Jan. 23, 1923. 1,442,962.

E. J. MILES.

ASSEMBLING AND DISASSEMBLING TOOL.

FILED JUNE 22, 1921. 2 SHEETS—SHEET 1.

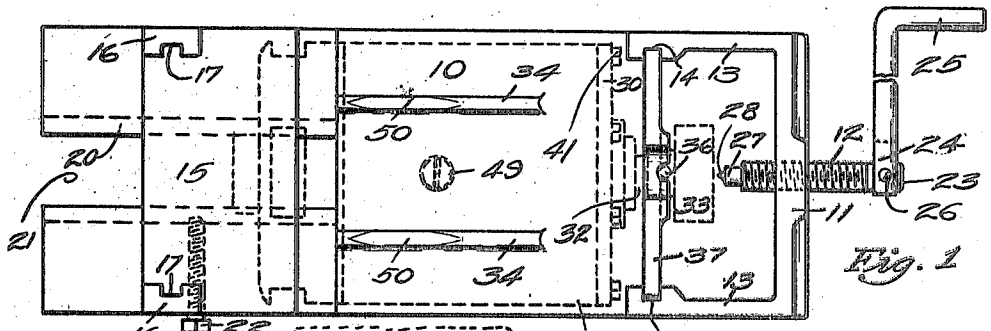


Fig. 1

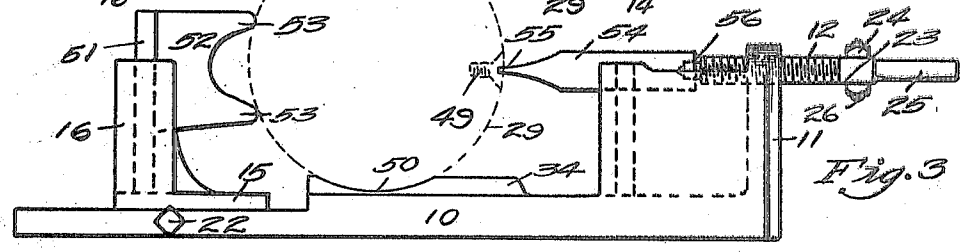


Fig. 3

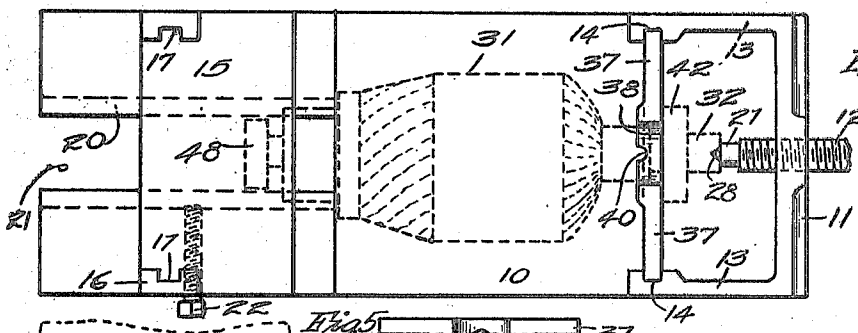


Fig. 2

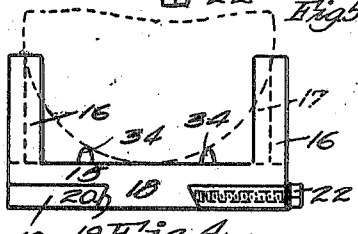


Fig. 4

Fig. 5

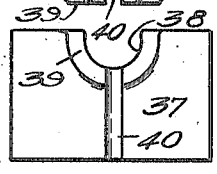


Fig. 6

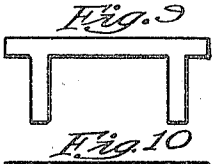


Fig. 9

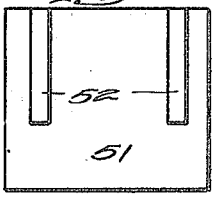


Fig. 10

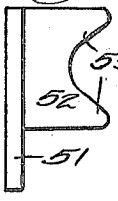


Fig. 11

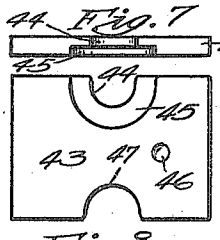


Fig. 8

Fig. 7

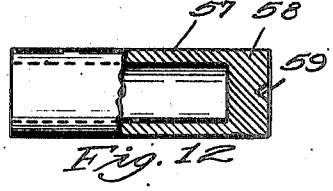


Fig. 12

Witness
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Fig. 13

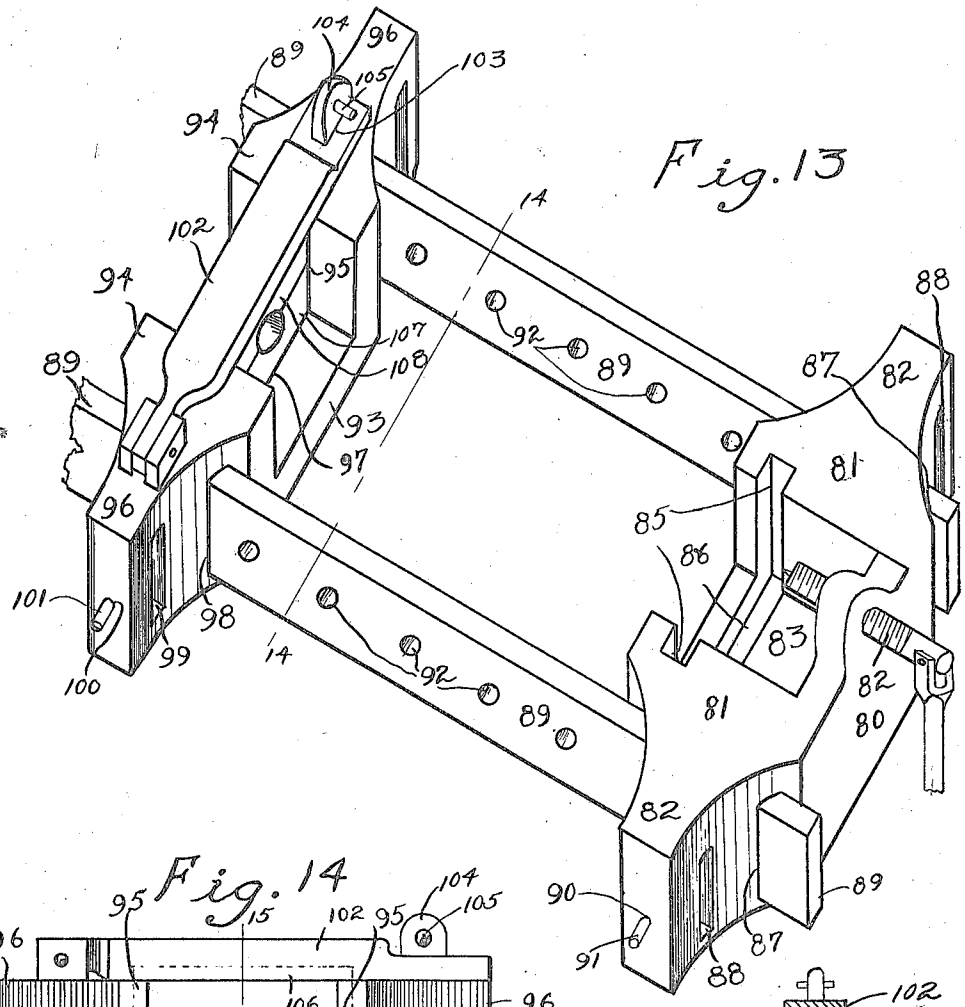


Fig. 14

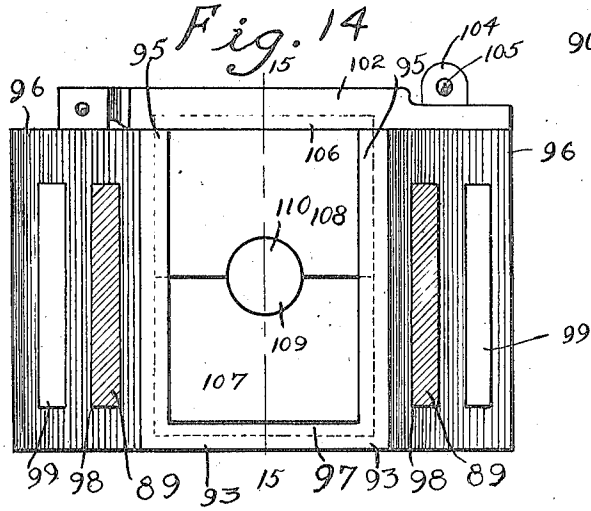
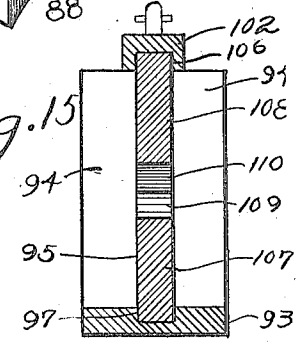


Fig. 15



Witness

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Patented Jan. 23, 1923. 1,442,962

UNITED STATES PATENT OFFICE.

EDWARD J. MILES, OF NEWTON, IOWA.

ASSEMBLING AND DISASSEMBLING TOOL.

Application filed June 22, 1921. Serial No. 479,554.

To all whom it may concern:

Be it known that I, EDWARD J. MILES, a citizen of the United States, and a resident of Newton, in the county of Jasper and State of Iowa, have invented a certain new and useful Assembling and Disassembling Tool, of which the following is a specification.

The object of my invention is to provide a tool of simple, durable and inexpensive construction for the convenient assembling and disassembling of generators, starting motors and other mechanism.

More particularly, it is my object to provide a tool, having parts conveniently arranged and constructed for readily taking apart mechanisms of the kind under consideration and putting them together with a maximum saving of time and work.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my device, whereby the objects contemplated are attained as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which:

Figure 1 shows a top or plan view of my improved tool, the dotted lines showing a generator in position.

Figure 2 shows a similar view with parts of the tool changed for accomplishing other operations, the dotted lines showing the rotor of a generator.

Figure 3 shows a side elevation of the device with the parts thereof in still another position.

Figure 4 shows an end elevation of the device showing the adjustable rear plate standards.

Figure 5 shows a top or plan elevation of one of the interchangeable plates.

Figure 6 shows a front elevation of the same.

Figure 7 shows a top elevation of another of said plates.

Figure 8 shows a side elevation of the same.

Figure 9 shows a top or plan view of another of said plates.

Figure 10 shows a front elevation of the same.

Figure 11 shows a side elevation of the plate shown in Figures 9 and 10.

Figure 12 shows a view, partly in section of a tubular accessory member.

Figure 13 shows a perspective view of a slightly different form of my invention.

Figure 14 shows a detail, sectional view taken on the line 14—14 of Figure 13; and

Figure 15 shows a vertical, sectional view taken on the line 15—15 of Figure 14.

When it is necessary to take apart a generator of the type used for instance on automobiles for starting purposes, there are gears, bearings and sleeves to be removed from shafts and various parts to be taken off which can be removed ordinarily with considerable difficulty.

In the ordinary garage and repair shop, there are few tools, which are especially adapted for the purpose and frequently in taking the generator apart by crude methods and with such tools as are at hand, the gears, bearings and delicate parts are injured. It is my purpose to provide a tool with which the entire process of taking the generator apart and putting it back together again may be readily and easily carried on in a minimum time with a minimum likelihood of injuring the delicate parts.

I will describe my improved tool in connection with the explanation of taking apart a well-known generator.

My tool comprises a supporting base indicated by the reference character 10, which may be bolted to a bench or the like, if desired.

At what I may call the front end of the base 10 is an upright member 11 forming the screw support, and in which the threaded rod or screw 12 is mounted. At the ends of the upright 11 are members 13 extending rearwardly from the support 11 adjacent to the outer side edges of the base 10, as shown for instance in Figures 1 and 2.

The members 13 form the front plate standards, and at their rear portions are provided with vertical grooves or slots 14 ar-

ranged to register with each other, as shown for instance in Figures 1 and 2, which slots are designed to receive plates. Mounted at the rear portion of the base 10 for longitudinal sliding movement with relation to said base is a cross member 15, having the rear plate standards 16, which are provided with the registering vertical grooves or slots 17 to receive plates hereinafter referred to.

The cross member 15 has on its lower side a downwardly projecting rib 18, having bevelled edges 19 arranged to coact with the bevelled edges 20 of a longitudinally arranged slot 21 in the rear portion of the base 10.

Mounted in the base 10 is a set screw 22 for locking the rib 18 to the cross member 15 and the rear plate standards 16 in any of the adjusted positions of said parts.

The screw 12 at its outer ends has flat sides 23 received between the arms 24 of a crank handle 25, which is pivoted to said screw by means of a pintle 26 extending through the arms 24 and the end of the screw 12.

At its inner end, the screw 12 has a reduced smooth-surfaced, cylindrical portion 27 at the inner end of which is a conical point 28.

The various detachable parts of my improved tool I will describe in connection with the explanation of the use of the tool.

A generator of the type to which I have above referred has an outer casing in which are secured the field windings. The outer casing has been indicated by dotted lines in Figure 1 by the reference character 29. At one end of the casing 29 is a movable plate 30.

Received within the casing 29 is the rotor 31, having the shaft 32 on one end of which is the pinion 33.

The base 10 is provided on its upper surface between the front and rear plate standards with laterally spaced longitudinally arranged ribs 34.

The first step in disassembling the generator involves the removal of the pinion 33. The pinion 33 has a hub 35. A pin 36 extends through the hub 35 and the shaft 32. In some generators, a nut is placed on the shaft.

In removing the pinion 33, the generator is placed lengthwise on the tool resting on the ribs 34. I use a plate, shown in Figures 5 and 6, and indicated by the reference numeral 37, which is slidably received in the grooves 14. The plate 37 has in its upper edge a suitable recess 38 designed to receive the shaft of the generator. In one side, the plate 37 has a vertical groove 40, shown in Figures 5 and 6.

The shaft 32 rests in the recess 38 and the pin 36 is arranged in line with the groove 40. The plate then forms a support for the shaft and the hub of the pinion 33, and the pin 36 can be easily driven out.

The plate 37 may be reversed and the shaft 32 rested thereon, whereupon the plate will serve as a mandrel to support the shaft for permitting the pin to be driven into the shole in the pinion hub and shaft.

When the parts are in the position just mentioned, the shaft 32 is in line with the screw 12. The screw 12 is rotated by means of the handle 25 until the inner end of the screw engages the shaft and forces it longitudinally away from the support 11 and out of the pinion.

The pinion 33 is held by the plate 37 and the shaft is simply forced out of the pinion. After the pinion has been removed, the plate 30 is removed from the casing 29 by taking out the screw bolts 41, after which the rotor 31 may be removed from the casing 29.

In Figures 7 and 8, I have shown another plate 43 having in one edge a recess 44, similar to the recess 38, but smaller than the recess 38. Adjacent to the recess 44 on one side of the plate 43 is a rabbet 45. At one side of the plate 43 is a small recess 46. In the edge of the plate 43 opposite the recess 44 is another recess 47 adapted to receive a shaft.

It will be understood that the plates herein mentioned are provided with recesses of suitable size and shape for supporting the work. When it is desired to remove the ball bearing device 42 from the shaft 32, the plate 43 is placed in the grooves 14, as shown in Figure 2, and the shaft 32 is placed in the recesses in the plate with the ball bearing structure in front of the plate. The screw bolt 12 can then be employed for forcing the shaft out of the ball bearing device.

When it is desired to remove the bearing 48, shown in dotted lines in Figure 1 and Figure 2, the plate 43 is inserted in the standards 13 after the removal of the plate 37 with the rabbet 45 at the front. The generator or the rotor is reversed end for end and placed so that the bearing 48 rests in the rabbet 45 and the shaft rests in the recess 44. The screw 12 can then be used for forcing the shaft from the bearing.

The ribs 34 help to hold the generator in position, as illustrated especially in Figure 4.

If it is desired to remove the screws 49, which extend through the casing 29 of the generator and hold the field windings in place, the generator is placed transversely in the recess 50 in the grooves 34, as illustrated by dotted lines in Figure 3. A plate 51 shown in Figures 9, 10, and 11, has spaced flanges 52 extending from one of its faces and formed with vertically spaced fingers 53. This plate is slipped into the rear plate

standards 16 with the flange 52 projecting forwardly and with the fingers 53 engaging the generator, as shown for instance in Figure 3.

I provide a screw driver element 54 angular in outline to receive a wrench, and having a screw driver bit formed on one end and at its other end a socket 56 adapted to receive the reduced end of the screw bolt 12. The screw bit is placed in the slot in the screw 49 and the screw 12 is manipulated until it is in position to hold the screw driver 54 in the slot in the screw 49. A wrench may then be placed on the screw driver 54 for the purpose of taking out or replacing the screw 49.

In reassembling the generator, the operations performed will be readily understood. The field windings are replaced and held in position by inserting the screws 49. The screws 49 may be tightened, if necessary, by placing the parts in the position shown in Figure 3, and using a wrench on the screw driver 54.

When it is desired to replace the bearings 48 and 42 or either of them on the rotor shaft, the plate 43 is placed in the rear plate standards with the proper notch or recess ready to receive the bearing 48 in the rabbet 45. The bearings are put on by hand as far as possible. The rotor is placed in position with the bearing 48 in the rabbet 45 of the plate 43. The tubular member 57 having the closed end 58 is placed with its open end abutting against the bearing 42 and with its opening in register with the shaft 32.

The closed end of the tubular member 57 has in its outer surface a centering recess 59. The end of the screw bolt 12 is placed in the recess 59 and the tubular member is forced rearwardly, thereby forcing the bearings onto the shaft 32. After the plate 30 has been replaced the pinion 33 may be forced onto the shaft 32. The plate 37 is placed in the rear plate standards flat side forward. The plate 43 is held with the screw bolt point 28 received in the recess 46. The rotor shaft is placed with its rear end against the plate 37 and in line with screw bolt 25. The hole in the pinion 33 is aligned with the front end of the shaft 32 and the screw is operated to force the plate 43 against the pinion for forcing the latter onto the shaft 32.

In Figures 13 to 15 inclusive, I have shown a slightly different form of my invention adapted for use with larger work.

In the form of invention shown in Figures 13 to 15, I have shown a front support 80, having the screw bolt 82 already described, mounted therein. At the ends of the support 80 are rearward extensions 81, having laterally projecting portions 82. Extending rearwardly from the lower part of the support 80 is a floor or bottom member 83.

The inner adjacent faces of the members 82 are provided with vertical slots 85 to receive the plates of the kind hereinbefore described and hereinafter mentioned.

The bottom 82 is also provided with transverse groove or slot 86, the ends of which register with the respective grooves 85.

In the members 81 and 82 are openings 87 and 88, as shown in Figure 13, which are rectangular in outline to receive bars 89. The inner holes are numbered 87, and the outer holes 88.

In the members 82 and 81 are holes 90 to receive pins 91. The bars 89 are each provided with a series of holes 92. By extending the pins selectively into the holes 92, it may be seen that the bars 89 may be locked against movement with relation to the members 81 or 82.

For ordinary work, the bars 89 are inserted through the openings 87, but where more space is necessary between the bars, they are inserted through the holes 88.

I provide another support comprising a base 93, having at its ends, the upright members 94 provided with suitable registering slots 95 on their inner adjacent surfaces. The upright members 94 have lateral extending parts 96.

The support or base 93 has in its bottom a slot or groove 97, the ends of which register with the upright grooves 95.

In the members 94 and 96 are holes 98 and 99, which correspond to the holes 87 and 88 in the member 80 and register therewith when the machine is assembled. The holes 98 and 99 are adapted to slidably receive the bars 89.

In the members 96 and 94 are holes 100 to receive pins 101 similar to the pins 91, which pins 101 may be inserted selectively into the holes 92 for locking the bars 89 with relation to the rear support.

Pivoted to the upper part of one of the members 94 is a locking bar 102, which has a hole 103 in its free end adapted to project over an ear 104, which projects upwardly from the other member 94. A pin 105 may be inserted through a suitable opening in the ear 104 for locking the bar 102 in its closed position.

On the underside of the locking bar or clamping device 102 is a groove 106, the ends of which register with the upper ends of the grooves 95, when the locking bar is in closed position.

The device shown in Figures 13 to 15 inclusive is used in a way similar to the use of the device heretofore described. The grooves 85 may be dispensed with, if desired.

In connection with either form of my de-

vice, plates 107 and 108 may be employed. The plates 107 and 108 may have recesses 109 and 110 of suitable size to receive work. The plates 107 and 108 are preferably made of such size that they may be superposed one upon the other in the receiving grooves with their notches adjacent to each other, so that a shaft or the like may be secured between the two plates.

These plates are also of such size that their edges are received in the grooves 97, 95 and 106, and the locking bar 102 may be locked down for holding the plates with the shaft or the like clamped between them.

The base 93 may be moved farther from or closer to the support 80 to accommodate the device to the nature of the work to be done.

It will be readily understood from the foregoing, that unless a proper tool is provided, the removal of the gear and bearings and the replacing thereof is a clumsy operation and if the bearings are pried off or knocked off, they are liable to be injured.

With a tool of the kind herein described, the parts may be assembled or taken apart without injury to any of the delicate members and in a minimum time.

The entire tool is inexpensive and simple of construction and all the parts may be packed in a small space for storage or transportation.

I claim as my invention:

1. In a device of the class described, a support, a screw mounted in said support, means for operating said screw, a spaced support having upright standards provided with registering grooves, and means for slidably connecting said supports.

2. In a device of the class described, a support, a screw mounted in said support, means for operating said screw, a spaced support having upright standards provided with grooves and a series of plates provided with work holding notches adapted to be selectively mounted in said grooves.

3. In a device of the class described, a support, a screw mounted in said support, means for operating said screw, a spaced support having standards provided with portions adapted to receive and hold plates, said standards being adjustably connected with said first support, and means for locking said standards in any of their adjusted positions.

4. In a device of the class described, a support, a screw mounted in said support, means for operating said screw, a pair of standards provided with registering grooves, a plate adapted to be received in said grooves having a notch to support work, said plate having a vertical groove in one side.

Des Moines, Iowa, May 3, 1921.

EDWARD J. MILES.