May 26, 1959 A. J. FREITAG 2,887,702

WIRE CLEANER

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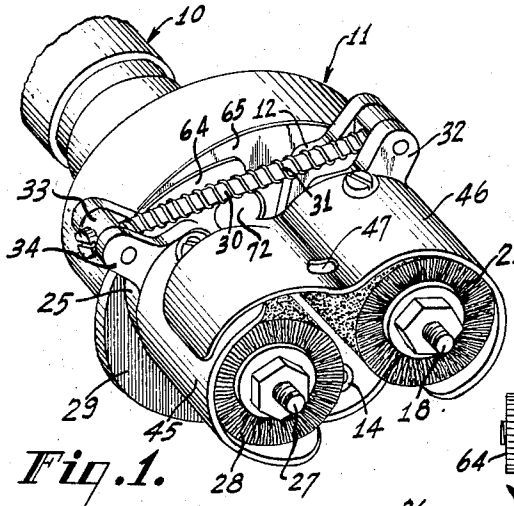


Fig. 1.

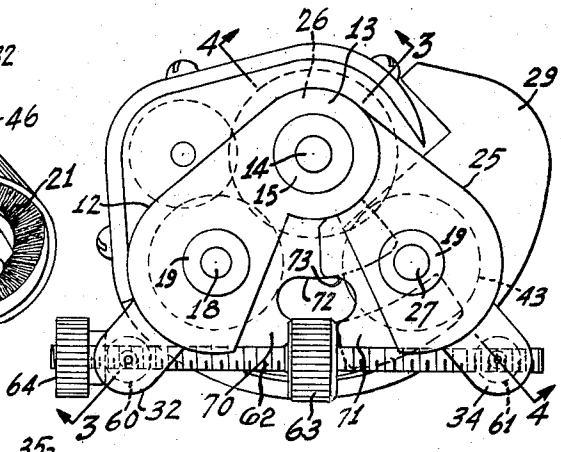


Fig. 2.

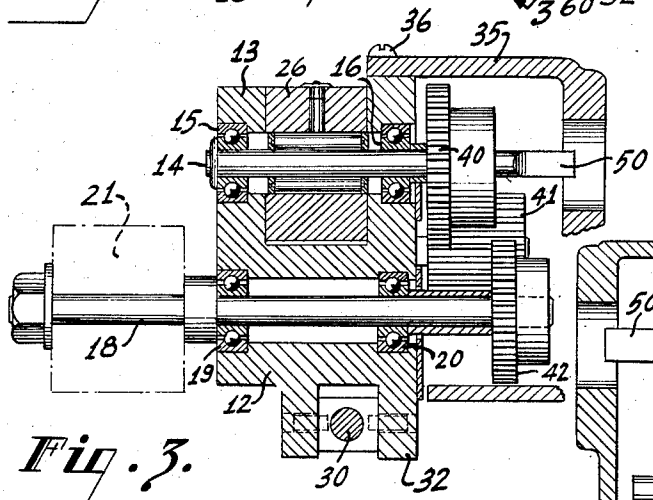


Fig. 3.

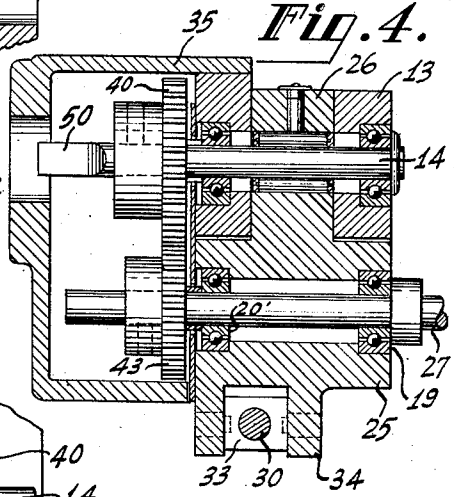


Fig. 4.

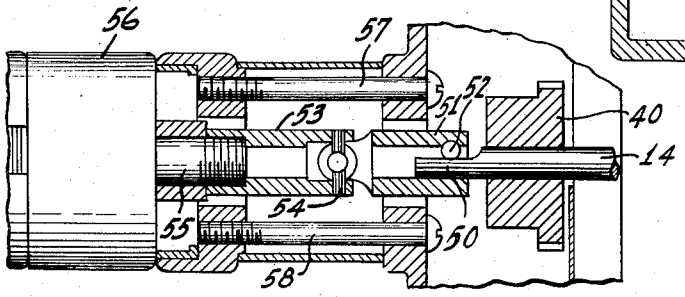


Fig. 5.

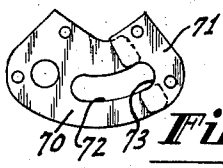


Fig. 6.

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WIRE CLEANER

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8 Claims. (Cl. 15—23)

My invention relates to wire stripping machines useful for cleaning, grinding, polishing as well as stripping insulation from wires or conductors coated with insulating coatings such as enamel, plastic, nylon, varnish, woven glass, and similar coatings.

There are not presently available completely universal, portable, light-weight, self-contained wire stripping machines. Equipment now available is not particularly suitable for cleaning wires of various shapes whether they be round, square, or rectangular. Brush spacings are usually fixed and no simple adjustment mechanism which can be positively locked is available.

The principal object of my invention is to provide a wire-stripping apparatus which is universal, portable, of light-weight, and completely self-contained.

Another object of my invention is to provide such an apparatus which is capable of cleaning wires of various cross-sectional shapes and one in which the brush spacings can be simply made by manual adjustment during operation or which can be locked in any desired position.

A further object of my invention is to provide such a device which may quickly and easily be dis-assembled for cleaning purposes, inspection and for changing the parts including the gear trains.

Briefly, in accordance with my invention, I provide a light-weight assembly including a prime mover in the form of an electric or fluid operated motor coupled through a gear train to a pair of brushes which can be manually adjusted to move toward and from each other to vary the spacing therebetween. I provide a main housing which may be in the form of a casting. It is provided with a yoke within which a second housing or frame member is supported for pivotal movement. The first or main housing member supports a brush shaft rotatably mounted therein and extending therethrough. The shaft has mounted at its outer end a brush and on its inner end a gear. The yoke portion of the housing rotatably supports the drive shaft which also pivotally supports the second housing or frame member. The drive shaft has mounted on its inner end a gear coupled through an idling gear in turn meshed with the brush gear described above. The second housing member supports at its free end a second brush shaft having at its outer end a brush and in its inner end a driving gear. This driving gear in turn meshes with the driving gear of the drive shaft. Means are connected between the two housing members for moving the brushes toward and from each other to vary the spacing therebetween. The gear train is enclosed within a casing supported on one of the housing members and in turn supports the driving motor coupled through a detachable universal connection to the driving shaft of the gear train. The brush members are provided with guards, one of which has an opening to serve as a guide for a wire to be positioned between the cleaning brushes.

The invention will now be described with reference to the drawings, in which:

Fig. 1 is a perspective view showing one form of my invention but with the driving motor only partially shown;

Fig. 2 is the brush end view of Fig. 1 with brushes and guards removed to show details of construction and turned 180° with respect to Fig. 1 and having a modified brush adjusting means;

Fig. 3 is a section taken along the line 3—3 of Fig. 2;

Fig. 4 is a section taken along the line 4—4 of Fig. 2;

Fig. 5 is a partial longitudinal section showing details of construction of the structure for coupling the driving motor and the gear train together; and

Fig. 6 shows details of the shields used with my invention.

Referring particularly to Figs. 1, 2, and 3, a device made according to my invention includes the power unit shown generally at **10** which is a light-weight electric motor and a drive unit shown generally at **11**. The drive unit comprises a pair of castings including a main frame or housing **12** provided with a yoke **13** through which the drive shaft **14** extends and which is rotatably mounted therein in bearings **15** and **16**. Rotatably mounted adjacent drive shaft **14** and spaced therefrom is the brush shaft **18** rotatably mounted in bearings **19** and **20**. The outer end of the shaft carries a brush **21**.

The second housing or frame **25** is provided with an extension **26** which is pivotally and rotatably supported on the shaft **14**. The second brush shaft **27** is rotatably mounted and supported by hearings **19'** and **20'** in the free end of the second housing member **25**. A brush **28** is supported on shaft **27**.

To adjust the brushes **21** and **28** toward and from each other I provide the housing member **12** with the U-shaped extension **32** and the movable frame **25** with the U-shaped extension **34**. Mounted in the U-shaped extension **32** is the spring guide **31** (see Fig. 1) extending between the U-shaped extensions and slidably through a rotatable member **33** supported in the U-shaped member **34**. A biasing spring **31** is supported on guide **30** and forces the U-shaped members apart.

The movable housing member **25** is provided with a flange-like extension **29** which may be manually pressed to swing the brushes toward each other against the biasing spring **31**; thus manual operation can be utilized for moving the brushes toward and from each other while holding the device in the worker's hand.

The gear train is housed within the gear guard or casing **35** secured to the fixed housing member **12** by means of screws **36** to permit quick detachment of the drive unit from the prime mover, that is, the Airon electric motor, to expose the gears and permit inspection of or interchange of the gears.

The drive shaft **14** is geared to the brush shaft **18** throught an idler gear **41** which, in turn, is meshed with the gear **42** fixed to the brush shaft **18**. Gear **40** meshes with and drives gear **43** fixed to the other brush shaft **27**. With this arrangement when brush **28** is rotated clockwise, brush **21** is rotated counterclock-wise so that the wire positioned between the brushes for cleaning will be pulled in the same direction by both brushes. However, this arrangement can be changed so that the brushes are rotated in the same direction causing the conductor positioned between the brushes for cleaning to have oppositely directed forces applied thereto. This is accomplished by removing gear **41** and replacing gear **40** with another gear having a longer axial dimension whereby it will mesh simultaneously with both gears **41** and **43**.

In order to prevent insulation and other material from entering the gear casing **35**, I provide shields **70** and **71** (for details see Fig. 6) attached to the housing **12** and frame **25**. Shield **70** is provided with slot **72** to permit the frame **25** and shaft **27** to be moved toward housing **12**. The slot **73** receives shaft **14** when the brushes are moved to operating position.

The brushes 21 and 28 may be provided with brush guards 45 and 46 secured to the frames and can easily be detached. Guard 46 may be provided with an aperture 47 which acts as a guide for the conductor or wire being stripped or cleaned.

The driving motor is coupled to the gear train by means of a universal coupling which can be readily attached to or detached from the drive shaft. Drive shaft 14 (see Fig. 5) is provided with a flattened end portion 50 which is received within the tubular coupling member 51 provided with a transverse pin 52 which slidably engages the flattened end of the drive shaft 14. The coupling member 51 in turn is connected to the tubular member 53 secured to the motor shaft 55 of motor 56 by means of the universal coupling element 54. Screws 57 and 58 extending through the back of the gear casing 35 fix the motor to the casing when the apparatus is assembled. Thus, the gears may be readily disconnected by detaching casing 35 from the frame member 12 and the driving motor 56 may in turn be readily detached from the casing 35 by unscrewing screws 57 and 58.

In Fig. 2 I show a modification of the arrangement for moving the brushes toward and from each other. The member 62 is threaded throughout its length. The ends are received within the rotatable collars 61 and 60 which are internally threaded for receiving the ends of the threaded rod 62 which are reversely threaded on opposite ends. A knurled adjusting knob 63 is centrally fixed on rod 62 for causing rotation of rod 62. This causes the brushes to be moved toward and from each other. A knurled nut 64 mounted at one end of the rod 62 may be used to lock the brushes in position.

When it is desired to clean or strip a conductor, the brushes are adjusted toward or from each other for proper spacing by the flange 29 which may be pressed by the operator or by the adjusting rod 62. When the motor 56 is energized, it drives shaft 14 which, in turn, drives the brush shafts 18 and 27 through the gear train comprising gears 41, 42 and 43 meshed with the gear 40 on the drive shaft. It is obvious from the above description how the device may be disassembled for inspection, repair and cleaning.

Apparatus made according to my invention is completely universal, portable and light in weight and is self-contained, thus permitting the device to be carried to and perform operations on heavy equipment which is difficult to move such, for example, as large motors, transformers, and the like.

The simple thumb adjustment mechanism can be positively locked in any desired position to clean or strip wires of various cross-sections. The positive locking arrangement is particularly useful when the apparatus made according to my invention is positively mounted, for example, on a bench stand, or in a similar fixed position.

Any type of driving unit can be used, either an electric motor or a fluid driven motor and because of the construction, as pointed out above, the whole equipment can be readily taken down. Obviously the device may be made in small or large sizes to handle different kinds of work and the width of the brushes and the material of which the brushes are made can be varied. Also grinding wheels, polishing or sanding discs can be substituted for the brushes.

While no dust collecting system has been shown, this can be readily added to be supported by the housing. If desired, the gear casing may be packed with grease or gears which require no lubrication such as nylon gears can also be added.

I claim:

1. A manually supportable and portable wire stripping apparatus including a housing member, a portion of which is formed as an integral yoke, a first shaft rotatably supported on said housing member and spaced from said yoke, a brush fixed to said first shaft, a second shaft extending through said yoke, a frame member pivotally supported on said second shaft within said yoke, a third shaft on said frame member, a second brush mounted on said third shaft, a gear train connected between said second shaft and said first and third shafts, means for rotating said members relative to each other to vary the spacing between said brushes and a prime mover connected to said second shaft for rotating said gear train and said brushes, said prime mover being detachably mounted on said housing.

2. A wire stripping apparatus including a housing member provided with a yoke, a first shaft extending through said yoke, a second shaft rotatably supported on said housing and spaced from said yoke, a brush fixed to said second shaft, a frame member pivotally supported within said yoke and mounted on the shaft extending through said yoke, a third shaft spaced from the shaft extending through said yoke, a brush mounted on said third shaft and oppositely disposed to said first brush, said members being provided at portions spaced from said yoke with U-shaped extensions, a spring guide extending between said U-shaped extensions and pivotally fixed to one of said extensions and slidably connected with the other of said extensions, a biasing spring mounted on said guide and positioned between said U-shaped extensions, and means on said pivoted frame member for manually moving said members toward each other against said spring, and driving means supported on said members and connected to said first shaft and gear connections between all of said shafts, for rotating said brushes.

3. A manually supportable and portable wire stripping apparatus including a housing member having an integral portion providing a yoke, a first shaft rotatably mounted in and extending through said yoke portion, a second shaft rotatably mounted in said housing member and spaced from said first shaft, a first brush mounted on one end of said second shaft and a gear fixed to the other end of said second shaft whereby said brush and gear are mounted on opposite sides of said housing member, a frame member having a portion pivotally mounted on said first shaft and positioned within said yoke, a third shaft rotatably supported on said pivoted frame member and spaced from said yoke, a brush mounted on one end of said third shaft and oppositely disposed to said first brush, a gear mounted at the other end of said third shaft, a driving gear mounted on said first shaft and meshing with said gear on said third shaft and an idling gear connected between said driving gear and the gear on said second shaft, a prime mover mounted on said housing and a universal coupling member connected between said prime mover and said first shaft for driving said gear train and for driving said brushes, and means on said members for moving said brushes toward and from each other to vary the spacing between said brushes, and means for quickly attaching and detaching said prime mover from said housing members, including a casing covering said gears and supporting said prime mover.

4. A manually supportable and portable wire stripping apparatus including a housing member having an integral yoke portion, a first shaft rotatably mounted in and extending through said yoke portion, a second shaft rotatably mounted in said housing member and spaced from said first shaft and said yoke, a first brush mounted on one end of said second shaft and a gear fixed to the other end of said second shaft whereby said brush and gear are mounted on opposite sides of said housing member, a frame member having a portion pivotally mounted on said first shaft and positioned within said yoke, a third shaft rotatably supported on said pivoted frame member and spaced from said yoke, a brush mounted on one end of said third shaft and oppositely disposed to said first brush, a gear mounted at the other end of said third shaft, a driving gear mounted on said first shaft and meshing with said gear on said third shaft and an idling gear connected between said driving gear and the gear on said second shaft, a prime mover and a universal coupling

member connected between said prime mover and said first shaft for driving said gear train for driving said brushes, and means on said members for moving said brushes toward and from each other to vary the spacing between said brushes, a detachable casing mounted on said housing member and providing a cover for said gear train and coupling member, said prime mover being supported on said casing.

5. A wire stripping apparatus including a first housing member provided with a yoke, a shaft extending thru said yoke, a second shaft rotatably supported in said housing and spaced from said yoke, a brush fixed to said second shaft, a second housing member pivotally supported within said yoke and mounted on the shaft extending through said yoke, a third shaft spaced from the shaft extending through said yoke, a second brush mounted on said third shaft and oppositely disposed to said first brush, said housing members being provided at portions spaced from said yoke with U-shaped extensions, a spring guied extending between said U-shaped extensions and pivotally fixed to one of said extensions and slidably connected with the other of said extensions, a biasing spring mounted on said guide and positioned between said U-shaped extensions, and means on said pivoted housing member for manually moving said pivoted housing member against said spring, driving means supported on said frame members and connected to said second and third shafts for driving said brushes.

6. A manually supportable and portable wire stripping apparatus including a first housing member having an integral portion providing a yoke, a shaft extending through said yoke, a second shaft rotatably supported in said housing and spaced from said yoke, a brush fixed to said second shaft, a second housing member pivotally supported within said yoke and mounted on the shaft extending through said yoke, a third shaft spaced from the shaft extending through said yoke, a second brush mounted on said third shaft and oppositely disposed to said first brush, said housing members being provided at portions spaced from said yoke with U-shaped extensions, means including a threaded rod extending between said U-shaped extensions, each of said U-shaped extensions having a rotatable collar mounted therein, each of siad collars being threaded to receive a threaded end of said threaded rod, and means fixed to said rod for rotating said rod for causing said brushes to be moved toward and from each other, and driving means supported on said frame members and connected to said second and third shafts for driving said brushes.

7. A manually supportable and portable wire stripping apparatus including a housing member having an integral yoke portion, a first shaft rotatably mounted in and extending through said yoke portion, a second shaft rotatably mounted in said housing member and spaced from said first shaft, a first brush mounted on one end of said second shaft and a gear fixed to the other end of said second shaft whereby said brush and gear are mounted on opposite sides of said housing member, a frame member having a portion pivotally mounted on

said first shaft and positioned within said yoke, a third shaft rotatably supported on said pivoted frame member and spaced from said yoke, a brush mounted on one end of said third shaft and oppositely disposed to said first brush, a gear mounted at the other end of said third shaft, a driving gear mounted on said first shaft and meshing with said gear on said third shaft and an idling gear connected between said driving gear and the gear on said second shaft, the oppositely disposed portions of said housing member and said frame member spaced from said yoke being of equal dimensions longitudinally of said shafts supported thereby, a prime mover and a universal coupling member connected between said prime mover and said first shaft for driving said gear train for driving said brushes, and means on said members for moving said brushes toward and from each other to vary the spacing between said brushes, a casing for said gears attached to said housing, and overlapping shields carried by said housing and said frame for closing the gear casing.

8. A manually supportable and portable wire stripping apparatus including a housing member having an integral yoke portion, a first shaft rotatably mounted in and extending through said yoke portion, a second shaft rotatably mounted in said housing member and spaced from said first shaft and said yoke, a first brush mounted on one end of said second shaft and a gear fixed to the other end of said second shaft whereby said brush and gear are mounted on opposite sides of said housing member, a frame member having a portion pivotally mounted on said first shaft and positioned within said yoke, a third shaft rotatably supported on said pivoted frame member and spaced from said yoke, a brush mounted on one end of said third shaft and oppositely disposed to said first brush, a gear mounted at the other end of said third shaft, a driving gear mounted on said first shaft and meshing with said gear on said third shaft and an idling gear connected between said driving gear and the gear on said second shaft, a prime mover and a universal coupling member connected between said prime mover and said first shaft for driving said gear train for driving said brushes, and means on said members for moving said brushes toward and from each other to vary the spacing between said brushes, a detachable casing mounted on said housing member and providing a covering for said gear train and coupling member, said prime mover being supported on said casing, a brush shield carried by said housing member and a brush shield carried by said frame member, said shields being coextensive with and enclosing said brushes and overlapping each other, one of said shields being provided with an aperture through which a wire may be extended to a position between said brushes.

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