the pulley **95** and vibrating the implement **27**. The vibratory translation of the implement vibrates and breaks up the soil into small particles so that it becomes aerated. As

the tool **11** is moved, the blade **27** of course moves and the soil set into motion around the blade edges becomes fluidized. This permits easy and relative free manual movement of the tool **11** along the area to be cultivated and, in addition, greatly enhances the agricultural qualities of the soil. Preferably, the blade edges are sharpened to further reduce the resistance thereof to movement through the soil.

In addition to fluidizing, aerating and in general loosening the soil, the vibratory modes suffered by the blade **27** enhances the capability of the tool for removing weeds and other undesirable objects from the soil. Thus, when the vibrating blade **27** engages the stalk of a weed, the weed begins to vibrate also and loosens within the soil. In addition, the soil around the vibrating blade is in a substantially fluidized state so that the weed can easily be withdrawn from the soil. Furthermore, the nodding mode suffered by the blade **27** tends to lift the soil, weeds or any other objects which it engages thereby increasing the effectiveness of the tool for purposes of weeding, rock removal, etc. Advantageously, even though the blade **27** has sharpened edges, it will not cut either weeds or plants since by reason of the fluidized state of the soil around the plant and weed stalks, there is no reaction to the vibrating action of the blade **27** thereon so that no cutting action can take place. This also enhances the safety of the tool since it greatly reduces the possibility of injury to the user by touching the blade **27**.

The vibration amplitude of the implement or blade **27** is, of course, dependent upon such factors as the weight of the eccentric portion **109** of the driven pulley **25**, the flexibility and length of the frame leg **18** and the shoe **25**, while the vibration frequency is dependent upon the rotational speed of the armature shaft **41** and the speed reduction ratio of the transmission **23**. If desired, the frequency of the induced horizontal vibrational mode can be "tuned" to the natural frequency of the column formed by the frame leg **18** and the shoe **25** between the driven pulley **95** and the blade **27** so that a resonant, reinforced vibration condition exists. The length of this column can be such that it represents a multiple of half wave lengths so that an anti-node, or a point of maximum vibration amplitude occurs at the blade **27** thereby making the amplitude of blade translation a maximum. This natural frequency can be determined empirically or theoretically.

By way of example, it has been determined that for soil cultivation and aeration, a tool utilizing a pulley **99** weighing about 0.363 lb. and rotating at about 5000 r.p.m to give an orbital vibration frequency of from about 40 to about 80 cycles per second and a vibrational amplitude of from about 1/16 to about 3/8 inch produces good results. Highly satisfactory results have been achieved with a frequency of about 60 cycles per second and a vibration amplitude of about 1/4 inch; however, as described, these values are exemplary only and are not to be considered critical.

The vibratory force induced by the eccentric weight **109** tends to vibrate the entire frame **13** and together therewith, the handle **15** connected to the frame **13**. However, the relatively great mass of the drive motor **19** at the end of the frame **13** remote from the pulley **95** reduces somewhat the effect of the vibratory force at this end of the frame **13**. In addition, the rotating parts of the motor **19** tend to remain stabilized in planes transverse to the rotational axis thereof by virtue of the angular momentum of the motor rotating parts which function somewhat in the nature of a gyroscope. The rotational axis of the motor parts is substantially parallel to the rotational axis of the eccentric weight **109** so that this angular momentum or gyroscopic action opposes the effect of the horizontal mode or vibrational component in the plane of the pulley **95**. Also, if the "natural frequency" condition exists, the handle **15** could be connected to the frame **13** at a "node," or a point of minimum vibration amplitude, in the latter which would effectively isolate the handle **15** from vibrations in the frame **13**.

However, the frame **13** and the handle **15** are interconnected by a resilient assembly to help isolate the handle **15** from the vibrations in the frame **13**. This handle **15**, as seen in FIGS. 1–3, includes handle and handle cover portions **123**, **125** secured together in clam shell relation by screws **127**. The handle and handle cover **123**, **125** preferably are constructed from a moldable plastic material and serve to trap the electrical leads **83**, **85**, **87** and the switch **31** in place and clamps a bushing **124** on the line cord **33** therebetween. The handle **123** and cover **125** have abutting, substantially horizontal ledges **129**, **130** formed internally thereof and integral therewith, and the handle **123** and handle cover **125** cooperatively form a dependent skirt **131** adapted to loosely embrace the frame **13**.

The frame members **35**, **37**, at the upper, terminal end of the leg **16**, have abutting end walls **133**, **134** forming a horizontal ledge which is substantially parallel to and spaced below the ledges **129**, **130** on the handle **123**. A pair of isolators **135**, **137** interconnect the ledges **129**, **130** and the end walls **133**, **134**, and therefore the handle **15** and the frame **13**. These isolators **135**, **137** include helically wound, stranded steel cables **139**, **141** clamped between pairs of metal retainer plates **143**, **145** and the latter are detachably secured to the ledges **129**, **130** and end walls **133**, **134** by bolts **147** and nuts **149**. Isolators of this type are manufactured and sold by Aeroflex Laboratories Incorporated, Plainview, N.Y., and provide a damping effect in three planes. In addition, these isolators have the unique characteristic of isolating the handle **15** from the induced vibrations in the frame **13** while providing a relatively stiff connection therebetween capable of transmitting operator thrust from the handle **15** to the frame **13** during use.

Another feature of the present invention resides in the structural arrangement which is calculated to provide optimum tool balance and control. Thus, the relatively large mass motor **19** together with the transmission **23** and the tool assembly **17** are positioned below the handle **15** and therefore are easily supported by the operator with one hand grasping the hand grip **29**. In addition, the hand grip **29** is inclined and faces in the direction of the tool assembly **17** so that the tool **11** is easily moved forward and back as well as to either side.

FIGS. 7–9 illustrate a modified form of handle isolating construction. In this form, the handle **15** and frame **13** are interconnected by three isolators **151**, **153**, **155**, each of which is secured to the frame leg **16** and includes a rubber or rubber-like sleeve **157** having a pair of rigid plates **159**, **161** secured in spaced relation within the ends thereof. Each of the plates **159**, **161** has a threaded post **163**, **165**, respectively, secured thereto or integral therewith and extending outwardly at the ends of each isolator **151**, **153**, **155**. The posts **165** of the isolators **151**, **153** extend between the housing end walls **133**, **134** at the parting plane therebetween and may have a nut **169** threaded thereon and trapped between the end walls **133**, **134**. The post **165** on the isolator **155** extends through a lateral plate **167** fixed to or integral with frame leg **16**, and is secured in place by a nut **168**. The posts **163** of each isolator **151**, **153**, **155** extends through a bent arm **171** and is secured thereto by nuts **173**. The arm **171** is provided with a pair of rearwardly bent flanges **175**, **177** near its lower end, which have a bolt **178** extending therethrough and through aligned openings **181**, **183** in the handle and handle cover **123**, **125**, the bolt **178** being secured in place by a nut **184**. Also, the upper end of the arm **171** is secured to the handle **123** and handle cover **125** by screws **182** threaded into bosses or nuts **184** secured to or integral with the arm **171** and located on either side of the isolator **151**. Like the isolator construction described above for FIGS. 1–6, this construction through the rubber or rubber-like sleeves **157**, permits

limited universal relative movement between the handle **15** and the frame **13** but provides a relatively stiff connection therebetween capable of transmitting operator thrust during use. In all other respects, the details of the tool construction in FIGS. 7 and 8 is the same as that illustrated and described for the embodiment of FIGS. 1–6.

FIG. 10 illustrates a modified form of belt tensioning device and a modified frame construction. Here, the bearing block **101** is biased in a direction away from the driven pulley **93**, or in a right hand direction as seen in the figure, by a compression spring **187** caged between a pocket **189** on the housing leg **18** and the bearing block **101**. The compression spring **187** desirably is constructed to set up the desired tension in the belt **97** so that when the parts are assembled, the bearing block **101** will be properly positioned automatically and the bolts **105** need only be tightened. The modified frame construction, illustrated in FIG. 10, shows the foot member **25A**, to which the implement **27** is secured, as integral parts of the clam shell frame members **35, 37**, respectively, and carrying one of the connecting screws **39**.

As described above, the blade or implement **27** illustrated in FIGS. 1–3 is constructed and particularly shaped for advantageous use in cultivating and aerating soil. For other uses, such as paint scraping, stirring, and the like, other blades or implements may be substituted for the pointed blade **27**. For example, a chisel edged or convex shaped blade **27A**, shown in FIG. 11, will find use in surface scraping applications such as paint removal. Also, a relatively blunt faced, generally cylindrical implement **27B**, shown in FIG. 12, will be useful for stirring or agitating fluids or solids. Other types of blades useful in still other applications will be readily apparent to those skilled in the art and it is to be understood that the blade illustrated is given by way of example only.

FIGS. 13 and 14 illustrate a modified form of tool construction. This device, illustrated generally at **201**, includes an elongated frame **203** which preferably is constructed of a relatively strong and flexible material such as, for example, spring steel. The frame **203** has an electric motor **205** suitably secured thereto at one end and an implement or tool **207** integral with or otherwise fixed thereto at the other end thereof. The motor **205** has an output shaft **209** with a drive pulley **211** secured thereto for rotation therewith. A driven pulley **213** is rotatably supported by a shaft **215** on the frame **203** at a point remote from the pulley **209**, and a belt **217** interconnects the pulleys. The driven pulley **213** may be eccentrically weighted, like the pulley **95** in the previous embodiments, so that when rotated, the pulley **213** imparts vibrations to the frame **203**. The frame **203** is, of course, flexible, the shafts **209, 215** support the pulleys **211, 213** in cantilever fashion and the blade **207** is spaced downwardly and forwardly of the pulley **213** so that the blade **207** undergoes vibratory translation in much the same fashion as, but perhaps to a greater extent than, the blade **27** in the embodiments of FIGS. 1–10. A suitable handle **219** is fixed to the motor **205** for control and manipulation of the tool.

By the foregoing, there has been disclosed an improved portable, vibrating tool construction calculated to fulfill the inventive objects hereinabove set forth, and while a preferred embodiment of the present invention has been illustrated and described in detail, various additions, substitutions, modifications and omissions may be made thereto without departing from the spirit of the invention as encompassed by the appended claims.

We claim:

1. A portable, motor powered vibrating tool construction comprising a frame, a motor supported upon said frame and including an output rotatable shaft having a drive pulley fixed thereto, vibration inducing means including a rotatable unbalanced weight carried upon a driven pulley supported upon said frame remote from said motor, an endless belt interconnecting said drive and driven pulleys whereby energization of said motor is effective to vibrate said frame adjacent said inducing means, implement means interconnected with said frame for vibratory movement in response to action of said vibration inducing means, handle means interconnected with said frame adjacent said motor, and vibration isolating means between said handle means and said frame.

2. A portable, motor powered, vibrating tool construction comprising a motor, an elongated frame extending away from said motor, vibration inducing means including a rotatable member supported in cantilever fashion upon said frame remote from said motor and adapted to be activated upon energization of said motor, implement means interconnected with said frame on the side of said inducing means remote from said motor for vibration in response to activation of said inducing means, said inducing means imparting components of vibratory translation to said frame generally in the plane of rotation of said inducing means and generally in a plane extending longitudinally of said frame.

3. A portable tool comprising frame means, an electric motor supported upon said frame means and having an output shaft rotatable about an axis, vibration inducing means supported upon said frame means at an area laterally spaced from said axis and adapted to set up vibrations in a plane generally transverse to said axis, implement means rigidly fixed to said frame means at an area spaced laterally from said axis and said inducing means, transmission means interconnecting said output shaft and said inducing means whereby energization of said motor effects vibration of said implement through said inducing means and said frame means, and handle means interconnected with said frame means adjacent said motor.

4. A tool as defined in claim **3** wherein said vibration inducing means includes rotatable means.

5. A construction as defined in claim **3** wherein said frame means includes first and second legs, said motor being supported upon said first leg, and said vibration inducing means being supported upon said second leg at the end thereof remote from said first leg.

6. A construction as defined in claim **3** wherein said frame means includes first and second, generally concave, clam shell members detachably secured together along a longitudinal parting plane, said frame means having first and second legs encasing said motor and vibration inducing means, respectively, said frame means further including a foot portion adapted to have said implement secured thereto.

7. A construction as defined in claim **1** wherein said weighted pulley is rotatably supported by a stub shaft having one end fixed relative to said frame, the other end of said shaft being free.

8. A construction as defined in claim **1** which includes a bearing block fixed to said frame, said stub shaft having its one end fixed within said bearing block, said weighted pulley being supported upon said bearing block.

9. A construction as defined in claim **8** wherein said bearing block is adjustable upon said frame toward and away from said drive pulley to vary the tension in said belt.

10. A construction as defined in claim **9** which includes spring means carried by said frame and engaging and normally biasing said bearing block in a direction tensioning said belt.

11. A construction as defined in claim **3** wherein said frame means includes a detachable shoe adjacent said vibration inducing means and an implement detachably secured to said shoe.

12. A construction as defined in claim **4** wherein said tool means includes a generally flat blade, said rotatable vibration inducing means adapted to impart to said blade a component of motion in an orbital path substantially

in the plane of said blade, and another component of motion generally transverse to said orbital path.

13. A construction as defined in claim **3** wherein said implement is flat and generally rectangular in configuration and has sharpened front and rear edges.

14. A construction as defined in claim **3** wherein said implement is generally cylindrical in cross section.

15. A construction as defined in claim **5** wherein said vibration inducing means includes rotatable means supported upon said second frame leg and is effective to vibrate said second frame leg other end and said implement imparting to it a component of motion in a plane substantially transverse to the axis of rotation of said vibration inducing means and another component of motion in a plane including said axis and intersecting said first mentioned plane.

16. A construction as defined in claim **15** wherein said implement is spaced transversely from said second leg and is operatively connected thereto adjacent said vibration inducing means.

17. A construction as defined in claim **5** wherein said handle means is disposed above said first frame leg, said handle means having a hand grip disposed above and to the side of said first frame leg opposite said second frame leg.

18. A construction as defined in claim **5** wherein said handle means is disposed above said first frame leg, and vibration isolating means including flexible means interconnecting said handle means and said frame and permitting limited, universal, relative movement therebetween.

19. A construction as defined in claim **2** wherein said implement means is disposed in axially and radially spaced relation to said rotatable vibration inducing means.

20. A construction as defined in claim **2** wherein said inducing means is rotatable about an axis generally transverse to said frame.

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ROBERT C. RIORDON, Primary Examiner

R. V. PARKER, JR., Assistant Examiner

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