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PULLEY REMOVING DEVICE

Filed June 22, 1959

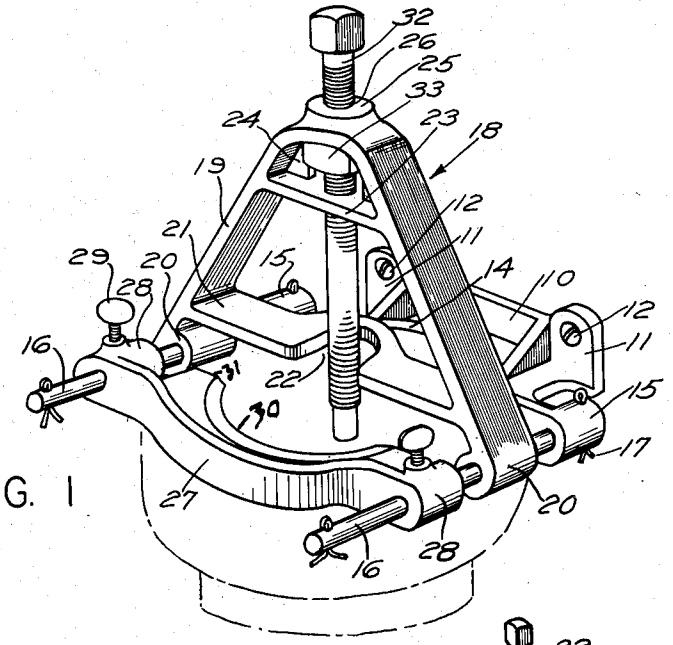


FIG. 1

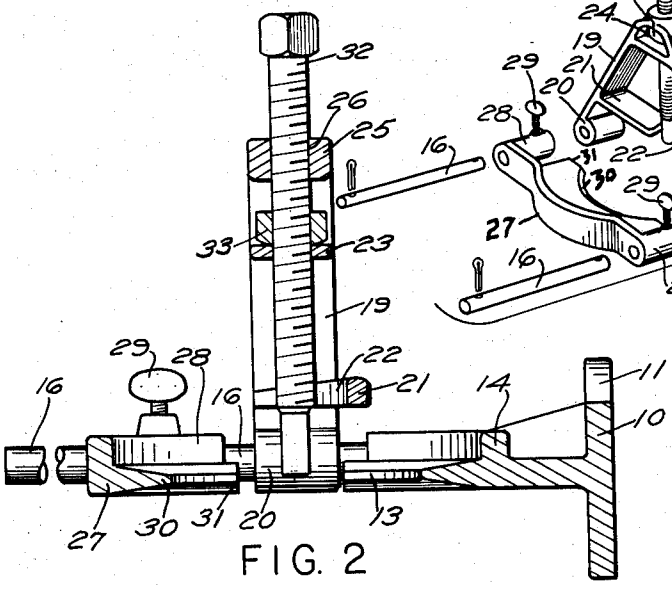


FIG. 2

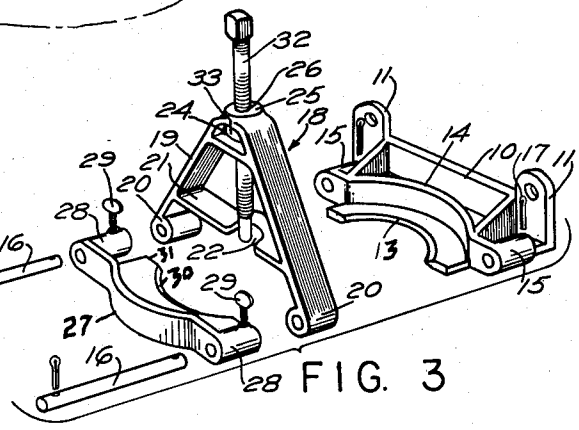


FIG. 3

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PULLEY REMOVING DEVICE

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My present invention relates to the tool art and more particularly to a device for removing a generator pulley for repairs.

The principal object of the present invention is to provide a device for easily and rapidly removing the pulley from a generator shaft.

Another object of the present invention is to provide a device which utilizes both pressure and shock for removing the pulley from a generator.

Another object of the present invention is to provide a simple and easily operable device for removing the pulley from the generator without distortion.

A further object of the present invention is to provide a device for removing a generator pulley which is simple in construction and easy and economical to manufacture and assemble.

With the above and other objects and advantageous features in view, my invention consists of a novel arrangement of parts more fully disclosed in the detailed description following, in conjunction with the accompanying drawings and more particularly defined in the appended claims.

In the drawings,

FIG. 1 is a perspective view of the device for removing the generator pulley in operable position.

FIG. 2 is a longitudinal section of the device in inoperable position.

FIG. 3 is an exploded perspective view of the device.

In the repair of automotive generators it is usually found necessary to remove the generator pulley. This pulley is retained on the shaft by friction. The usual method is to supply a clamp for holding the pulley and hammering at the end of the shaft. However, this is a very awkward position and it is difficult to clamp the pulley. Another method is to provide a three jaw clamp which holds the pulley while applying pressure on the shaft. This method frequently distorts the pulley or the shaft or both. The present invention is designed to provide a simple device which utilizes the best features of both methods. The device of the present invention is designed to simply and quickly clamp the generator pulley, apply pressure on the shaft, and then apply a hammering or a shocking action to break the friction grip and remove the pulley.

Referring more in detail to the drawings, the device comprises a base member **10** preferably of cast metal and having spaced ears **11** integrally formed at each end through which screws or bolts **12** may be inserted to mount the device on a wall or on a table. The device is illustrated in position to mount on a wall. However, it can be turned 90 degrees, mounted on a table, and will operate from that position. Integrally formed with the base **10** at the forward edge thereof is a tapered arcuate flange **13** having a semicircular shape. The base may be provided with a strengthening rib **14** extending parallel with the forward edge of the flange **13**. Extending integrally laterally from the base **10**, at each side edge is a heavy ear portion **15** on a transverse line rearwardly of the forward ends of the flange **13**. The ears **15** have longitudinal openings therein in which a pair of shafts **16** are mounted. Each shaft **16** is locked in its ear **15** by passing a cotter pin **17** through the portion **15** and shaft **16** as shown in FIG. 1. The shafts **16** are thus retained rigidly in spaced parallel relation and the distance between the shafts is greater than the largest size of pulley to be removed.

I now provide an A-shaped frame **18** which may also be in the form of an integral metal casting. The frame **18** is provided with slanted side walls **19** each terminating at its lower end **20** with a bearing portion having a longitudinal opening with a diameter slightly greater than the diameter of the shafts **16**. The frame **18** is thus slidably mounted on the shafts **16** and can be readily moved along the shafts. The frame **18** is provided with a lower integral transverse brace **21** having a U-shaped central cut out portion **22** in vertical alignment with the top center of the frame **18**. Adjacent to the top of the frame **18** but spaced therefrom is a second short transverse bar or brace **23** having a central opening. The bar **23** is provided with inwardly extending wall portions **24** extending from each end towards each other as shown in FIG. 1. The top of the frame **18** is provided with a flattened portion **25** having a central opening **26** in vertical alignment with the opening in the bar **23** and of the U-shaped cut out **22** in the bar **21**.

Mounted on the shafts **16** is a third casting **27** which comprises a transverse body portion having end bearings **28** with transverse openings of larger diameter than the shafts **10** so that it will slide freely on the shafts **16**. A wing bolt **29** extends through the portion **28** at each end so that the member **27** can be locked in any desired position along the shafts **16**. The member **27** is arcuate in the center portion curving opposite the flange **13** on the base **10** and complementary to it. It is provided with a tapered horizontal flange **30** similar to the flange **13** with the ends **31** extending forwardly of the portions **28** as shown in FIG. 2.

I now provide an elongated threaded bolt **32** of smaller diameter than the frame opening **26** and the opening in the brace **23**. A nut **33** which threadedly engages the bolt **32** is positioned on the brace **23** so that the bolt **32** passes through the opening **26**, threadedly engages the nut **33**, then passes through the opening in the brace **23** and extends through the U-shaped portion **22** on the brace **21**. The lower end of the bolt **32** may be unthreaded. Now referring to FIG. 1 the nut **33** is preferably rectangular and of such size that it can be positioned between the portions **24** but cannot be rotated between the portions **24**. Also, referring to FIG. 2, the distance between the top of the frame **18** and the brace **23** is greater than the thickness of the nut **33** leaving a space between the nut and the top of the frame.

In use, the generator shown in dotted lines in FIG. 1 is positioned so that the pulley is in a plane in alignment with the flanges **13** and **30**. The pulley is pushed towards the base until the groove in the pulley engages the flange **13** in the base. The member **27** is then pushed inwardly until its flange **31** enters the groove in the pulley on the opposite side. The curvature of the flanges are such that they will engage more than half the circumference of the pulley grooves. With the flanges entering the pulley groove the wing nuts **29** are tightened to lock the pulley in place. The frame **18** is now slid along the shafts **16** until the bolt **32** is in vertical alignment with the pulley shaft. The bolt **32** is now turned clockwise, the threads engaging the nut **33** which cannot turn. When the bottom end of the bolt **32** engages the pulley shaft on the generator additional movement will lift the bolt **32** upwardly against the top of the frame **18** as shown in FIG. 1. This is so because the bolt **32** is not threaded into the frame. The space is now between the brace **23** and the underside of the nut **33**. The bolt **32** is now tightened to provide a pushing strain on the generator shaft. However, it is not tightened to a point where the pulley or the shaft will become distorted. A

hammer can now be used to hit the top of the bolt **32** sharply to break the frictional engagement between the pulley and the shaft. It will be noted that the blow of the hammer will not strain the frame **18** or affect the threads on the bolt **32**. Since the bolt is actually loosely mounted in the frame it can travel downwardly the distance between the bottom of the nut **33** and the brace **23**. This is sufficient to cause a separation of the pulley from the shaft. The top of the A-frame **18** and the brace **23** help to align the bolt **32** and keep it from bending. A tight fit at this point is therefore unnecessary. It will be found in actual use that it is unnecessary to tighten the wing nuts **29** except in the most stubborn cases. The pulley is placed in position, the member **27** pushed inwardly and the bolt **32** tightened in a matter of minutes.

The device of the present invention can be used as a puller to remove V type grooved light weight pulleys made of sheet iron or non-ferrous metal in any construction where the pulley will tend to bend or fracture when excessive pressure is applied. The conventional three jaw puller commonly used, will ruin these V type, because they grip the pulley far out on the outer periphery. A heavy pull with this type puller will bend the grooves of the pulley and fracture the pulley clear to the hub. On most generators the jaws are too thick to go between the pulley and the end plate. Also, most arbor presses will not take these generator pulleys because the end plates are too big to go into the press.

The puller of the present invention grips the pulley down into the bottom of the grooved "V" nearest to the hub where the pulley is the strongest, because that is where the flanges that make up the pulley are fastened together. The device of the present invention has a wrap around effect which in most cases will contact from 75% to 100% of the circumference of the pulley. This type of contact, plus a steady continuous applied pressure by the bolt, makes the shocking action extremely effective in removing the pulley without damage.

I have thus provided a simple and effective device for removing a generator pulley from the shaft using pressure and a sharp blow. The hammering blow on the bolt does not wear the threads and the device provides a positive clamping action in a simple inexpensive construction. The device will operate either horizontally or vertically and can be used to remove other types of discs and pulleys from shafts. Other advantages of the present invention will be readily apparent to a person skilled in the art.

I claim:

1. A device for removing a pulley wheel from a shaft comprising a base member, spaced parallel supports extending forwardly from said base member, a clamping member slidably mounted on said supports for retaining a pulley wheel having a peripheral groove between said clamping member and said base member, and means slidably mounted on said supports between said base member and said clamping member for applying pressure on the pulley wheel shaft at right angles to a plane through said parallel supports, said pressure applying means comprising an A-shaped frame extending vertically from said supports and having bearing portions at its bottom ends slidable on said supports and extending at right angles to a plane through said supports, spaced parallel transverse braces extending between the sides of said frame, said frame and braces having vertically aligned openings, and a threaded bolt extending vertically through said openings, said openings being of greater diameter than said bolt, and a nut threaded on said bolt and positioned between the top of said frame and the upper of said transverse braces, said nut being thinner than the space between the upper end of said frame and said upper brace whereby said nut is free to move vertically between the upper end of said frame and said upper brace, said nut being trapped and held captive between said upper

end of said frame and said upper brace, the opening in said upper brace being smaller than the outer dimension of said nut, and means integral with said frame for restricting rotating movement of said nut, said base member comprising a generally elongated member having a bearing portion at each end for retaining said supports, the forward edge of said base member between said supports forming an arcuate flange for engaging the groove of the pulley wheel.

2. A device for removing a pulley wheel from a shaft comprising a base member, spaced parallel supports extending forwardly from said base member, a clamping member slidably mounted on said supports for retaining a pulley wheel having a peripheral groove between said clamping member and said base member, and means slidably mounted on said supports between said base member and said clamping member for applying pressure on the pulley wheel shaft at right angles to a plane through said parallel supports, said pressure applying means comprising an A-shaped frame extending vertically from said supports and having bearing portions at its bottom ends slidable on said supports and extending at right angles to a plane through said supports, spaced parallel transverse braces extending between the sides of said frame, said frame and braces having vertically aligned openings, and a threaded bolt extending vertically through said openings, said openings being of greater diameter than said bolt, and a nut threaded on said bolt and positioned between the top of said frame and the upper of said transverse braces, said nut being thinner than the space between the upper end of said frame and said upper brace whereby said nut is free to move vertically between the upper end of said frame and said upper brace, said nut being trapped and held captive between said upper end of said frame and said upper brace, the opening in said upper brace being smaller than the outer dimension of said nut, and means integral with said frame for restricting rotating movement of said nut, said base member comprising a generally elongated member having a bearing portion at each end for retaining said supports, the forward edge of said base member between said supports forming an arcuate flange for engaging the groove of the pulley wheel, said clamping member comprising an elongated member having a bearing portion at each end, said supports passing through said bearing portions, the edge of said clamping member facing said base member having an arcuate flange for engaging the groove of the pulley wheel.

3. A device for removing a pulley wheel from a shaft comprising a base member, spaced parallel supports extending forwardly from said base member, a clamping member slidably mounted on said supports for retaining a pulley wheel having a peripheral groove between said clamping member and said base member, and means slidably mounted on said supports between said base member and said clamping member for applying pressure on the pulley wheel shaft at right angles to a plane through said parallel supports, said pressure applying means comprising an A-shaped frame extending vertically from said supports and having bearing portions at its bottom ends slidable on said supports and extending at right angles to a plane through said supports, spaced parallel transverse braces extending between the sides of said frame, said frame and braces having vertically aligned openings, and a threaded bolt extending vertically through said openings, said openings being of greater diameter than said bolt, and a nut threaded on said bolt and positioned between the top of said frame and the upper of said transverse braces, said nut being thinner than the space between the upper end of said frame and said upper brace whereby said nut is free to move vertically between the upper end of said frame and said upper brace, said nut being trapped and held captive between said upper end of said frame and said upper brace, the opening in said upper brace being smaller than the outer dimen-

sion of said nut, and means integral with said frame for restricting rotating movement of said nut, said supports comprising shafts each having one end locked in said base member, said shafts passing through bearing portions on said clamping member and said A-shaped frame.

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