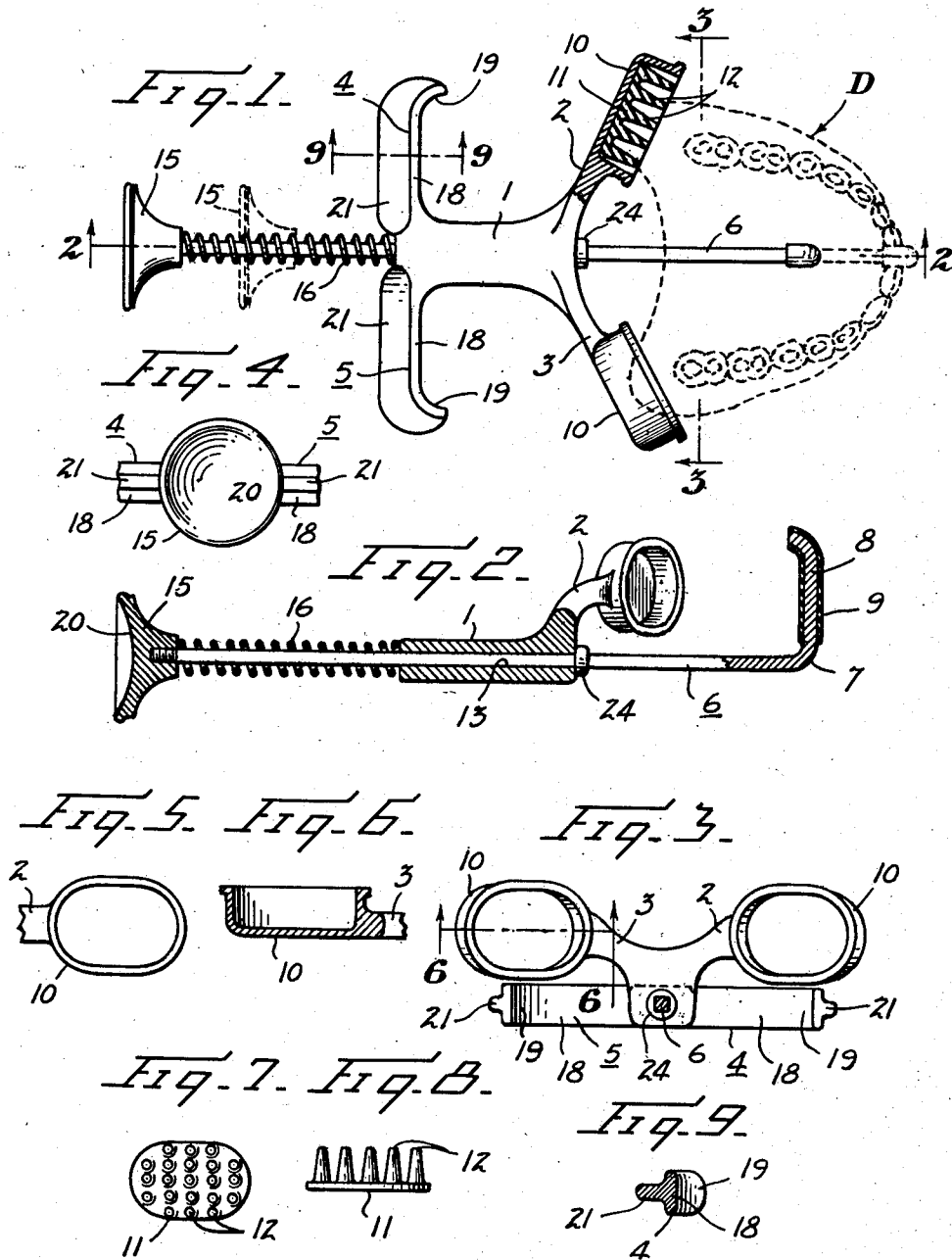


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CLAMP FOR HOLDING DENTURES

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CLAMP FOR HOLDING DENTURES

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This invention relates to devices for holding dentures and more particularly to an improved clamp for yieldingly gripping a denture plate to hold it for cleaning or repairing.

Denture clamps heretofore known have not been entirely satisfactory for numerous reasons. One of the principal objections to conventional clamps is that severe or localized stresses are imposed on the denture and the rather fragile and delicate construction of some dentures results in fracture or other damage.

Conventional clamps are frequently difficult to manipulate and require considerable manual dexterity in mounting a denture plate that is to be cleaned or repaired. Clamps which are easy to manipulate and which properly cushion the denture have usually been quite complicated and costly.

The present invention has, therefore, as its principal object, the provision of a generally improved denture clamp that is simple in design and construction and relatively inexpensive to manufacture and that yieldingly cushions delicate and fragile portions of a denture held thereby while yet being easy to manipulate or handle in mounting or removing a denture.

Another object is to provide a denture clamp of the character mentioned which is both light in weight and is conveniently handled for manipulating a clamped denture in servicing or cleaning the latter.

Another object is to provide such a denture clamp which is designed so as to present smooth contours and fully exposed surfaces and which can be easily disassembled to facilitate cleaning and sterilization of the clamp.

A more specific object is concerned with the provision of a denture clamp incorporating a spring pressed or biased member that yieldingly engages the denture, the device also incorporating resilient cushions or pads for engaging fragile portions of a denture held thereagainst by the spring biased member. According to a specialized version of the invention, the device comprises a body member in which a spring biased clamping rod is slidably mounted, the body member having offset denture receiving portions desirably in the form of a pair of spaced obliquely disposed cups, and the rod having an offset portion fitted with a rubber cushion for engaging the curved frontal portion of a conventional denture and holding the heel of the denture against the cups in a three point suspension of the denture.

Other objects and advantages of the inven-

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tion relate to certain novel details of construction and combinations and arrangements of parts set forth in the following detailed description of a preferred embodiment. This description is made in connection with the accompanying drawings forming a part of the specification.

In the drawings:

Figure 1 is a plan view, partly in section and with parts broken away and removed, of the improved denture clamp device showing diagrammatically and by broken lines a denture plate held by the device;

Fig. 2 is a longitudinal sectional view through the denture clamp with the rubber cushion pad removed from the cup, the section being taken substantially along the line indicated at 2—2 of Fig. 1;

Fig. 3 is a transverse sectional detail taken substantially along the line 2—3 of Fig. 1, the rubber pads being removed from the cups in this view;

Fig. 4 is an end view of the device, with parts broken away and removed, showing the actuating button or handle;

Fig. 5 is a fragmentary elevational detail showing one of the cups for receiving the heel part of the denture, the rubber cushion or pad being removed;

Fig. 6 is a fragmentary sectional detail through one of the heel receiving cups, this view being taken substantially along the line indicated at 6—6 of Fig. 3 and the rubber cushion or pad being removed;

Fig. 7 is a plan view of one of the rubber cushions or pads removed from the cup in which it is supported on the body of the device;

Fig. 8 is an elevational view of the rubber cushion or pad; and

Fig. 9 is a sectional detail through one of the limbs or handle portions of the body, this view being taken substantially along the line indicated at 9—9 of Fig. 1.

The clamping device of the present invention comprises a body member 1 bifurcated at opposite ends in the provision at one end of a pair of divergent denture supporting limbs 2 and 3 that receive the denture heel, and at the other end of oppositely directed handle limbs 4 and 5 which receive the fingers of the operator. The body member, together with the integral pairs of limbs at its ends, is formed as by casting of a light metal such as zinc or aluminum. A smooth corrosion resisting finish may be provided on the surface of the body as by plating. For producing a cheap device which need not

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withstand rough treatment and high temperatures such as encountered in sterilizing apparatus, a plastic material or even a stiff rubber composition may be used for the body.

Extending longitudinally through the body and freely slidable therein for relative endwise movement is a clamping member in the form of a metal rod 6. This rod and passage 13 in which it is guided in the clamping body 1 are complementally shaped to a square or other noncircular section as shown in Fig. 3 to prevent turning of the rod in or relative to the body.

The slide path of the rod, which coincides with its longitudinal axis, bisects the angle between the divergent denture receiving limbs 2 and 3. The rod projects beyond the body 1 and is bent at 7 to provide an angularly disposed denture engaging hook portion 8 located in the angle between the denture supporting limbs. This denture engaging portion or rod end is thus in offset relation and approximately at 90° to the rod axis. A cushion in the form of a soft rubber tube 9 is drawn and stretched over the rod end 8 to resist slippage and to prevent damage or surface injury to a denture engaged by this part of the clamping member.

At their outer ends the limbs 2 and 3 are each formed with an integral cup 10 for receiving and supporting a heel part of denture D (Fig. 1). These spaced cups have openings disposed in planes which are intersected by the slide path or axis of the clamping rod 6 at a common point and at acute angles. The cup openings are thus oblique to the rod axis and are directed slightly toward one another, being in obtusely angled planes. The two cups are on opposite sides of the clamping rod and are spaced to receive corners of the heel portion of denture D in symmetric relation. Within each of the cups 10 is a resilient rubber cushion which may take the form of a sponge rubber or foam latex pad but preferably comprises a molded rubber base 11 and a multiplicity of integral closely spaced upstanding prongs 12. As shown in Figs. 3 and 5 the cups 10 are each oval in form, being elongated in the direction of their common axis to accommodate dentures of different widths and sizes. The base portions 11 of the rubber cushions are formed substantially to the same oval or elliptical shape as the interior of the cups 10 and are molded slightly larger than the cup openings so as to be slightly compressed and confined by the cup walls. This confinement of the rubber pads by the surrounding cup walls frictionally retains the pads or cushions within the cups for normal use while permitting removal of the pads for cleaning or sterilization. The upstanding prongs 12 of the cushion pads are laterally unstable and readily yield under localized pressure applied by part of the heel portion of the denture. This yielding or deformation of the rubber cushion accommodates the irregularly shaped heels of various types and sizes of dentures and the prongs 12 distribute the pressure applied to the rubber cushions by the denture heel to eliminate concentrated stress on the clamped denture and thereby prevent fracture and breakage. As shown in Fig. 1 the height of the rubber cushion pad is the same as the depth of the cup 10, or substantially so, to locate the tip ends of the yielding prongs 12 in or adjacent the plane of the cup opening. The cup walls thus support the outermost of the prongs 12 against excessive lateral deflection and prevent dislodgment of the denture heel from the cups or one of them.

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At the end of the body 1 opposite the denture clamping limbs 2 and 3 the rod 6 projects between the oppositely directed hand grip limbs 4 and 5 and receives a button or handle 15 screwed onto the threaded end of the rod. The handle is spaced from the denture body to accommodate a helical coil compression spring received about the rod in this space. The spring normally biases the rod so as to draw it to the left as viewed in Figs. 1 and 2 for the purpose of clamping a denture between the angularly disposed hook portion 8 of the rod end and the heel receiving cups 10 of the clamp body. This three point clamping action is indicated by the broken lines of Fig. 1 which show the displacement of the rod 6 from its normal position to the right in the accommodation of the denture D. This displacement results in compression of the spring 16 which thereby holds the rubber covered rod end 8 pressed yieldingly against the curved frontal surface portion of the denture. A stop in the form of a metal washer 24 is secured on the rod 6 as by brazing and engages the end of the body 1 to limit the travel of the rod.

Each of the handle or hand grip limbs 4 and 5 is formed with a broad surfaced finger receiving pad portion 18 curved at its outer end toward the cup end of the body as indicated at 19. The front sides of the pad portions 18, being the sides directed toward the cups 10, are engaged by the fingers of the operator manipulating the clamp, the thumb or palm of the operator's hand being then conveniently pressed against the concave end face 20 of the button or handle 15 in applying endwise pressure to the rod 6. Thus the device is conveniently held and manipulated by one hand in releasing a clamped denture or in opening the parts in providing the necessary clearance between the cups and the clamping end 8 of the rod to receive a denture to be clamped. Reinforcing ribs 21 may be formed integrally on the rear faces of the oppositely directed grip limbs 4 and 5.

It is thus apparent that the denture clamp described is convenient to use and securely holds dentures of various shapes and sizes in a yielding three point grip which leaves the denture fully exposed for cleaning or repair. The few parts of the clamp can be easily disassembled as by unscrewing the handle button from the rod 6 for cleaning or sterilization. Replacement of damaged or worn parts of the clamping device is also facilitated by this simple construction.

In accordance with the patent statutes the principles of the present invention may be utilized in various ways, numerous modifications and alterations being contemplated, substitution of parts and changes in construction being resorted to as desired, it being understood that the article shown in the drawings and described above is given merely for purposes of explanation and illustration without intending to limit the scope of the claims to the specific details disclosed.

What we claim and desire to secure by Letters Patent of the United States is:

1. A grip for holding a denture plate of the type having a heel portion and a curved frontal portion, said grip comprising a body member having a bifurcated end providing divergent limbs, said limbs being formed with cups for receiving spaced parts of the heel portion of a denture plate, a rod carried by the body member and guided thereby for longitudinal sliding movement along an axis located in the angle between the limbs of the body, means on the rod for engaging

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the curved frontal portion of a denture plate, and means resiliently biasing the rod to draw the plate engaging means of the latter toward the body member in gripping a denture plate between said last named means and the plate receiving limbs of the body member.

2. A grip for holding a denture plate of the type having a heel portion and a curved frontal portion, said grip comprising a body member bifurcated at both ends in the provision at one end of divergent limbs, said limbs being formed with cups for receiving spaced parts of the heel portion of a denture plate and at the other end of divergent limbs for receiving the fingers of an operator, a rod guided by the body member for relative longitudinal sliding movement along an axis bisecting the angle between the plate receiving limbs, means on one end of the rod for engaging the curved frontal portion of a denture plate, the other end of the rod projecting between said other divergent limbs and being engageable by the thumb or palm of an operator whose fingers are received by said other limbs, and means resiliently biasing the rod to draw the plate engaging means of the latter toward the body member in gripping a denture plate between said last named means and the plate receiving limbs of the body member.

3. A grip for holding a denture plate of the type having a heel portion and a curved frontal portion, said grip comprising a body member having a bifurcated end providing divergent limbs, said limbs being formed with cups for receiving spaced parts of the heel portion of a denture plate, a rod embraced by the body member and guided thereby for longitudinal sliding movement along an axis located in the angle between the limbs of the body, means on the rod for engaging the curved frontal portion of a denture plate, the rod and the body member being constrained against relative turning to retain the plate engaging means on the rod in predetermined orientation, and means resiliently biasing the rod to draw the plate engaging means of the latter toward the body member in gripping a denture plate between said last named means and the plate receiving limbs of the body member.

4. A grip for holding a denture plate of the type having a heel portion and a curved frontal portion, said grip comprising a body member bifurcated at both ends in the provision at one end of divergent limbs, said limbs being formed with cups for receiving spaced parts of the heel portion of a denture plate and at the other end of divergent limbs for receiving the fingers of an operator, and means movably mounted on the body for engagement with a denture plate placed against the heel receiving limbs, said plate receiving limbs being offset from the plane of the body member, said plate engaging means including one element extending into the angle between the heel receiving limbs and another element extending through and beyond the other end of the body member into the angle between the finger receiving limbs for engagement by the palm or thumb of the operator whose fingers are received by the divergent limbs on said other end of the body.

5. A grip for holding a denture plate of the type having a heel portion and a curved frontal portion, said grip comprising a body member bifurcated at both ends in the provision at one end of divergent limbs, said limbs being formed with cups for receiving spaced parts of the heel portion of a denture plate and at the other end of

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divergent limbs for receiving the fingers of an operator, means movably mounted on the body for endwise sliding movement and for engagement with a denture plate placed against the heel receiving limbs, said plate engaging means including one element extending into and substantially bisecting the angle between the heel receiving limbs and extending to a point beyond the ends of such limbs, the said plate engaging means also including another element extending into the angle between the finger receiving limbs and to a point beyond the ends of the finger receiving limbs for engagement by the palm or thumb of the operator, and resilient means biasing the plate engaging means normally to grip a denture plate placed between the heel receiving cups of said first mentioned limbs and said one element of the plate engaging means.

6. A grip for holding a denture plate of the type having a heel portion and a curved frontal portion, said grip comprising a body member having a bifurcated end providing divergent limbs, rubber pads mounted on the limbs in spaced relation for receiving spaced parts of the heel portion of a denture plate, a rod carried by the body member and guided thereby for longitudinal sliding movement along an axis located in the angle between the limbs of the body, means on one end of the rod for engaging the curved frontal portion of a denture plate, means on the other end of the rod to be engaged by the operator in applying endwise pressure to the rod, and a spring carried by the rod and disposed between the body member and one of the rod ends for resiliently biasing the rod normally to grip a received denture plate between the plate engaging means of the rod and the limbs of the body.

7. A grip for holding a denture plate of the type having a heel portion and a curved frontal surface portion, said grip comprising a body member having in one end spaced cups adapted to receive spaced parts of the heel portion of a denture plate, an elongated clamping rod, means guiding the rod for longitudinal sliding movement relative to the body member, said rod having a longitudinal axis located between the cups and the cups each having an opening for receiving a denture plate heel part in a plane which intersects the axis of the rod, means on the rod for engaging the frontal surface of a denture plate the heel parts of which are received in the cups, and resilient means within the cups for cushioning the received denture heel parts and distributing clamping pressure thereon.

8. A grip for holding a denture plate of the type having a heel portion and a curved frontal surface portion, said grip comprising a body member having in one end spaced cups adapted to receive spaced parts of the heel portion of a denture plate, an elongated clamping rod, means guiding the rod for longitudinal sliding movement relative to the body member, said rod having a longitudinal axis located between the cups and the cups each having an opening for receiving a denture plate heel part in a plane which intersects the axis of the rod, means on the rod for engaging the frontal surface of a denture plate the heel parts of which are received in the cups, and rubber pads in the cups for cushioning denture heel parts, said pads each comprising a rubber body disposed against the bottom of the cup and a multiplicity of upstanding integral rubber prongs distributed over the surface of the rubber body, the prongs each being laterally deflectable in deforming to accommodate localized

pressure applied by a received denture heel part.

9. A grip for holding a denture plate of the type having a heel portion and a curved frontal surface portion, said grip comprising a body member having in one end spaced cups adapted to receive spaced parts of the heel portion of a denture plate, an elongated clamping rod, means guiding the rod for longitudinal sliding movement relative to the body member, said rod having a longitudinal axis located between the cups and the cups each having an opening for receiving a denture plate heel part in a plane which intersects the axis of the rod, said rod being formed at one end with an angularly disposed portion of engaging the frontal portion of a denture plate, and means resiliently biasing the rod normally to draw the plate engaging portion toward the body member for gripping a received denture plate between the cups and said plate engaging portion of the rod.

10. A grip for holding a denture plate of the type having a heel portion and a curved frontal surface portion, said grip comprising a body member having in one end spaced cups adapted to receive spaced parts of the heel portion of a denture plate, an elongated clamping rod, means guiding the rod for longitudinal sliding movement relative to the body member, said rod having a longitudinal axis located between the cups and the cups each having an opening for receiving a denture plate heel part in a plane which intersects the axis of the rod, said rod being formed at one end with an angularly disposed portion for engaging the frontal portion of a denture plate, means resiliently biasing the rod normally to draw the plate engaging portion toward the body member for gripping a received denture plate between the cups and said plate engaging portion of the rod, and means constraining the rod and the body member against relative turning and retaining the angularly disposed portion of the rod in a plane substantially bisecting the angle between the planes of the cup openings.

11. A grip for holding a denture plate of the type having a heel portion and a curved frontal portion, said grip comprising a body member, a clamping rod carried by the body member and longitudinally slidable relative thereto, said rod being formed at one end with an angularly disposed portion for engaging the frontal portion of a denture plate, said body member being formed with a portion at one end thereof having a pair of divergent limbs one on each side of the rod, each limb including a cup adapted to receive the heel portion of a denture plate, said heel receiving cups both being in a plane laterally offset from the longitudinal axis of the rod, the rod and the body member being constrained against relative turning to retain the plate en-

gaging portion of the rod in predetermined orientation to the body in all positions to which it is slidable, the angularly disposed portion of the rod extending from the rod axis toward the plane of the denture receiving cups, and resilient means biasing the rod normally to draw the angularly disposed plate engaging end toward the offset heel receiving cups in the limbs of the body in gripping a received denture plate therebetween.

12. A denture grip comprising a body member formed at one end with a pair of spaced cups for receiving spaced parts of the heel of a denture plate and formed at the opposite end with spaced finger receiving pads, a rod guided by the body member for longitudinal sliding movement, said rod having on one end means for engaging the frontal surface of a denture plate the heel of which is received in the cups, means biasing the rod to draw it yieldingly in a direction to grip a denture plate between said denture engaging means and the cups, and means on the other end of the rod for receiving pressure from the palm or thumb of the hand of an operator having fingers disposed against the pads to shift the rod longitudinally on the body member and against the force of the biasing means in releasing a gripped denture plate and in opening the grip to receive a denture plate.

13. A grip for holding a denture plate of the type having a heel portion and a curved frontal portion, said grip comprising a body member and a slide member mounted and guided one on the other for relative sliding movement, one of said members being formed with spaced cups to receive spaced parts of the heel of a denture plate, the other member having means for engaging the frontal surface of a denture plate the heel of which is received in the cups, resilient means biasing the members to slide one on the other in a direction to grip a denture plate between said denture engaging means and the cups, and means on the members for receiving the fingers and thumb or palm of an operator to shift the members relatively one on the other and against the force of the biasing means in releasing a gripped denture plate and in opening the grip to receive a denture plate.

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