This invention relates to textile machinery and more particularly refers to improvements in cushioning devices for shuttle binders such as are currently used in box looms for checking the movement of the shuttle at the end of its stroke.

In the great majority of looms which have come to our notice, the movement of the shuttle is checked by a binder consisting of a curved metallic arm pivotally mounted at one of its ends and pressed inwardly by a spring, causing it to yieldingly bear against the side surface of the shuttle as the shuttle reaches the shuttle box.

When the shuttle reaches the extreme end of its movement in one direction, the weft or filling which unwinds from a spool carried by the shuttle extends rearwardly of the shuttle directly from the inner end thereof. However, when the shuttle reverses its movement the weft or filling which unwinds from the same end of the shuttle is turned backward and runs along the adjoining side surface of the shuttle, said surface being the one which comes into contact with the binder when the shuttle reaches the end of its stroke.

Although the binder yields easily when the side surface of the shuttle bears against it, the impact and the friction developing between the metallic surface of the binder and the hard polished surface of the shuttle frequently cause the thread used as a weft or filling to break. This necessitates stopping of the loom and fastening of the broken ends of the thread and results in a considerable loss of time both for the loom and the attendant.

The primary object of this invention is to provide cushioning means for covering the surface of the binder, adapted to partly absorb the impact of the shuttle, and to nullify or greatly diminish the friction to which the thread is subjected, during the period in which the shuttle travels for the length of the binder.

Another object is to provide a web protector for binders adapted to be easily secured in position and to be easily removed therefrom and replaced by another similar device when required.

A further object is to provide a novel and improved device of the character specified comprising a strip or web of fabric possessing a certain resiliency and a thickness sufficient to produce a cushioning effect, said fabric having a structure causing it to resist wear and to last for relatively long periods of time.

A still further object is to provide a protective device for binders of the character specified, which is relatively inexpensive and which shall effectively prevent breakages and thus permit the uninterrupted operation of a loom for relatively long periods of time.

Other objects and advantages of the present invention will more fully appear as the description appears and will be set forth and claimed in the appended claims.

Our invention is illustrated by way of example in the accompanying drawings, in which:

Fig. 1 is a top plan view of a portion of a lay beam and shuttle box showing the binder bearing against the side of the shuttle, said binder being equipped with our improved protector;

Fig. 2 is a top plan view of said binder;

Fig. 3 is a front view thereof; with the protector removed;

Fig. 4 is a front view of the binder protector shown in Figs. 1 and 2;

Fig. 5 is a view in perspective of one of the clips used to grip and fasten each end of the fabric forming part of the device shown in Fig. 4;

Fig. 6 is a view in perspective of a different type of clip which can be employed for the same purpose;

Fig. 7 is a front view of a still different type of clip;

Fig. 8 is a longitudinal section thereof;

Fig. 9 is a cross section of a binder equipped with a protective device embodying our invention, said device being fastened in position by means of clips such as shown in Figs. 7 and 8;

Fig. 10 is a front view of a web or binder protector consisting of a strip or web of fabric provided with a fastening spring at each end; and

Fig. 11 is a fragmentary front view of a protective device illustrating a still different type of fastening clip.

Referring to Figs. 1 to 5, 20 designates a lay beam with a stationary shuttle box 21. 22 designates the lip on the mouthpiece and 23 the protector finger. The shuttle 24 of ordinary construction is provided with a bobbin 25 from the forward end 26 of which the weft or thread 27 unwinds. Said weft or thread emerges from the side of the shuttle at 28 and is turned rearwardly along the side 29 of the shuttle, so that said weft or thread normally rubs against the inner surface 30 of the binder 31 when the shuttle moves towards the right to the extreme position shown in Fig. 1. The binder 31 has an inwardly curved or bulging outline and is pivotally mounted at 33 and is pressed inwardly by a spring 33 causing it to yieldingly against the side surface of the shuttle.

In order to prevent excessive friction against the weft or thread, we equip that portion of the
curved surface of the binder which is likely to
come in contact with the side surface of the shut-
tle with a protector consisting of a strip 34 of
yielding material extending longitudinally of the
binder directly against the inner surface there-
of, and secured in position by suitable fasten-
ning means, for instance, by means of end clips 35.

The manner of applying the protective device
will be best understood from Figs. 2 and 3, which
illustrate the constructional type of binder used
in the arrangement of Fig. 1. From said figures
it will be observed that the central curved por-
tion of the binder is relatively wide and is con-
nected by two narrower or neck portions 37, 38
to its outer end 39 against which bears the pro-
tector finger 23 and to its hub or pivotal support
32 respectively. It is therefore feasible to pro-
vide a protecting strip extending for the entire
length of the wider central portion 36 and se-
cured in position at the strangled points 39, 40
where said wider portion joins the neck portions
37, 38.

By thus taking advantage of the shoulders
formed by the ends of the wider central portion, it
is possible to secure the protective strip tightly
in position, so that it will closely adhere to the
surface 34 of the binder, precluding the possi-
blity of its becoming loose or wrinkled. The strip
is neither too tight nor too loose, for it is

As stated above, the fabric should possess both
a cushioning effect and a good resistance to wear,
therefore, it should be a woven fabric in prefer-
ence to felt and it should be sufficiently thick and
soft to permit the clip to be securely embedded
therein during the movement of the shut-
tle. We have found that very good results can
be obtained by using as a protective strip, web-
bng such as is used for instance, in making wicks
for alcohol and oil burners. Such a type of fab-
ric has its main interwoven strands running in
a 'diagonal,' almost longitudinal direction, and
therefore is well apt to withstand rubbing action
which is exerted substantially in the direction
in which the fibers of such strands run. At the
same time, such a type of fabric is comparatively
soft and heavy and well adapted to provide the
needed "give" or cushioning effect.

However, there are undoubtedly other types of
fabrics or felts that can be used to good advan-
tage and therefore we do not wish to be re
stricted in this respect to any particular fabrics
or material. For instance, a protective strip
might be made of a suitable grade of rubber,
although we are aware that sponge rubber has
been used before as an integral part of a binder
and has not proved very satisfactory, due to the
fact that rubbing and heat are likely to cause
the rubber to harden and to disintegrate, and
also affect its resiliency.

In order to facilitate and enhance the prac-
tical use of the device it is preferable to equip
each end of the protective strip with fastening
means forming an integral part of the device
and doing away with the necessity of using
strings or other fastening means detached from
the strip and apt to become loose in service or
to become displaced. The fastening means can
be adapted to any suitable basis. For instance, in
Fig. 1, 2, 4, 5, we illustrate "clips made of thin, soft
metal, each 'clip being obtained from a cross
shaped blank bent midway of its width as shown
at 41, forming a double thickness T shaped clamp
having two longitudinal extensions 42, 43 acting
as means for fastening the device onto the
'binder, and two inwardly extending jaws 44, 45
provided with prongs such as 46 adapted to grip
the fabric therebetween and to securely hold it
in place.

The two longitudinal extensions 42, 43 can be
wound about the narrow or neck portions 37, 38
of the binder and their two ends can be folded
together to form a seam lock (not shown), connect-
sing said two longitudinal extensions to each other.

The construction of the clip may be somewhat
simplified by adapting the arrangement shown
in Fig. 6 in which the clip consists of a single
strip of soft and thin metal 47. Two prongs 48,
49 are punched out of the central part of the
strip and are bent downwardly, constituting
means for piercing the fabric, said prongs being
adapted to be turned outwardly or inwardly so
as to form a permanent connection between the
strip and the fabric.

In Figs. 7, 8 and 9 we show a still different type of
fastening or clip which consists of a thin strip
of metal 50, similar to that of Fig. 6, that is,
formed with two prongs 51, 52 adapted to go
through the fabric 53 and to be bent over as
shown in Fig. 9.

One of the ends of strip 50 is provided with two
openings 54, 55, and the other end is provided
with a tongue 56 extending lengthwise therethro-
from. The tongue is formed so as to slide and
be securely fastened by being inserted through
the fabric 53 and bent over as shown in Fig. 9.

The perforated end 58 of the strip 50 is bent rearwardly and
downwardly of the binder and the outer end of the
tongue 56 is inserted through opening 54 and
is bent reversely therefrom at 59 and is then
bent around the body of the device, its end 60
being finally inserted through opening 55 and
retaining the clip or fastening device in posi-
tion.

It is within the scope of our invention to pro-
vide the protective strip with fastening means
other than a metallic clip. For instance, in Fig.
10, we show the strip or fabric 61 provided at
each end with a spring 62, 63 by means of which
said ends may be tied in position upon the binder.

In Fig. 11, we show still another type of fasten-
ing device or clip comprising a thin metal strip
64 having open slots 65, 66, separated by a
bridge portion 67. The end 68 of the pro-
ective strip 69 is inserted through slots 65, 66,
and under bridge portion 67 and is strangled in
position by the frictional action of the edges of
said bridge portion and the edges of said slots,
securely locking the strip in position and pre-
venting its coming off.

Our invention may be carried into practice in
ways different from those shown without depart-
ing from the inventive idea; the drawings will
therefore be understood as illustrative purposes and not in a limiting sense.
Accordingly, we reserve the right to carry our
invention into practice in all those ways and
manners which may enter, fairly, into the scope
of the appended claims.

We claim:
1. A weft protector for looms equipped with a
shuttle box and a binder therefor, consisting of a
strip of cushioning material adapted to cover
the binding surface of said binder, and fastening
means permanently secured onto each end of said
strip, forming a unitary structure therewith, for
removably securing the same onto said binder.
2. A weft protector for looms equipped with a
shuttle box and a binder therefor, consisting of a strip of relatively thick and soft fabric, adapted to cover the binding surface of said binder, and fastening means permanently secured onto each end of said strip, forming a unitary structure therewith, for removably securing the same onto said binder.

3. A weft protector for looms equipped with a shuttle box and a binder therefor, consisting of a strip of cushioning material adapted to cover the binding surface of said binder, and a fastening member at each end of said strip, adapted to be wound about said binder for removably fastening said strip thereto, said member being made of relatively thin, soft, bendable metal.

4. A weft protector for looms equipped with a shuttle box and a binder therefor, consisting of a strip of cushioning material adapted to cover the binding surface of said binder, and a clip at each end of said strip, for removably fastening said strip onto said binder, said clips comprising two end extensions adapted to be wound about said binder and to be connected to each other at the rear thereof.

5. A weft protector for looms equipped with a shuttle box and a binder therefor, consisting of a strip of relatively thick and soft fabric, adapted to cover the binding surface of said binder, and a fastening member at each end of said strip, adapted to be wound about said binder for removably fastening said strip thereto, said member being made of relatively thin, soft, bendable metal.

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