Dec. 11, 1923. 1,477,219

A. J. HALVORSEN

CLAMP

Filed Dec. 8, 1919 2 Sheets-Sheet 1

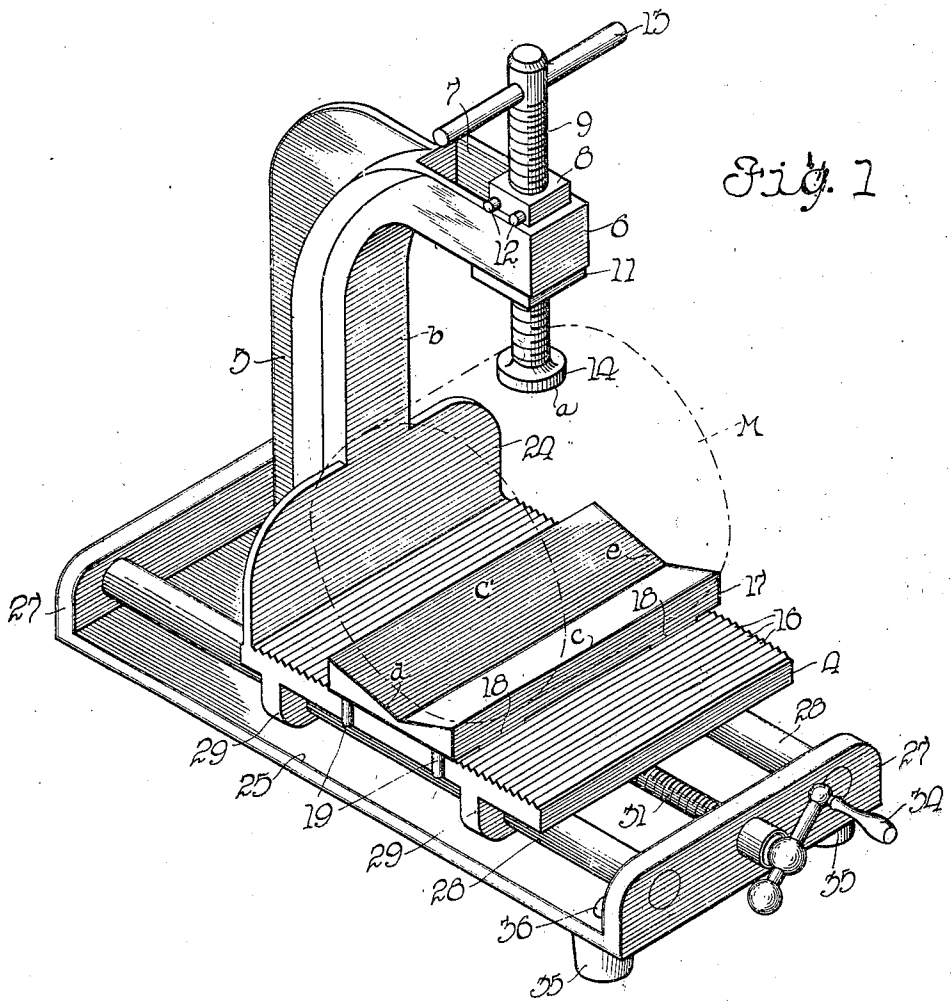


Fig. 1

Inventor
Albert J. Halvorsen
By Brown Bartucker & Dienner
Attorneys

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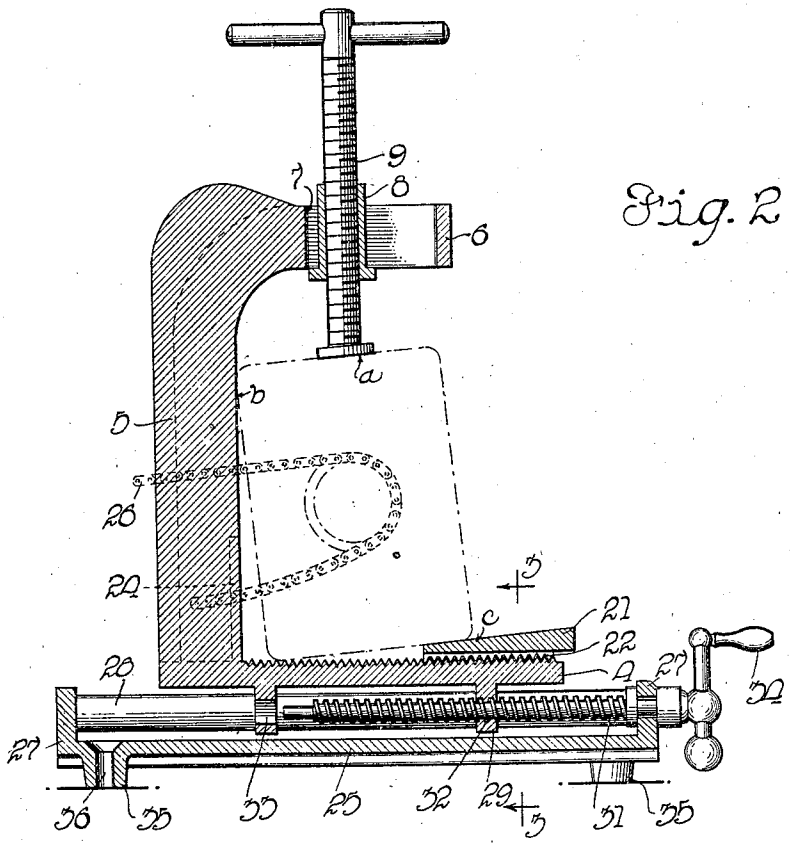


Fig. 2

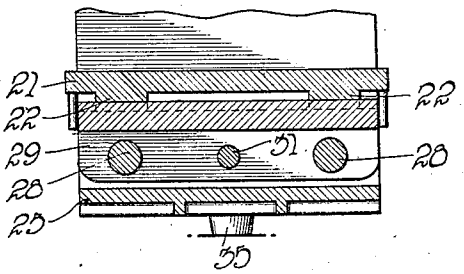


Fig. 3

Inventor
Albert J. Halvorsen
By Brown Bartcher & Kenner
Attorneys

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UNITED STATES PATENT OFFICE.

ALBERT J. HALVORSEN, OF CHICAGO, ILLINOIS, ASSIGNOR TO OLIVER E. BECKER, OF CHICAGO, ILLINOIS.

CLAMP.

Application filed December 8, 1919. Serial No. 343,440.

To all whom it may concern:

Be it known that I, ALBERT J. HALVORSEN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Clamps, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to clamps, and has general reference to a construction of universal clamp adapted to grasp objects of different sizes and different formations for rigidly holding the same.

In its more specific aspect, the invention relates to a universal clamping device for supporting small power units, such as electric motors, generators, and various other power appliances for performing tests upon the units to determine their torque, efficiency, speed characteristic, etc. The utility of this clamp resides particularly in the fact that quite frequently small motor or generator units are without any convenient means of mounting or support when removed from their permanent mounting in the machine, or other place of location, this having particular illustration in the electrical units removed from gasoline or electric vehicles, and consequently the mounting of the motor or generator unit preparatory to making the desired test is time-consuming and inconvenient. Even where the motor or generator is provided with a mounting base, the rigid mounting of the same on the testing block is inconvenient and difficult.

The primary object of the invention is to provide a form of universal clamp which will be applicable to the supporting of power units and other objects of various sizes and formations.

A secondary object of the invention is to devise a clamp of this description which will be shiftable with the object being clamped to impose greater or less tension on the testing belt or chain or for general adjusting for facilitating the performance of the testing operations.

As I have previously intimated, the invention is not necessarily limited to universal clamps for supporting electrical power units, but is capable of extensive adaptation to other apparatus, such as to vises and the like for supporting various objects being measured, tested or having machining operations performed thereon.

In the accompanying drawings:

Figure 1 is a perspective view of my improved clamp;

Figure 2 is a longitudinal sectional view of the same; and

Figure 3 is a transverse sectional view taken on the line 3—3 of Figure 2.

The clamp proper comprises a bed plate 4 and an integral upright standard 5, from which projects a forwardly extending portion 6. The standard 5 is of T-shaped section to give rigidity and strength to the standard. The extending portion 6 is slotted as indicated at 7 for the reception of a threaded bearing block 8 through which screws a vertical clamping screw 9. At its lower end the bearing block 8 is formed with an integral flange or collar 11, adapted to bear against the under side of the projecting head portion 6. At its upper end the bearing block is provided with pairs of short pins 12, which rest upon the upper margins of the slot 7 and support the bearing block. The mounting of the bearing block 8 in the slot 7 permits of a horizontal translational adjustment of the clamping screw 9 in addition to its vertical adjustment. The upper end of the clamping screw 9 is provided with a suitable pin or handle 13 and the lower end is provided with a swiveled head 14 for bearing upon the motor or other object being clamped. The swiveled head 14 is also arranged to have a certain degree of rocking motion relative to the stem 9, so as to permit the head 14 to adjust itself to inclined surfaces on the motor or other object being clamped.

Referring now to the construction of the bed plate 4, it will be noted that the entire upper surface thereof is formed with a series of transversely extending serrations or teeth 16. Adapted for longitudinal adjustment along this bed plate, is a transverse saddle block or supporting member 17 of shallow trough-shaped formation. This saddle block is designed to support the motor M or other unit being tested. Across the bottom of the saddle block 17 are formed longitudinally extending segments 18—18 which are formed with serrations or teeth meshing in the serrations 16 in the bed plate. The saddle block 17 is held against lateral shifting

by short pins 19 in its lateral edges, which embrace the sides of the bed plate 4.

When the motor M is relatively large and of general oblong formation, such as illustrated in Figure 2, it is preferable to substitute the saddle block 17 by a wedge block 21, so as to incline the motor and wedge it against the standard 5. In such arrangement the front surface of the standard 5 functions as a point of clamping support. The wedge block 21 is constructed similarly to the saddle block 17, being provided with toothed segments 22 adjacent its ends for engagement in the toothed surface of the bed plate, and being provided with guide pins 20 at its ends. It will be evident that a translational adjustment of either the saddle block or the wedge block is had by merely raising the same and shifting it along to the desired point on the bed plate and then replacing it in the teeth 16. By the provision of the toothed surfaces on the bed plate and supporting block this translational adjustment of the supporting block can be made by small degrees, and furthermore when in fixed position the supporting block is rigidly held against the vibration and strain of the motor. This same relation of interengaging toothed surfaces may be adapted to the bearing block 8 and slotted head portion 6, by providing serrations on the upper surface of the flange 11 and on the lower surface of the head portion, but this is not in the present case necessary as the serrations on the blocks 17 and 21 prevent shifting of the object which is being clamped. Supporting blocks of other forms than those herein shown may be provided for suitably supporting any special machinery or object of peculiar formation. The standard 5 is formed with lateral wing extensions 24, projecting up from the bed plate 4 for increasing the area of clamping support adjacent this portion of the standard. These wing extensions afford an extensive transverse clamping area for clamping objects which can be placed in contact with the lower portion of the standard so as to securely hold such objects against twisting in the transverse plane of the clamp. These wing extensions are made low, however, so as not to interfere with the testing chain. If desired, the generator may be so clamped that the shaft end carrying the pulley will project beyond the wings 24 and thus permit the driving chain to escape the wing, as shown in Figure 2.

The clamp proper, together with the motor M, is movable as an entirety along a stationary base 25, so as to provide for increasing or decreasing the tension on the chain or belt 26, or for performing other adjustments. The base member 25 is formed with upturned flanges 27 at its ends in which are mounted cylindrical guide bars 28—28. The bed plate 4 is slidably mounted on these guide bars by the provision of guide members 29—29 extending transversely across the bottom of the bed plate and provided with holes through which extend the guide bars 28. A lead screw 31 is journaled in the front end flange 27 and has threaded engagement in a hole 32 in the forward guide member 29. The rear guide member 29 is provided with an aligned hole 33 through which the lead screw is adapted to slide freely. It will be apparent that by rotation of the handle 34 on the front end of the lead screw the clamp and motor can be easily shifted to impose any desired tension on the driving belt or chain. The base member 25 is supported on three short supporting legs 35 through which pass screws or bolts 36 for rigidly fastening the device to the testing block or other working surface.

Referring now to the operation of the clamps, it will be observed that the swiveled head 14, the front face of the standard 5, and the sloping faces of the saddle and wedge blocks 17 and 21 constitute a plurality of points of clamping support, designated for reference, a, b, c and c' respectively. These points of clamping support all lie in the longitudinal plane of the clamp, in which plane the pull of the chain or the strain of the torque arm is at its maximum. In the transverse plane of the clamp the motor clamping point is afforded by the swivel head 14 and the two lower clamping points d and e, at the ends of the supporting block (Figure 1). From the above, it will be seen that the motor is always supported at three circumscribing points in both the longitudinal and transverse planes of the clamp, and as a result is rigidly held against movement in any direction.

It will be apparent that the several points of clamping support a, b, c and c' in the longitudinal plane of the clamp circumscribe or define a closed geometrical figure, which, by reason of the lateral and radial adjustments of the clamping points, is conformable in size and shape to accommodate the size and shape of the particular motor to be clamped. For example, when it is desired to mount a motor of oblong formation, such as is shown in Figure 2, one end of the motor is rested on the inclined slope of either the saddle block 17 or the wedge block 21 so as to incline the upper edge of the motor against the standard 5, and thereupon the clamping screw 9 is screwed down hard upon the opposite edge of the motor to rigidly clamp the motor in position. For motors of this general formation, but of greater or lesser breadth, the clamping points a and c are simply moved toward or away from the clamping point b by virtue of the translational adjustment of the clamping screw 9 and of the supporting

block. This translational adjustment of the clamping points *a* and *c* hence enables these clamping points to be always arranged in such relation as to circumscribe or embrace the object being clamped.

For mounting a motor of circular form, the saddle block 17 may be employed and the motor mounted as illustrated in Figure 1, either in or out of engagement with the standard 5; or the wedge block 21 may be employed and the motor wedged against the standard for its third point of clamping support. In the latter relation different sizes of motors can obviously be accommodated by the translational adjustment of the clamping screw and wedge block.

It will be apparent from the foregoing that practically any formation or size of power unit or other object can be accommodated in the clamp by the proper arranging and adjusting of the several clamping points.

After mounting the motor in the clamp, the clamp and motor may be shifted as an entirety along the guide rails of the base 25 in an obvious manner for the purpose of imposing tension on the driving connection, or for varying the frictional contact of a variable speed friction drive.

I do not intend to be limited to the particular details herein shown and described.

I claim:

1. In a universal clamp, clamping members affording a plurality of clamping points circumscribing a closed geometrical figure, and adjusting means for permitting translational motion in the longitudinal plane of said clamp of certain of said clamping points and radial motion relative to the geometrical center of said figure of one of said clamping points for modifying the size and formation of said figures.

2. In a universal clamp, a plurality of clamping members, said clamping members affording a plurality of points of clamping support defining a closed geometric figure, and adjusting means for permitting lateral translational adjustment of a plurality of said clamping points relative to said geometric figure and for permitting radial adjustment of one of said clamping points relative to the geometric center of said figure.

3. In a universal clamp, a bed plate, a supporting member thereon, a standard, a clamping member carried by said standard, and adjusting means for permitting a translational adjustment of said supporting member and said clamping member relative to said standard.

4. In a universal clamp, a bed plate, a supporting member thereon, a standard, a clamping member carried by said standard, adjusting means for permitting a horizontal adjustment of said supporting member and said clamping member relative to said standard, and means for permitting vertical adjustment of said clamping member.

5. In a device of the class described, a clamp comprising a bed plate, a supporting block movable along said bed plate, a standard, a clamping screw carried by said standard, means for permitting translational and longitudinal adjustment of said clamping screw relative to said standard, a base member, guide members on said base member for supporting said clamp, and means for traversing said clamp along said guide members.

6. In a device of the class described, a clamp comprising a bed plate, a supporting block movable along said bed plate, co-operating serrations in said bed plate and said supporting block for permitting locking adjustment between the two, a standard at one end of said bed plate, said standard comprising a head portion, a bearing block shiftably mounted on said head portion, a clamping screw carried in said bearing block, a base member, guide rails supported by said base member, said clamp being mounted on said guide rails, and a lead screw for traversing said clamp along said guide rails.

7. In combination, a universal clamp comprising a bed plate having a supporting member thereon, a standard, a clamping member carried by said standard, adjusting means for permitting translational adjustment of said supporting member and said clamping member relative to said standard, a base member for supporting said clamp, guides on said base member, said clamp being movable along said guides.

8. In combination, a universal clamp comprising a plurality of points of clamping support, said clamping points defining a closed figure, adjusting means for permitting lateral translational adjustment of one or more of said clamping points relative to said closed figure, and for permitting radial adjustment of one of said clamping points relative to said closed figure, a base for said clamp, and guide means on said base, said clamp being shiftable along said guide means, said shifting being independent of said adjustable means.

9. In a universal clamp, a corrugated bed, a corrugated supporting block adjustable on said bed, a support stationary with relation to said bed, a nut shiftable along said support, and a clamping screw threading through said nut and co-operating with said supporting block.

10. In a universal clamp, a corrugated bed, a corrugated supporting block adjustable along said bed, a superposed supporting member, said supporting member being slotted, a nut shiftable in said slot parallel to the adjusting motion of said supporting

block, and a clamping screw threading through said nut.

11. In a universal clamp, a corrugated bed, a corrugated supporting block adjustable along said corrugated bed, means for laterally guiding said supporting block on said bed, a slotted standard above said bed, a nut shiftable in said slotted standard, parallel to the adjusting motion of said supporting block, means for guiding and supporting said nut in said slot, a clamping screw threading through said nut, a base member having guides thereon, said corrugated bed being mounted on said guides, and means for shifting said bed along said guides.

12. In a universal clamp, a bed plate, the surface of said bed plate being serrated, a supporting block having co-operating serrations and adapted for adjustable positioning on said bed plate, a standard rising from one end of said bed plate, said standard comprising a slotted head portion, a shiftable bearing block supported in said slotted head portion, and a clamping screw threading through said bearing block.

13. In a universal clamp, clamping members affording a plurality of clamping points circumscribing a closed geometrical figure, one of said clamping members being removably seated with respect to its support, and interlocking means between said clamping member and its support to prevent accidental longitudinal or transverse shifting of the clamping member.

14. In a clamp, a bed plate, a horizontally adjustable supporting member on said bed plate, a vertical standard projecting from said bed plate, and a clamping member carried by said standard having horizontal adjustment relative thereto to compensate for the horizontal adjustment of said supporting member.

In witness whereof I hereunto subscribe my name this 4th day of December 1919.

ALBERT J. HALVORSEN.