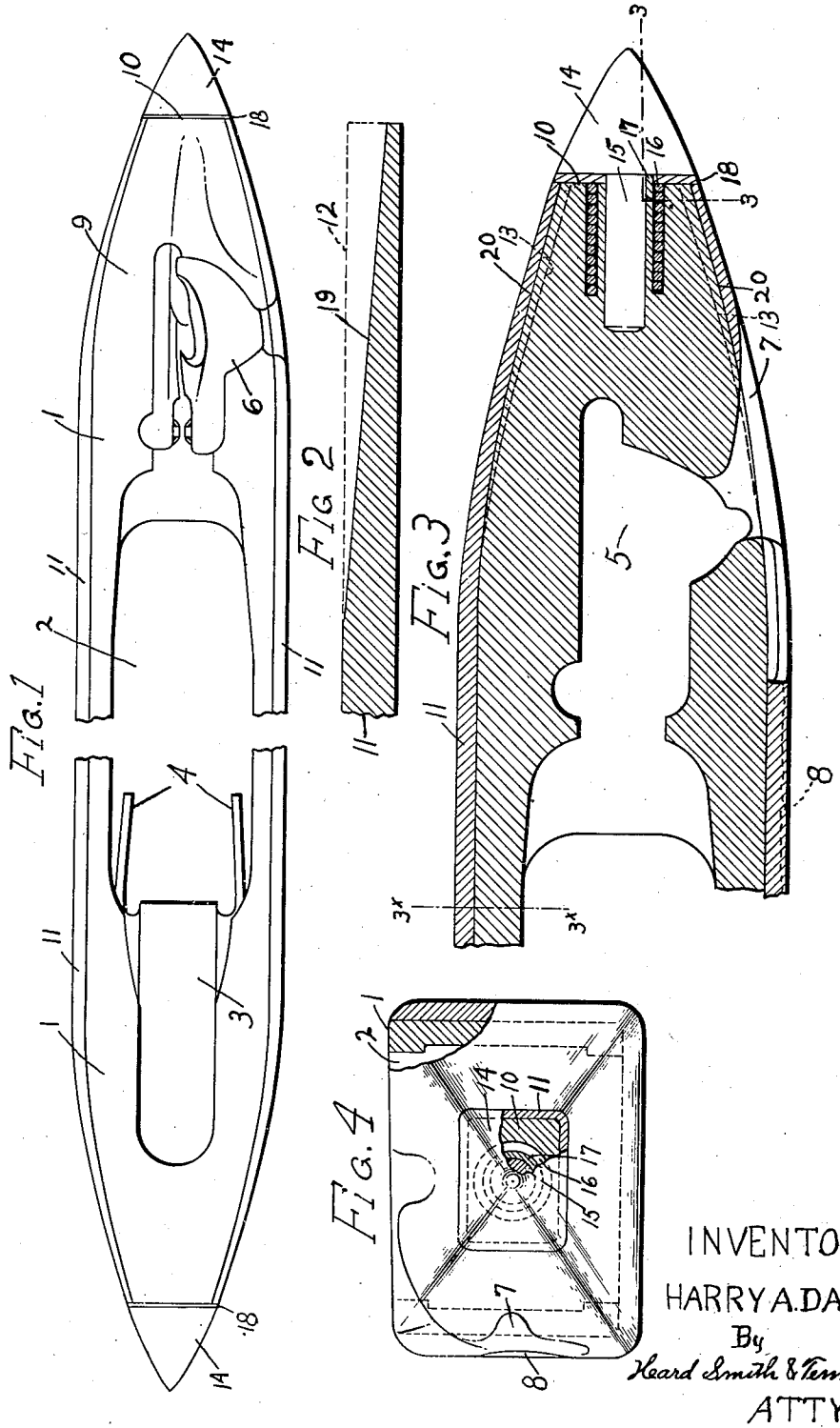
March 6, 1945. H. A. DAVIS 2,371,032

ARMORED LOOM SHUTTLE

Filed Dec. 31, 1943




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Patented Mar. 6, 1945 2,371,032

# UNITED STATES PATENT OFFICE

2,371,032

## ARMORED LOOM SHUTTLE

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Application December 31, 1943, Serial No. 516,386

4 Claims. (Cl. 139—196)

This invention relates to improvements in loom shuttles, and the general object of the invention is to provide an armored loom shuttle which is less likely to become damaged or fractured when in normal use by the impact of the picker mechanism and which will therefore be less likely to be diverted from the proper direction of flight than shuttles heretofore produced.

The object of the invention therefore broadly is to provide a loom shuttle of longer life, greater accuracy of operation when in use, and which will enable the production of more uniform and perfect fabric than shuttles heretofore employed.

More specifically the object of the invention is to provide a loom shuttle with a stronger point structure and increased bearing surfaces to engage the walls and binder of the shuttle box so that the wear of the shuttle and the shuttle box and binder will be greatly minimized.

A further object of the invention is to provide a loom shuttle of such rigid construction and contour as will avoid defective shuttle operations which result in smashes, breakages, snagging of the yarn, etc., which results in producing imperfect cloth as well as delays in the operation of the loom resulting therefrom.

In the manufacture of usual armored loom shuttles a block of wood of rectangular cross section and of suitable length is shaped to provide a substantially rectangular body or core portion which when the armored facing or facings are secured to the surfaces thereof will be of the desired standard size and the end portions of the block convergingly curved to a truncated end. A plate or plates of tough grainless or laminated facings of uniform thickness are then bonded to the desired side or sides and the convergingly end portions of the wooden body or core throughout their lengths. Each end of the body or core is then drilled axially to receive the shank of the conical metal tip and at a narrow distance therefrom is provided with a concentric groove to receive a ferrule or wire coil to prevent rupture of the thin shell of wood remaining between the shank of the tip and the ferrule as the shank of the tip is forced into place. The end portions of the armored body are then sized down to the size and shape of the base of the metal tip and the shuttle finally smoothly finished. By reason of this construction only a small restricted area of wood remains, in usual armored shuttles, to abut the base of the metal tip or the fibre or soft metal washer which is usually interposed therebetween.

Furthermore the sizing down of the conical end portions of usual armored shuttles frequently so thins the end of the armor as to expose portions of the wood at the adjacent thin edges of the facing which, because of repeated impact of the picker stick upon the metal tip, frequently results, when the shuttle is in use, in the splitting of the narrow end wall of the wood of the shuttle or in the detachment of the thin edges of the facing thereby causing misalinement of the shuttle in its flight and also enabling the defective end portion of the shuttle to engage and injure or sever some of the warp threads.

One of the principal objects of the invention is to provide a loom shuttle construction in which the truncated ends of the wooden body or core present a sufficiently large area to withstand the impact of the picker stick mechanism without deformation or fracture and therefore to insure longer life of the shuttle and accuracy in its flight and also to provide a facing or armor having sufficient thickness to completely surround the truncated end of the body or core at the base of the shuttle tip or the washer which is interposed between the truncated end of the body and the metal shuttle tip.

Usual loom shuttles comprise a rectangular chambered body having conoidally converging end portions which merge into the flat surfaces of the body and even if the shuttle is in perfect alinement in its flight the rounded surfaces of the end portion engage the binder and walls of the shuttle box with a tangential point contact which in the continuous use of the shuttle results in the wearing and fraying of the portions of the shuttle thus engaged and also in wearing a groove in the binding material which requires frequent replacement of the binder and also necessitates the squaring up of the shuttle and consequent weakening of the same. The pertinence of this trouble can be no better emphasized than from the fact that mills of any size are equipped with shuttle sanding or other devices to redress the shuttles by squaring them and frequently sizing them to another standard gage so that first-class goods can be woven. Such repairs of the shuttle box require the stoppage of the loom with consequent hold-up in production and together with the replacement and repair of shuttles further increase the cost of production of acceptable fabric.

Another object of the invention is to provide a loom shuttle in which the curvedly converging end portions will present flat faces to engage the shuttle box and binder and thus with a contact which will avoid such wearing of the walls of

the shuttle and the binder and consequently further insure accuracy of flight of the shuttle.

These and other objects and features of the invention will more fully appear from the following description and the accompanying drawing and will be particularly pointed out in the claims.

A preferred embodiment of the invention is illustrated in the drawing as applied to a self-threading shuttle of the "Draper" type.

In the drawing:

Fig. 1 is a plan view of a typical automatic self-threading shuttle embodying the invention centrally broken away to indicate that the shuttle may be of any desired length;

Fig. 2 is an enlarged longitudinal sectional view of an end portion of the fibre covering or armor employed in the present invention showing in dotted lines the shape of the end portion of an armored plate for shuttles heretofore employed;

Fig. 3 is a view, mainly in horizontal central section, of one end portion of an armored wooden shuttle embodying the invention, the metal tip being shown in elevation and indicating by a dotted line the contour of the end portion of the wooden body of a usual armored shuttle; and,

Fig. 4 is an end view of the preferred form of armored shuttle illustrated in Figs. 1 and 2 having a pyramidal metal tip with portions broken away on the irregular section line 3—3 and 3*x*—3*x* Fig. 3.

The self-threading loom shuttle embodying the present invention as illustrated in the drawing comprises a wooden body or core 1 of general rectangular cross section having a usual chamber 2 extending vertically through the body to receive the bobbin with a bobbin holder 3 having a forked end 4 extending into the chamber 2 to receive and hold the base of the bobbin and to permit replacement of the bobbin in an automatic loom. The opposite end of the body is provided with a suitable recess 5 (Fig. 2) to receive the threading block 6 (Fig. 1) with the usual groove 7 extending from the thread eye toward the front of the shuttle and the usual longitudinal channel 8 in which the thread runs during the flight of the shuttle. The main rectangular body 1 of the shuttle has continuing convergingly curved end portions 9 extending to the truncated ends 10. In usual constructions the armor plate or plates 11 of grainless fibre or of laminated construction are of uniform thickness throughout their length as indicated by the dotted line 12, Fig. 2, and when applied to the continually converging end portion of the body necessitate the cutting down of the converging wooden portion of the body or core along the dotted lines 13, as illustrated in Fig. 3, so that the truncated end of the wooden body is of restricted area. As all shuttles are necessarily provided with a hard metal tip 14 the shank 15 of which extends axially into the truncated end of the shuttle body, and usually are provided with a ferrule or wire coil 16 located in a channel which is narrowly spaced from the shank of the shuttle to prevent the annular layer of wood 17 therebetween from splitting, the effective area of the truncated end which abuts the base of the metal tip or a washer 18 interposed between the truncated end and the base of the tip is greatly restricted and during the use of the shuttle is likely to be deformed or broken by the repeated hammering of the picker stick mechanism thereby causing such diversion of the axis of the tip with that of the shuttle body as to cause misalinement of the shuttle in its flight.

In the final turning down of the usual conoidal ends of the armor fibre-clad shuttle the adjacent edges of the armor plate are frequently so cut away as to expose unreinforced portions of the truncated end of the wooden body thereby enabling said ends to be more easily fractured. Furthermore the thin adjacent edges of the armored facings are likely to become loosened or detached and will present frayed or roughened edges which in the flight of the shuttle will snag or break the warp or the filling which is carried by the shuttle.

In the present invention the armor plate or plates 11 are of uniform thickness throughout the rectangular body portion of the shuttle and are gradually diminished in thickness at the respective end portions to provide flat faces 19 as shown in Fig. 2 to be bonded to the converging end portions of the core or body. By reason of this construction the converging end portions of the body may be of greater thickness than in usual constructions as is shown by the solid line 20, thereby greatly increasing the wooden area of the truncated end which engages the washer 18 or the base of the shuttle tip.

In the preferred embodiment of the invention illustrated the flat faces of the rectangular shuttle body continue in rectangular cross section to the truncated ends thereof and the thickness of the armored facing progressively diminishes from the main body to its truncated end. In this construction the shuttle tip instead of being conical is of pyramidal form complementary to the rectangular truncated end of the shuttle body. In such constructions the greater wooden area of the end of the shuttle body or core is maintained, and the relatively thin end of the facing which terminates flush with the end of the body or core and abuts a washer which is interposed between the base of the rectangular tip, is of uniform thickness throughout and the wooden end of the shuttle is uninterruptedly covered and reinforced.

Desirably the armor facing is of hard tough grainless fibrous material which presents a smooth polished surface. It will be understood however that other types of armor may be employed such as suitable plastic material or the like which is of grainless construction and sufficiently tough and hard to withstand usage to which the shuttle is put and which will present a smooth surface.

By reason of this rectangular cross sectional construction of the tapering end portion of the shuttle, the shuttle, when entering the shuttle box will engage the wall of the box or binder in such manner as to avoid the grooving of the wall of the shuttle box or binder or the local wearing of the shuttle as in the case of shuttles having a converging end portion of rounded contour.

The additional wood at the end of the shuttle block provided by the present invention enables the shuttle to withstand the impact of the blows of the picker mechanism without the likelihood of fracture or breakage and thereby greatly increases the accuracy of operation of the shuttle and the length of its life.

Furthermore by providing the bottom and a side or sides of the shuttle with grainless facing the friction of the shuttle upon the lay and shuttle box is greatly reduced.

In the embodiments of the invention the upper edge or edges of the facing presents a smooth

grainless surface which will avoid snagging and breakage of the threads with which it comes in contact.

The above and other advantages of the present invention will be readily appreciated by those skilled in the art.

It will be understood that while the invention is illustrated herein as embodied in an automatic loom shuttle it may be employed in other types of shuttles, that the armor facing may be of any suitable preferably grainless material, that the facing may be applied to one or more sides of the shuttle including the bottom and top, and that the particular embodiments of the invention shown and described herein are of an illustrative character and not restrictive of the meaning and scope of the following claims.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is:

1. A loom shuttle having a wooden body comprising a main chambered portion of substantially rectangular cross section and integral continuing end portions of rectangular cross section curvedly converging to truncated ends of said body, a facing of hard tough armoring fibrous material bonded throughout its area to a side of said main portion and to the continuing end portions thereof progressively decreasing in thickness from said main portion to the truncated ends of the body and pyramidal metal tips fixedly secured to the truncated ends in axial alinement with the body having a base conforming to and abutting the truncated ends of said body and facing, whereby the converging flat sides of the shuttle will engage the wall and binder of the shuttle box.

2. A loom shuttle having a wooden body comprising a main chambered portion of substantially rectangular cross section and integral continuing end portions of rectangular cross section curvedly converging to the truncated ends of said body, facings of hard tough grainless fibrous material bonded throughout its area to the bottom and an adjacent side or sides of said main portion and the continuing end portions thereof, the facings for the main areas of said bottom and sides being of uniform thickness with the thickness of said facings progressively decreasing from the ends of said main portion to the truncated ends of the body, and pyramidal metal tips each having a rectangular base conforming to and abutting the respective truncated end of said body and facing and each having an integral shank firmly embedded in said body in axial alinement therewith.

3. A loom shuttle of that type having a chambered integral wooden body of substantially rectangular cross section with the end portions curvedly converging to truncated ends, a facing of tough armoring material conforming to and bonded throughout its area to a side of said body, and tapering metal tips having bases conforming to and abutting the respective ends of the armored body, in which the armoring material progressively decreases in thickness along the curvedly converging portions of said side of the body to the ends thereof which abut the bases of the tips to provide at each end a greater wooden end area engaging the base of the tip than if the facing were of uniform thickness throughout its length and thereby increasing the resistance of the shuttle to the shocks imparted by the picker mechanism of the loom.

4. A loom shuttle of that type having a chambered integral wooden body of substantially rectangular cross section with adjacent sides at the end portions thereof curvedly converging to truncated ends, flat facings of hard tough grainless material conforming to and bonded throughout their areas respectively to the said adjacent sides of said body, and tapered metal tips having bases conforming to and abutting the respective ends of the faced body, in which the said flat facings progressively decrease in thickness along the curvedly converging portions of said sides of the body to the ends thereof which abut the bases of the tips to provide at each end a greater wooden end area engaging the base of the tip than if the facings were of uniform thickness throughout their lengths and thereby increasing the resistance of the shuttle to the shocks imparted by the picker mechanism of the loom.

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