May 29, 1928. 1,671,270

M. B. BEHRMAN

PILE WIRE

Filed Feb. 4, 1925

Fig. 1.

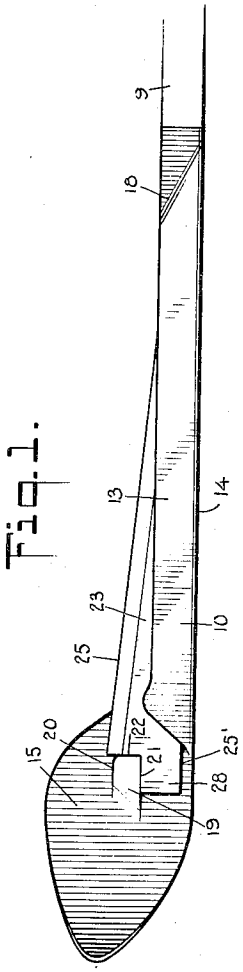


Fig. 2.

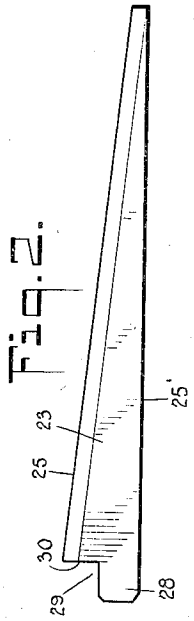


Fig. 3.

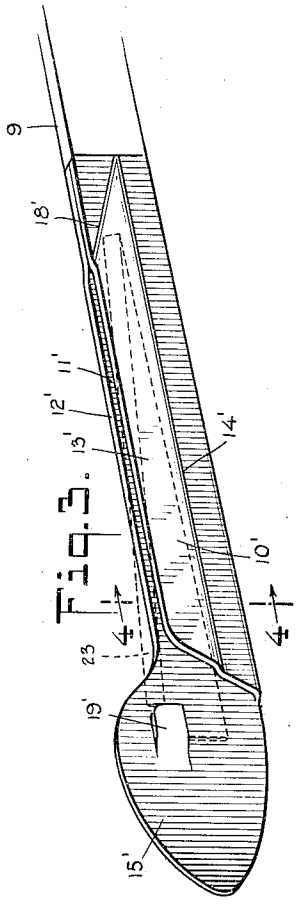
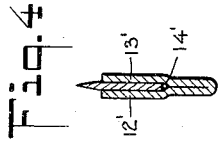


Fig. 4.



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UNITED STATES PATENT OFFICE.

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PILE WIRE.

Application filed February 4, 1925. Serial No. 6,687.

My present invention relates generally to a pile wire and more particularly to the manner whereby a blade can be removably associated therewith.

The frequency of the cutting operations necessitates the resharpening or replacement of the cutting edges at short intervals. Where I have attempted to meet this situation by making the cutters separable from the pile wire, I have been presented with a number of problems, among which is that which arrives because of the fact that (first) looms of this type are already provided with pile wires at considerable expense and their replacement is not feasible from the practical standpoint and (secondly) the manner of associating the blade with the pile wire must be of such a character that it will hold the blade against movement with reference to the pile wire during the cutting operation and yet will permit of its rapid and easy removal.

Among the important objects of my invention is the provision of a holder for a cutter or blade which is of such a character that the holder can be formed as a separable unit for attachment to a pile wire and can be associated with the conventional form of pile wire without requiring a replacement of the pile wires or any substantial change or reconstruction therein, and the provision on said holder of an arrangement for fixedly associating a cutting blade therewith in such a manner as to permit of easy and quick removal and replacement.

I have found however that making the blade holder as an attachment to the pile wire carries with it the difficulties that arise from the fact that the point at which the blade holder is attached to the pile wire is subject to bending and turning stresses, to which the pile wire as a whole is subjected in the general operation of the loom.

For purposes of holding the blade, I have found that a holder formed of sheet material and bent intermediate its ends to give it a substantial U shape, with the walls of the U spaced so as to receive a blade therewithin, possesses many advantages. On the other hand, such a U-shaped holder always presents the possibility that when it is subject to turning or bending stresses, there will be a tendency for the walls of the U to spread and to become misshapen.

Another object of my invention, therefore, is the provision of an arrangement whereby a U-shaped holder of this type can be so secured to a pile wire so that not only is the point of attachment no weaker than any other portion of the pile wire, but that by such manner of attachment the tendency of the walls to spread will, to some extent, be overcome.

Pile wires used with different types of looms and in different mills differ as to heights and blade holders intended to serve as attachments thereto must necessarily be made to conform thereto. The variation in the height of the holder will necessarily result in a variation in the depth of the blade holding channel in the holder, particularly where the U-shaped holder of the character referred to is employed. Therefore, where the blades are to be received seated on the bottom of the channel, there will be required a blade of different dimensions for each differently dimensioned holder, as otherwise the blades will project to different extents above the top of the holder and above the top of the pile wires.

A still further object of my invention is the provision of an arrangement whereby a blade of standardized dimensions and particularly of standardized height can be associated with holders or pile wires of different heights, with the cutting edge of the blade in the same predetermined position with reference to the top of the holder or pile wire.

My invention further involves the manner of treatment of pile wires or blade holding attachments thereto, which have channels therein for the reception of a blade, whereby a seat for a blade is produced which is at a predetermined distance from the top of the wire or holder, and also makes the wire or holder produced thereby.

My invention further involves an arrangement whereby the manner of associating the blade holder with the pile wire is of such a character that there is formed thereby an abutment wall for one end of the blade which forms part of the blade holding means and also co-ordinately involves an arrangement whereby the provisions of a seat in the pile wire or on the blade holder attached thereto positioned always at a predetermined distance below the top regard-

less of the height thereof as aforementioned can be formed along with the said abutment wall.

My invention furthermore generally involves the provision of a new, simple and effective blade holding attachment for a pile wire and of a blade to be carried thereby which will give a maximum of efficiency.

For the attainment of these objects and such other objects as may hereinafter appear or be pointed out, I have illustrated one embodiment of my invention in the drawings wherein:

Fig. 1 shows in side elevation a blade secured to the holder attachment for a pile wire of a character fitted therefor;

Fig. 2 shows the blade removed from its holder; and

Fig. 3 shows my arrangement whereby this blade can be standardized so as to be received in a holder for a pile wire which is of greater height than that shown in Fig. 1;

Fig. 4 is a vertical section taken on line 4—4 of Fig. 3.

Upon viewing Fig. 1 of the drawing, it will be observed that I here employ a blade holder 10 which is in the form of a thin strip of sheet material bent so as to provide a channeled construction which is preferably, though not necessarily, U-shaped in cross-section, the channel 11 being defined by the walls 12 and 13 upstanding from the bottom 14. Extending forwardly from the wall 12 is the enlarged spoon-like member 15, preferably curved at its outer end, for purposes well understood to those skilled in the art.

The channel 11 is provided in any preferred or desired manner with the inclined end abutment wall 18, the illustrated embodiment showing this wall as formed by forcing together the walls 12 and 13 along a line which is inclined as shown in the drawing, and which is to form an overhanging wall for the front end of the blade.

The spoon-like member 15 is provided with a punched up projection or finger 19, cut away along three sides, 20, 21 and 22 and positioned angularly part way across the channel 11. It will be observed that in this illustrated embodiment that the finger is formed by a lower cut to form the wall 21, by a much shallower cut to form the shorter side 20, and by a cut 22 connecting the two, and that the free end of the finger 19 is deflected into the path of the knife sufficiently to permit the end wall formed by the cut 22 to form an abutment for the butt end wall of the blade as shown in Fig. 1.

Upon viewing Fig. 1 of the drawing, it will be observed that the knife or cutter 23 which I employ is preferably of the flexible wafer type, the cutting edge 26 of which inclines upwardly with reference to the bottom edge 27 and at an angle approaching that of the end wall 18 in the channel 11, and that the butt end of the blade is provided with the cutout 29, the position and dimensions of which are preferably determined by the character and dimensions of the member 19 to serve the purposes intended, the cutout 29 thus providing the finger 28 upon the butt end of the cutter.

In the insertion of this type of blade in the holder, the front or pointed end of the blade is first worked at an angle into the channel 11 to bring the front or pointed end of the blade into position beneath the inclined end wall 16 of the channel and the blade is then moved angularly downwardly, so as to cause the butt end to move over the inclined surface of the finger 19, which surface inclines from its free end to the inner surface of the spoon 15 into which it merges. In this movement of the blade over the surface of the finger 19 a relative lateral movement between a part of the blade and the finger will take place, and in the embodiment of the application, it will be the blade which will flex as the holder 10 is made of relatively stiff material.

It will be understood that the dimensions of the parts are such that as the blade reaches its final predetermined position in the holder with the front or pointed end of the blade beneath the wall 18 and with the lower edge 27 of the blade seated on the bottom of the channel 11, that the end wall 30 of the cutout 29 will be positioned with the wall 30 immediately adjacent and to the front of the end 22 of the finger 19.

By making the cut which forms the wall 20 of the finger 19 materially shorter than the cut which forms the lower wall 21 I provide an arrangement whereby the blade can be inserted more readily, due to the inclination given to the finger which not only inclines longitudinally of the blade, but also downwardly furthermore the lower wall of the cut out 29 in the blade forms a stop for the blade to prevent a reverse movement thereof, because of the engagement of such wall with the wall 21 of the holder.

Upon viewing Fig. 1, it will be observed that with the lower edge 25′ of the blade seated on the bottom 14 of the channel 11, the cutting edge 25 will have its desired predetermined position above the channel, so as to effectively cut the strands being woven, and it is due to the fact that the height of the holder 10 which naturally corresponds to the height of the pile wire is such as to cause the cutting edge to be properly positioned. Pile wires, however, vary in height both as to the looms and as to the mills in which they are used, and unless some special provision is made, it will be seen that the blades will have to be variably dimensioned so as to serve effectively with the different heights and sizes of pile wires. For example, I show in Fig. 3 a holder which is

to be attached to a pile wire which is higher than that of the pile wire of Fig. 1, and in which the blade of Fig. 2 could not be used, because no substantial part of the edge thereof would be exposed sufficiently to serve effectively for cutting purposes, and in this Fig. 3, I show my method by which this holder can be so treated as to cause it to serve effectively without requiring any change in the size of the blades, and in this way, I am permitted to standardize on the blade regardless of the character of pile wire with which it is to be associated.

The blade holder Fig. 3 is in all respects like that of Fig. 1, except that the height thereof is very much greater, and in order that it may receive the blade of Fig. 2 without interfering with its effective operation, the abutment 14′ is provided upon which the blade seats, and beyond which it cannot be forced, and this abutment seat 14′ is at the same linear distance throughout all its points from the top of the walls which form the channel therein as is the bottom 14 in Fig. 1, so that the blade 25 received in said channel 11′ and seated on the seat 14′ is positioned with reference to the holder embodiment of Fig. 3 exactly as is this blade in Fig. 1. This abutment seat I form preferably by crimping together the lower ends of the walls 12′ and 13′, as clearly shown in Fig. 4 and as this crimping can extend for any distance above the bottom, it is obvious that by standardizing on a blade which is operated effectively when seated on the bottom of a holder to be attached to the narrowest pile wire as in Fig. 1, that provision can be made for any pile wire which is of greater height by crimping together the lower ends of the walls to a greater or less extent, depending upon the extent to which the pile wire which is to be accommodated, exceeds the narrowest pile wire such as that shown in Fig. 1.

In this manner, it will be clear that while the holder will have to be dimensioned so as to fit the particular size pile wire to which it is to be attached, that this will not be the case with the blade, and that therefore the same blade can be employed with all sizes of pile wires.

I have found that by employing a U-shaped holder 10, as set forth, I obtain a very efficient blade holding means which is economical to manufacture and permits of the ready insertion and removal of the blade. I have found, however, that a U-shaped holder of this character, when attached to the pile wire 9, which is generally in the form of a solid bar, presents difficulties arising from the fact that in the operation of the loom the pile wires are subject to stresses and strains and twisting and bending forces, with the tendency always present not only to cause the walls 11 and 12 of the pile wire to spread and become misshapen, but these forces are also applied to the point at which the holder 10 is affixed to the pile wire 9, with the consequent liability of breakage at this point.

I have found that by affixing the holder 10 to the pile wire 9 by a welding operation, in the manner to be pointed out, I not only secure an attachment which is no weaker than if the holder 10 were made integral with the pile wire 9, but in addition brace the walls 11 and 12 of the holder against spreading and also against permanent distortion.

In my preferred practice, I first pinch together the inner ends of these two adjacent walls 12 and 13 of the member 10, as shown in Fig. 4, and then weld these ends directly to the adjacent end of the pile wire 9. For this welding operation I preferably employ the jump gap method in which an alternating current of high amperage is passed through both the holder 10 and the pile wire 9, with the two spaced a predetermined distance. In this manner I obtain a weld not only between the holder and the pile wire, but a weld will also be effected between the portions of the walls 12 and 13 of the holder which are pinched together, partcularly where the walls of the holder 10 are thinner than the pile wire 9, as in the illustrated embodiment, as the adjacent end of the holder 10 will heat up to a greater extent and the flow of the metal will occur mainly at the said adjacent end of the holder. In this manner I obtain an attachment between the channeled holder 10 and the pile wire 9 which not only is no weaker than if the holder 10 had been a solid bar, but in addition strengthens the end of the holder.

It will be understood of course that a welding operation of this character results in an extrusion of metal and this extrusion is ground off so as to give the pile wire and the holder attached thereto a thickness at the point of attachment which is the same as that of the pile wire.

The wire which I employ is preferably of spring steel and in the welding operation that portion of both the holder and the pile wire which is adjacent the point of weld is tempered so highly as to become brittle, and in order to restore the temper of these parts, it is re-annealed so that the desired spring character of this portion of the wire is restored and the temper thereof made the same as that of the original pile wire. This increased temper to glass hardness is due to the rapid cooling of the heated metal in the open air and also the small mass of metal and re-annealing restores the malleability of the metal to its original condition.

Upon viewing Figures 1 and 3 of the drawing, it will be observed that the walls 12′ and 13′ are pinched together so as to

provide not only the contacting ends for the purposes of the weld, but also the inclined overhanging wall 18. When, therefore, the holder, treated as described and as shown in Fig. 1, is welded to the pile wire 9 in a manner already described, the welding operation will not only fixedly associate the holder 10 with the pile wire 9, but it will also weld together the pinched together portions of the walls 12 and 13 and at the same time produce the overhanging wall 18 beneath which the knife is to be received, as shown in Fig. 1. In this way, I not only simultaneously produce the weld and the overhanging walls with increased effectiveness, but due to such construction also shorten the holder itself and bring the knife immediately adjacent to the weld, so that the leverage of the turning forces applied to the free end of the holder is not only reduced but the force is applied so close to the weld that the tendency of these twisting forces to disrupt the weld is reduced to a minimum.

By my invention I thus not only attain a blade of maximum effectiveness but also the standardization of the blade. In addition, I attain a holder which can be made separate and apart from the pile wire and which can be made to serve as an attachment to any conventional type of pile wire already in use, but which holder can be constructed so as to serve its purpose for holding a blade without considering the character of the pile wire to which it is to be attached.

While I have disclosed in this application an embodiment of my invention in which the seat to raise the blade is formed by crimping the holder, it will be understood that this is merely illustrative and that the invention resides broadly in the provision of an abutment of such a character that it may be associated with or formed in the holder at any time so that there is provided a raised seat for the blade at any desired or predetermined point above the bottom of the holder or channel therein.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is—

1. A pile wire cutter comprising a pile wire and a U-shaped holder attached thereto, the walls of the holder adjacent the bottom of the channel in the holder being pinched together so as to provide a bottom for the channel positioned at a predetermined point above the lower end of the holder.

2. A pile wire cutter comprising a pile wire and a U-shaped holder welded thereto, the walls of the holder adjacent the point of weld being pinched together so as to provide an overhanging wall in the channel intermediate the ends thereof and beneath which a blade is adapted to be received, and the wall adjacent the bottom of the holder being pinched together so as to provide a supplementary seat.

3. A pile wire cutter comprising a pile wire and a channeled blade holder associated therewith, one of the walls of the channel being forced inwardly so as to provide a seat for the blade positioned at a predetermined point above the bottom of the channel, whereby a standard blade can be associated with a holder to expose the blade to the same extent regardless of the depth of the channel.

4. A blade holder adapted to be associated with or to form part of a pile wire, said holder having a channel to receive a blade and means for associating a standard blade with the holder with its cutting edge exposed to the same extent regardless of the depth of the channel, said means comprising a blade seat forming the bottom of the channel and positioned predeterminedly above the bottom of the holder thereof.

5. A blade holder adapted to be associated with or to form part of a pile wire, said holder having a channel to receive a blade and means for associating a standard blade with the holder with its cutting edge exposed to the same extent regardless of the depth of the channel, said means comprising a blade seat forming the bottom of the channel and positioned predeterminedly above the bottom of the holder and an overhanging abutment wall in the channel beneath which one end of the blade is adapted to be received.

6. A blade holder adapted to be associated with or to form part of a pile wire, said holder having a channel to receive a blade and means for associating a standard blade with the holder with its cutting edge exposed to the same extent regardless of the depth of the channel, said means comprising abutment portions formed in the channel, one of said abutment portions forming a seat for the blade predeterminedly positioned above the bottom of the holder, and the other abutment member forming an overhanging wall beneath which one end of the blade is received.

7. A blade holder adapted to be associated with or to form part of a pile wire, said holder having a channel to receive a blade and means for associating a standard blade with the holder, said means comprising a portion beneath which one end of the blade is received, said portion being formed by forcing inwardly part of one wall of the channel and means for receiving the blade with its cutting edge exposed to the same extent regardless of the depth of the channel, said means comprising a blade seat formed in the channel predeterminedly above the bottom of the holder.

8. The process of forming a blade holding

part of a pile wire, said process including the steps of forming a channeled holder for the blade and then forming in the channel an overhanging abutment beneath which the rear end of the blade can be received and held by forcing the material of the side wall inwardly into the channel.

9. In a device of the character described, in combination, a blade having an inclined cutting edge and narrowing toward one end, the upper portion of the wider rear part of the blade being removed to provide a finger extending rearwardly from the bottom of such wider rear part, a blade holder adapted to be associated with or form part of the pile wire, said holder having a channel to receive said blade and a spoon portion extending beyond the channel, and means for associating the blade with the holder, said means comprising an overhanging portion in the channel beneath which the narrower end of the blade is received, and a member formed from and projecting integrally from the spoon portion and so dimensioned and positioned that when the blade is in the channel with the narrower portion received beneath the overhanging portion therein, said member will be received in the space left by the removal of the upper portion of the widened rear part and the aforementioned finger will be positioned beneath said member.

In witness whereof, I have signed this specification.

MARCUS B. BEHRMAN.