Oct. 10, 1933. A. H. KILMER 1,929,497

METHOD OF LOCKING WIRES AND LOCKING TOOL FOR USE THEREIN

Filed July 13, 1932

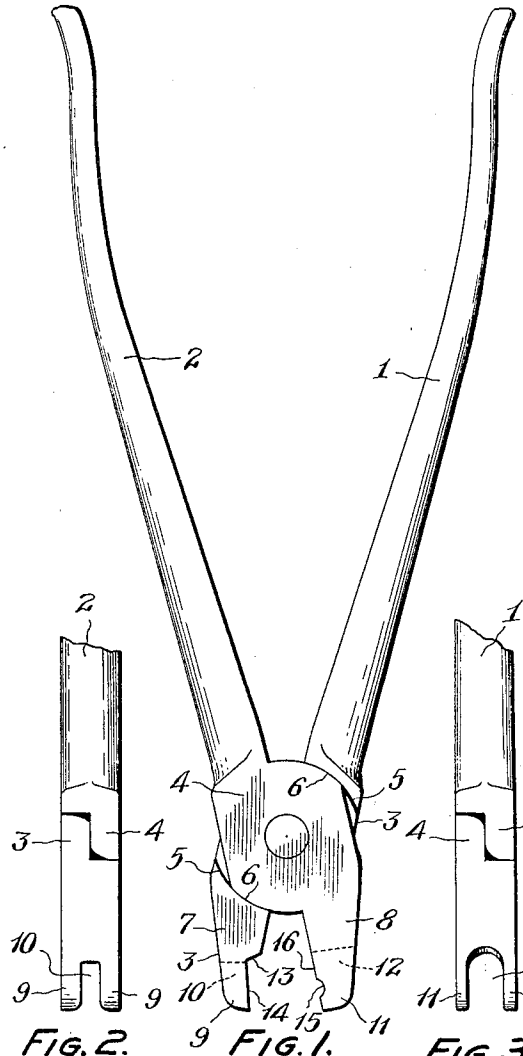


FIG. 1.

FIG. 2.

FIG. 3.

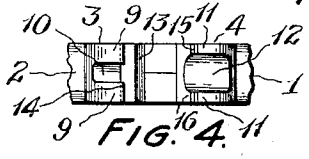


FIG. 4.

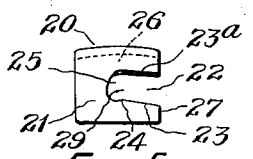


FIG. 5.

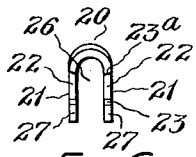


FIG. 6.

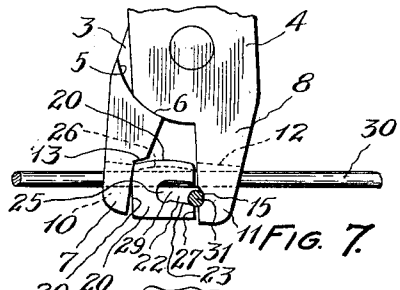


FIG. 7.

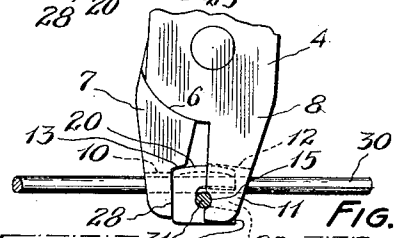


FIG. 8.

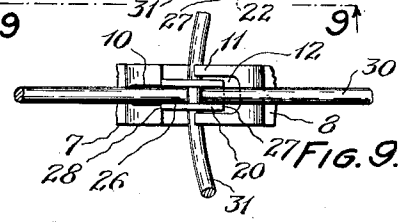


FIG. 9.

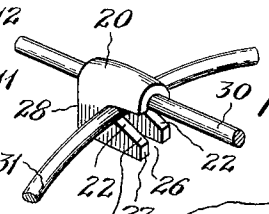


FIG. 10.

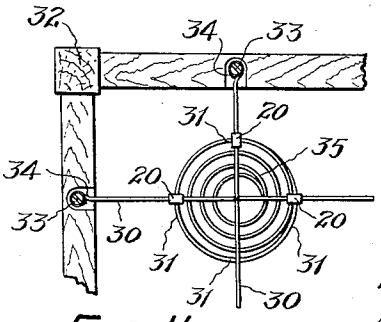


FIG. 11.

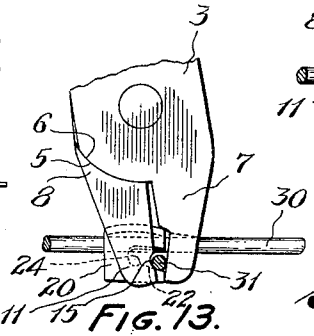


FIG. 13.

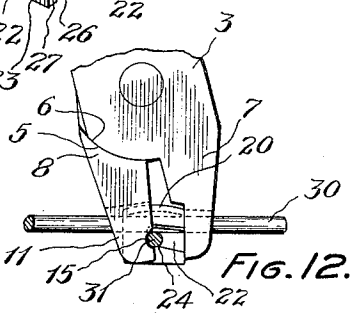


FIG. 12.

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Patented Oct. 10, 1933 1,929,497

UNITED STATES PATENT OFFICE

1,929,497

METHOD OF LOCKING WIRES AND LOCKING TOOL FOR USE THEREIN

Augustus H. Kilmer, Cleveland Heights, Ohio

Application July 13, 1932. Serial No. 622,283

9 Claims. (Cl. 140—55)

My invention particularly relates to improved methods of locking spring wires to support wires, and to improved tools for effecting the locking together of such wires and the releasing of such wires one from the other. The invention is particularly adapted for use in the furniture trade, such as the manufacture and repair of chairs, davenports, etc., where it is utilized for efficiently securing together the support wires which are attached to the furniture frame and the wires which comprise the coil springs used in such furniture.

The annexed drawing and the following description set forth in detail certain steps comprising my improved method and certain means illustrating my improved locking tool, such steps and such means illustrating, however, only a few of the various series of steps by which the improved method may be carried out, and only one combination of means in which the invention of the improved locking tool may be embodied.

In said annexed drawing:

Figure 1 is an elevation of my improved locking tool in the position in which it is most naturally and conveniently operated, the jaws thereof being partially opened and substantially in the position they assume at the beginning of the locking operation;

Figures 2 and 3 are, respectively, fragmentary left-hand and right-hand side views of the tool shown in Figure 1;

Figure 4 is a fragmentary bottom plan of the tool shown in Figure 1;

Figure 5 is a side elevation of a lock adapted for use when practicing my improved method and within which the two wires to be locked together by my improved locking tool may be secured;

Figure 6 is a right-hand end view of the lock shown in Figure 5;

Figure 7 is a fragmentary elevation of the tool and lock and the wires at the commencement of the operation which locks two wires together;

Figure 8 is an elevation of the elements shown in Figure 7 at the end of the locking operation;

Figure 9 is a view of the elements shown in Figure 8, taken from the plane indicated by the line 9—9, Figure 8;

Figure 10 is a perspective of the joint secured by the completion of the locking operation illustrated in Figure 8;

Figure 11 is a fragmentary plan view of a chair frame to which are secured support wires which also have been secured to a standard chair spring by means of my improved locking tool, locks such as shown in Figures 5 and 6 being illustrated for the several joints between the support and spring wires;

Figure 12 is a view illustrating the position assumed by the locking tool at the commencement of the operation by which the support and spring wires are released one from the other; and

Figure 13 is a view showing the relative positions of the several elements at the completion of the wire-releasing operation.

Referring to the annexed drawing in which the same parts are indicated by the same respective numbers in the several views, the locking tool comprises the handles or grips 1 and 2 integrally formed with opposed pivoted jaw heads 3 and 4, respectively. During the relative opening and closing movements of the handles 1 and 2, the jaw heads 3 and 4 slide upon each other through the medium of the complementary surfaces 5 and 6. The jaw head 3 is formed with a jaw 7 and the jaw head 4 with a mating jaw 8. Both of the jaws 7 and 8 have bifurcated end portions, indicated by the spaced end extensions 9—9 and 11—11, respectively, thereby forming open-ended longitudinal slots 10 and 12, respectively, in the two jaws. The slot 12 is materially wider than the slot 10. The slot 10 is adapted to receive a support wire. The purpose of this particular construction will be hereinafter explained in connection with the description of a lock 20 utilized for holding the spring and support wires permanently in secured position. The biting or holding surface of the jaw 7 is indicated by "14" and the corresponding surface of the jaw 8 by "16". On the inner surface of the jaw 7 adjacently above the gripping surface 14 is formed a transverse shoulder or abutment 13, and intermediate the ends of the gripping surface 16 in the jaw 8 are formed transverse aligned grooves 15, one in each of the end extensions 11. These transverse grooves 15 are adapted to accommodate a cross spring wire which it is intended to secure to the support wire.

The lock 20, to which reference has been made above, is illustrated in Figures 5 and 6, and is of plate-like formation, U-shaped in cross-section, and having the spaced wings 21. These wings 21 are formed with aligned open-ended slots 22 which have bottom walls 23 tapering inwardly relatively to the opposed top walls 23a so as to produce a slot formation which is narrower at its inner closed end than at its outer open end. However, the inward tapering of the walls 23 is interrupted by an upwardly-extended projection 24 producing a restricted slot portion 29 and effecting, as will be readily understood, a drag

upon or an obstacle to the easy sliding movement of a cross wire inwardly of the slots 22 from the outer to the inner ends of the latter. Adjacently within the shoulders 24 the slots 22 merge into a slightly larger inner portion 25. The space between the wings 21 of the lock 20 is indicated by "26" and the front end of the wings 21 adjacent the open ends of the slots 22 by "27" and the rear end of the wings 21 by "28".

In Figures 7 to 10, I illustrate how the lock 20 can be used with the locking tool shown in Figure 1 to secure together a support wire 30 and an intersecting cross wire, such as a spring wire 31. To produce the joint from these two wires 30 and 31, the support wire 30 is located within the space 26 of the lock 20 and above the slots 22, as shown in Figure 7, and the cross wire 31 is placed so as to intersect the open front ends of the slots 22, also as shown in Figure 7. Then the lock 20 which can be accommodated in the slot 12 of the jaw 8 of the locking tool is engaged by the latter, with the comparatively narrow slot 10 formed in the jaw head 7 disposed adjacent the rear end 28 of the lock 20, and the comparatively wide slot 12 formed in the jaw head 8 adjacent the front end 27 of the lock 20. In positioning the lock 20 for the locking operation, the upper part of the rear end 28 of the lock 20 is caused to engage the abutment 13 of the jaw 7, as clearly shown in Figure 7. In thus positioning the locking tool relatively to the lock 20 and the two wires, preliminarily to the locking operation, the spring wire 31 is engaged with the grooves 15 formed in the extensions 11 of the jaw head 8. Upon compressing the handles 1 and 2 of the locking tool, the lock 20 is forced by the jaw head 7 into and through the wide slot 12 in the jaw head 8, which movement of the lock 20 causes the cross spring wire 31 to ride inwardly and upwardly upon the bottom walls 23 of the slots 22, the spring wire 31 being forced by the projection 24 forming the restricted slot portions 29, subsequent to which the spring wire 31 reaches its final position in the slot portions 25 where it is rigidly secured with its top surface pressed against the lower surface of the support wire 30. A right line movement of the lock 20 is assured during this locking operation, and the tilting of the lock 20 avoided, by reason of the fact that the rear end of the lock is held down by engagement with the shoulder or abutment 13 of the jaw head 7, as clearly shown in Figure 7. The relative positions of the jaws of the locking tool and the several elements of the completed joint at the end of the locking operation are clearly shown in Figures 8 and 9. The resultant joint itself, as distinguished from the combination of the same with the locking tool, is clearly shown in Figure 10.

My improvements are very practical for use in making the spring supports for furniture. Particularly, they are utilized in uniting the usual support wires to the spring wires. Such an application is shown in Figure 11. The support wires 30 are secured to the furniture frame 32 by any suitable means such as the screws 33 which pass through the eyes 34 formed at the ends of the support wires 30. These support wires intersect each other in the axis of the coil spring 35 and are secured to the spring 35 by means of my improved tool and the lock 20 in as many places as desired, such as illustrated by the three joints of this character shown in Figure 11.

Oftentimes it is desirable to release the spring wires from the support wires. This is usually necessary when it is desired to conveniently repair the furniture. My improved tool is also utilized for effecting this releasing operation. In thus using the tool, its jaws are reversed relative to the lock 20, and the grooves 15 are caused to engage the side of the spring wire 31 opposite that which they engage during the locking operation. This reversing of the tool, of course, results in the extensions 11 of the jaw 8 sliding over the rear end of the lock 20. This initial positioning of the tool for the unlocking operation is illustrated in Figure 12. Upon compressing the tool handles 1 and 2 the lock 20 is forced by the jaw head 7 through the slot 12 and outwardly of the latter so as to cause the spring wire 31 to ride over the lock extensions 24 and the walls 23 of the slots 22 to a point adjacent the open end of said slots 22, thus releasing the spring wire 31 from engagement with the support wire 30, as clearly illustrated in Figure 13, the jaws 7 and 8 of the tool approximating a nearly complete closed position at the end of this unlocking operation. Upon opening the jaws 7 and 8 from the position shown in Figure 13, the support wire 30 and the spring wire 31 and the lock 20 separate and fall apart, as will be readily understood.

I direct particular attention to the fact that in the use of my improved locking tool the lock 20 is not distorted or impaired. The form of lock is preserved so that the joint can be readily unlocked, and the same lock 20 utilized for another locking operation. I also direct particular attention to the slot construction 12 in the jaw head 8 which accommodates both the support wire 30 and the lock 20. In other words, the lock 20 can be forced through the slot 12 and along the support wire 30 which also intersects the slot 12.

What I claim is:

1. A wire-locking tool having pivoted jaws, said jaws being slotted to receive a wire, the slot of one jaw also adapted to accommodate a lock, said last-named jaw also being grooved to receive a cross wire, the other jaw being formed with a shoulder for positioning the lock.

2. A method of locking wires consisting in, positioning a wire in a lock; positioning a cross wire transversely of the first-named wire; and then forcing the lock into engagement with the cross wire and effecting the engagement of the two wires by the movement of the lock while prserving the form of the lock.

3. A method of locking wires consisting in, positioning a wire within and lengthwise of a lock; positioning a cross wire adjacently one end of the lock and a spaced distance from the first-named wire; and forcing the lock lengthwise of the first-mentioned wire, the lock progressively engaging more tightly that surface of the cross wire furthest removed from the first-mentioned wire, thereby effecting the engagement of the two wires, the entire lock movement being effected while preserving the form of the lock.

4. A method of locking wires consisting in, positioning a wire within and lengthwise of a lock positioning a cross wire adjacently one end of the lock and a spaced distance from the first-named wire; forcing the lock lengthwise of the first-mentioned wire, the lock progressively engaging more tightly that surface of the cross wire furthest removed from the first-mentioned wire, thereby effecting the engagement of the two wires; and interposing a drag upon said lengthwise movement of the lock adjacently forward of the engaged position of the wires.

5. A wire-locking tool adapted to accommodate a wire and having pivoted jaws, one of said jaws being formed with a slot adapted to accommodate a lock and the other jaw having a shoulder forming an abutment for the lock, said jaws offering no obstruction to the passage of the lock along the slot during the relative pivotal movement of the jaws, one of said jaws being adapted to accommodate a cross wire.

6. A wire-locking tool having pivoted jaws adapted to accommodate a wire, one of said jaws being formed with a slot adapted to accommodate a lock and the other jaw having a shoulder forming an abutment for the lock, said jaws offering no obstruction to the pasasge of the lock along the slot during the relative pivotal movement of said jaws, the jaw having the lock slot being also formed with a groove extended transversely of said slot and adapted to accommodate a cross wire.

7. A wire-locking tool having pivoted jaws, said jaws being slotted to receive a wire, the slot of one of said jaws also being adapted to slidably receive a movable lock, said last-mentioned jaw being grooved to receive a wire at right angles to the first wire, the other jaw being formed with a shoulder for positioning the lock.

8. A wire-locking tool having pivoted jaws, said jaws being slotted to receive a wire, the slot of one of said jaws being of a greater cross-section than the other to accommodate a lock also, one jaw being formed with a shoulder portion forming an abutment for the lock and the other jaw member having a groove extended transversely of its slot and adapted to accommodate a cross wire.

9. A wire-locking tool consisting of handle members pivoted together and having opposed jaw members each formed with a slot to accommodate a wire, one of said slots being of a greater cross-section than the other to accommodate a lock also, the jaw member having the slot of smaller cross-section being formed with a shoulder portion having an abutment for the lock and the other jaw member having a groove extended transversely of its slot and adapted to accommodate a cross wire.

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