Oct. 20, 1953 F. D. AMMEN 2,655,927

SPRING CLAMP

Filed Aug. 14, 1950

Fig. 1

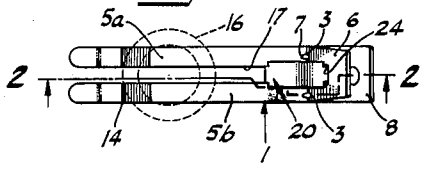


Fig. 2

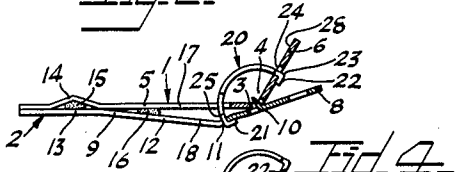


Fig. 4

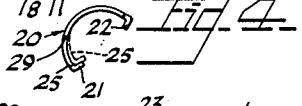


Fig. 5

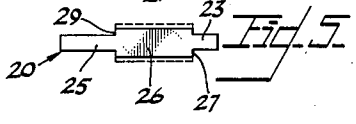
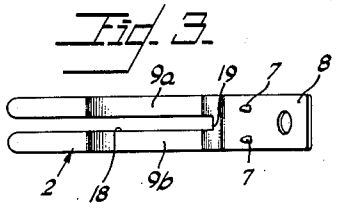


Fig. 3



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SPRING CLAMP

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Application August 14, 1950, Serial No. 179,158

7 Claims. (Cl. 132—46)

1

This invention relates to spring clamps.

While the invention is closely related to the invention disclosed in Reissue Patent No. 23,163, granted to Kenneth Reiner, et al. on the 1st day of November, 1949, titled Clamps, the present invention facilitates providing a spring of increased power or resilient force, if desired, without necessitating changing the material out of which the entire clamp is constructed.

In the patent referred to above, two cooperating clamping members are provided, constructed in such a way that they are enabled to rock upon each other on a transverse axis. These two members include jaw-members or jaw-extensions that lie close together when the clamp is closed, to enable them to clamp a flat curl. The other ends of the clamping members constitute handle portions, and when the clamp is in its closed position, they extend in a general radial direction from the axis referred to; and when they are pressed toward each other, the jaw-members are forced apart, this movement being resisted by a bow-spring that is integral with one of the clamping members. In the patent referred to, the jaw-extensions are bifurcated so that slots are formed in the jaw-extensions, extending toward their outer ends. The bow spring referred to is formed integral with one of the clamping members, and extends through its said longitudinal slot and is formed with a hook that hooks into a transverse edge of the other clamping member, which edge is disposed transversely at the inner end of the longitudinal slot in its jaw-member. That construction, involving the forming of the bow-spring integrally with one of the clamping members, imposes a structural limitation on the width of the bow-spring, because the width of the spring is limited practically by the width of the clamping member from which it is struck, and by the fact that it should be sufficiently narrow to enable it to pass through the slots between the forks of the two clamping members. One of the objects of the present invention is to provide a spring clamp of this type, having features of construction that will enable the bow spring if desired, to have a greater width, in its body at least, than the width of the slots in the jaw-extensions of the clamp, through which the ends of the spring pass.

Another object of the invention is to provide a spring clamp having the advantageous features of the clamp disclosed in the said patent, but in which the bow-spring can be formed as a separate piece distinct from both of the clamping members, thereby enabling it to be made of a

2

material differing in its resiliency characteristics from the material out of which the two clamping members are formed; also to provide the bow-spring and the clamping members with correlated features of construction that will enable the spring to be readily placed in its position with relation to the clamping members, and which will enable the spring to hold itself in position, with the clamping members normally pressed together in their clamping position.

Another object of the invention is to provide a construction or form for the bow-spring, that will enable it to operate as a stop to limit the amount of opening through which the jaws of the clamp will swing in passing from their closed position to their full open position; the general purpose in accomplishing this object being to increase the efficiency of the clamp when in practical use.

Further objects of the invention will appear hereinafter.

The invention consists in the novel parts and combinations of parts to be described hereinafter, all of which contribute to produce an efficient spring clamp.

A preferred embodiment of the invention is described in the following specification, while the broad scope of the invention is pointed out in the appended claims.

In the drawing:

Figure 1 is a plan of a spring clamp embodying my invention, showing the same in its closed position. In this view the approximate outline of a flat curl held in the clamp is indicated in dotted lines.

Fig. 2 is a vertical section through the clamp illustrated in Fig. 1, taken on the line 2—2 of Fig. 1.

Fig. 3 is a plan of the lower clamp member shown in Figs. 1 and 2, with the upper clamp member removed.

Fig. 4 is a side elevation of the bow-forming spring illustrated in Fig. 2 and showing the same in substantially the same condition of expansion and stress that it has in Fig. 2; in this view dotted lines indicate the position the lower portion of this spring would assume if the upper end of the spring were held fixed while its lower end is permitted to resume the form that it would have when not under the influence of any stress or expanding force.

Fig. 5 is a plan view of a blank of preferred form, which may be employed in producing the bow spring; in this view, dotted lines indicate the form this blank would assume if increased power

or resilient force should be a requisite of the spring.

In practicing the invention as applied to the type of clamp disclosed in the reissue patent referred to above, the clamp includes two clamping members referred to hereinafter specifically as the first clamping member 1, and the second clamping member 2. These two clamping members are provided with correlated means enabling them to rock upon each other on a transverse axis. In the present instance, this means for effecting this connection is the same as illustrated in the reissue patent, and includes two spurs formed on one of the members, and small eyes or openings formed on the other member to register therewith. The eyes 3 are preferably formed at the vertex of the dihedral angle 4 that is formed between the jaw-extension 5 of the first member 1 and its integral handle extension 6. The spurs 7 that project up into the eyes 3 are disposed at the inner end of the handle extension 8 of the second clamping member that is formed integrally with the jaw-extension 9 of the second member 2.

When the two clamping members are superposed upon each other as shown, the handle extensions 6 and 8 extend in a substantially radial direction from the axis on which the clamping members rock when the clamp is being opened or shut. At the point where the spurs 7 are located, the material of the jaw-extension 9 is located slightly out of line with the plane of the handle extension 8 so that a relatively obtuse angle 10 is formed at this point, that forms a rudimentary socket for the vertex of the dihedral angle 4.

Toward the outer ends of the jaw-extensions 5 and 9, the material of the clamping member 2 is bent downwardly away from the plane in which the upper jaw-extension 5 is located, to form a downwardly offset extension 11, and beyond this point the material is bent upwardly in an inclined position to form an intermediate extension 12 that carries the integral jaw 13. This jaw 13 in this type of clamp, is substantially parallel with the plane of the upper jaw-extension in the closed position of the clamp; and superposed over this jaw 13, when the clamp is to hold a curl, the jaw-extension 5 is bent upwardly as indicated at 14 to form an angular socket 15 for holding one side of a flat curl 16 illustrated in section in Fig. 2, and in plan by the dotted lines in Fig. 1.

In this type of clamp the jaw extension 5 is bifurcated so that it has two forks 5a and 5b, and the jaw-extension 9 is also bifurcated so that it has two forks 9a and 9b. The forks of both of the clamping members are substantially the same width so that two superposed slots 17 and 18 are formed, which are in alignment with each other.

The slot 18 extends into the downwardly offset extension 11, and the end of this slot is formed by a transverse edge 19 (see Figures 2 and 3).

The two jaw-extensions 5 and 9 are resiliently and yieldingly biased toward their closed position by a bow-form spring 20 the ends of which are attached respectively in, or to, the handle extension 6 of the first clamping member, and to the jaw-extension of the clamping member 2. This bow-form spring is disposed substantially along an arc such that when it is in position as indicated in Fig. 2, the center of the arc preferably substantially coincides with the axis on which the two clamping members rock.

In order to anchor or secure the ends of this bow-form spring, I prefer to employ a lateral extension or hook 21 at the lower end of the spring, that is hooked onto the transverse edge 19. At the upper end of the spring 20 a hoook 22 is formed, and these two hooks are formed by bending the material of the spring inwardly toward the vertex of the dihedral angle 4. The hook 22 is formed on a relatively short tongue 23 that constitutes the upper end of the spring, and which projects through a slot or opening 24 that is formed in the handle extension 6, wide enough to permit the tongue and hook to be passed through from above.

The hook 21 is formed on a tongue 25 that constitutes the lower end of the spring, and before the spring is assembled with the other parts to complete the clamp, the tongue 25 is in the position indicated in dotted lines in Fig. 4, so that when the spring is in position, its resiliency will exert a considerable force on the clamping members in a direction to close the clamp and hold the jaw-extensions 5 and 9 pressed tightly together.

The width of the bow-spring 20 may be uniform throughout its entire length. In the present form of clamping jaws the tongue 25 should be narrow enough to pass through the slots 17 and 18.

By making the bow-spring 20 as a separate piece distinct from both of the clamping members, it becomes possible to use material for the spring having more resiliency, and of superior qualities for functioning as a spring, as compared with the material out of which the two clamping members are made. The clamping members are not required to have great resiliency. The jaw-extensions should be fairly stiff. The spring, on the other hand, should be readily distortable and highly resilient. So, in practicing this invention, it is possible to use relatively light gauge though stiff material for the clamp members.

In practice, however, if it is desired to increase the power or force exerted by the spring, this can be accomplished by increasing the width of the body 26 of the spring. (See Fig. 5 which illustrates the form of the blank from which the spring would be formed when struck out from plate material.) There is an advantage also in having the tongues 23 and 25 of less width than the body of the spring, because in that case the shoulders 27 that are formed adjacent the root of the spring 23, operate as means to engage the face 28 of the handle extension 6 when the hook 23 is in place. These shoulders steady and give lateral stability to the upper end of the bow-spring when the clamp is in its closed position; and the shoulders 29 that are formed adjacent the root of the tongue 25, may be used to function as stops to limit the opening movement of the jaw-extensions when the hook is moved to its open position by compressing the handle extensions 6 and 8. This feature is of some advantage when a beauty parlor operator is applying a number of curl clamps in position, to a patron's hair, because it gives a positive stop to positively resist the unnecessary or excessive opening movement of the jaw-extensions. In this connection, in operating a clamp of this kind, it is found that it is easier for an operator to hold the hook open against a positive stop, than it is to hold the clamp open against a changing resistance; in the latter case, there is a tendency for the operator to press the clamp to its widest open position. A clamp having the shoulders 29, pro-

vides a positive stop in the opening movement of the jaw-extensions, giving a sufficiently wide angle between the jaw-extensions to facilitate the application of the clamp to a curl; and also, by making a slight change in the punch that punches out the blank from which the spring is formed, the limit width of this angle can be readily changed.

The length of the slot 17 of course, should be such as to provide ample clearance for the inner face of the bow-spring either in the open or closed position of the clamp. The dotted lines at the sides of the body of the blank in Fig. 5, indicate how readily the change in the dies that punch out this blank, may be made to give a wider body to the spring, which of course, would increase the power or force of the spring when in use. It is believed that this feature adapts this clamp for use in other situations than for the special function of clamping a curl.

In securing the bow-form spring 20 to the superposed clamp members, the hook 23 should be inserted through the opening 24 first of all, and hooked onto the transverse edge of the opening or slot 24, after which the lower end of the hook should be passed down through the aligning slots 17 and 18 and the hook 21 snapped down onto the transverse edge 19 of the lower clamp member.

Many other embodiments of the invention may be resorted to without departing from the spirit of the invention.

I claim as my invention:

1. In a clamp, the combination of a first member and a second member superposed upon each other, said members having superposed jaw-extensions and superposed handle extensions, and having means for effecting a connection between the same enabling them to rock upon each other on an axis, and so that pressure exerted on said handle extensions can separate said jaw-extensions, the handle extension of said first member being disposed at an angle to the plane of its jaw-extension, a bow-form spring member constituting a separate piece distinct from both of said members, extending across said angle, a connection at one end connecting the same to the handle extension of the first member and a connection at its other end connecting to the second member, said connections operating to maintain said spring member in tension to hold said jaw-extensions normally in their closed position.

2. A clamp according to claim 1, in which the ends of the bow member include hooks, the handle extension of the first member and the jaw-extension of the second member having edges to which said hooks attach; said hooks projecting inwardly on the spring-member; and the resiliency of the spring-member operating to maintain said hooks in engagement with said edges.

3. A clamp according to claim 1, in which the end of the spring-member that attaches to the handle extension of the first member is provided with laterally projecting shoulders for engaging the face of the handle extension so as to give lateral stability to the spring-member.

4. A clamp according to claim 1, in which the end of the hook of the spring-member that connects to the handle extension, is formed as an integral tongue of reduced width with respect to the body of the spring-member, so that shoulders are formed on the same to engage the face of the said handle extension adjacent its sides, the said handle extension having an opening to receive the said tongue and present the said edge that the hook engages.

5. A clamp according to claim 1, in which the end of the spring-member that attaches to the handle extension of the first member is provided with laterally projecting shoulders for engaging the face of the handle extension so as to give lateral stability to the spring-member; said first member having an opening therethrough in its jaw-extension; said spring member having a tongue at its adjacent end, passing through said opening; said tongue having a terminal hook, and the said second member having an edge engaging said hook, to secure the spring in position.

6. A clamp according to claim 1, in which the said bow-form spring has inwardly projecting hooks at its ends, the said handle extension of the first clamp member having an opening with an edge adapted to engage the hook at one end of said bow-form spring, and the jaw-extension of the second member having an edge adapted to engage the hook at the adjacent end of the bow-form spring; said bow spring when the hooked ends are engaging said edges, being under tension so that the resiliency of the material of the bow-form spring maintains the hooks in engagement with said edges.

7. In a clamp, the combination of a first member and a second member superposed upon each other, said members having superposed jaw-extensions and superposed handle extensions, and having means for effecting a connection between the same enabling them to rock upon each other on an axis, and so that pressure exerted on said handle extensions can separate said jaw-extensions, the handle extension of said first member being disposed at an angle to the plane of its jaw-extension, an arcuate spring member constituting a separate piece distinct from both of said members, extending across said angle, connected at one end to the handle extension of the first member and connected at its other end to the second member at a point located toward the jaw-extension of the second member, said handle extension and said second member having connections including hooks at the ends of said spring member, and operating to maintain the arcuate spring in tension so that the force exerted by the spring maintains the clamp normally in its closed position.

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References Cited in the file of this patent

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