Dec. 11, 1962 L. J. RASERO ETAL 3,067,484

FABRIC WEB

Filed Sept. 10, 1959

Fig. 1

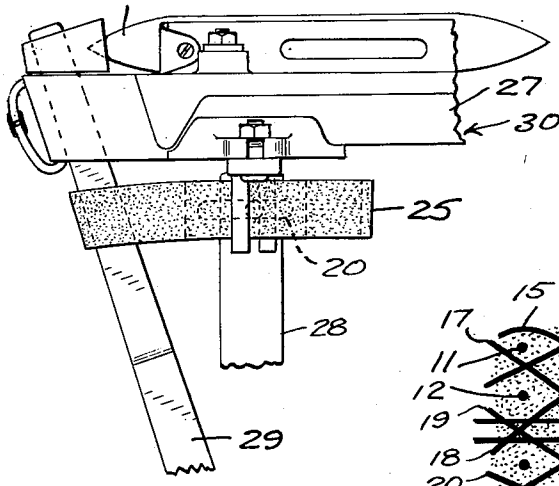
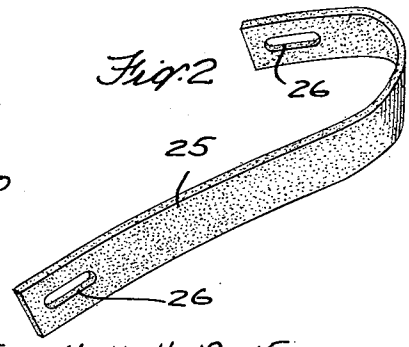


Fig. 2



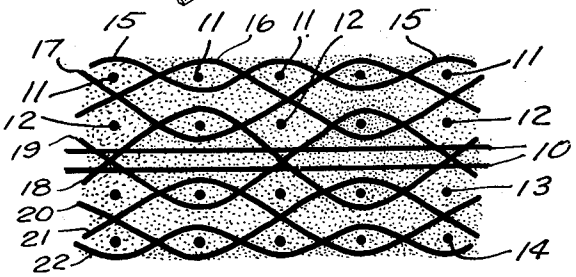


Fig. 3

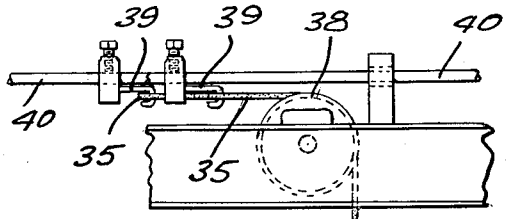


Fig. 4

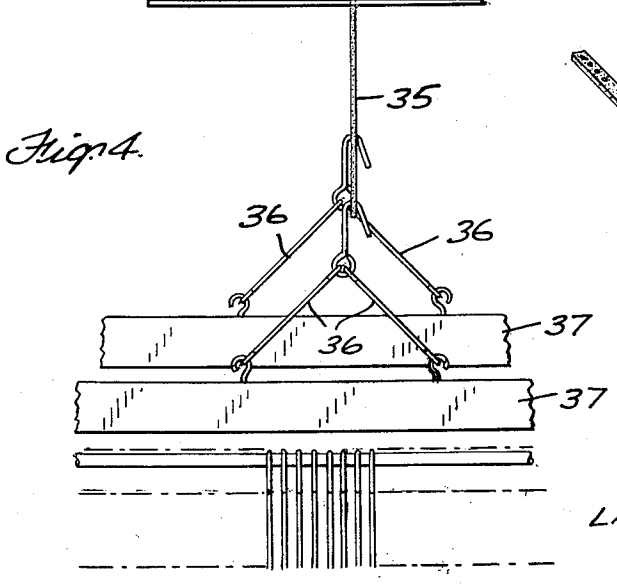
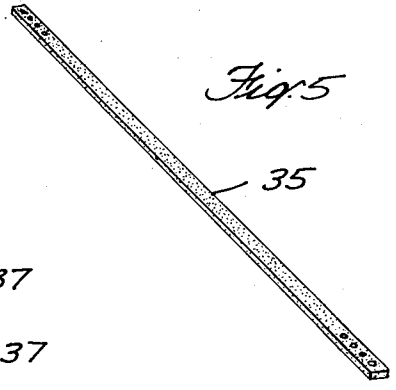


Fig. 5



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3,067,484

FABRIC WEB

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1 Claim. (Cl. 28—80)

This invention relates to fabric webbing adapted to absorb a high mechanical shock load and more particularly to a webbing suitable for use as a picker stick check strap or as a heddle frame harness strap on high speed looms.

Looms which are used in the weaving of textilt fabrics have constantly moving parts, particularly for the control of the warp threads, by the use of harness frames holding heddles through which the threads pass. These are directed to move upward and downward in order to produce the desired weave.

This motion must be controlled in order to eliminate the shock of starting and stopping and to provide a reliable continuous source of transmitting power from the head motion on the loom, which governs the operation of each harness frame. This is done by interposing between the harness frame and the head motion a harness strap which usually passes over a pulley, as the head motion is on one side of the loom and two pulleys are usually positioned equally across the width of the harness frame on small looms, with more pulleys on the wider looms.

The other area of control is the shuttle that moves through the warp threads and leaves behind it the filling yarn which completes the weave. The shuttle is motivated by a picker stick which has its input power multiplied by being longer on the output side than on the input side. This stick pushes the shuttle out of the box across the shed. The moment the shuttle is released from the box and flies through the warp yarn, the picker stick continues on with its momentum and must be controlled so that it does not hammer itself to pieces or destroy the mechanism which supports and holds it.

The purpose of this invention is to provide a woven material, suitably designed and treated, that can be used in these two areas of work on a loom, which have basically the same requirements.

A harness strap and a picker check strap must be able to absorb shock, must transmit a good deal of power, must be abrasion resistant to the motion, and yet be flexible and have long wear life, flex life and high strength. It should be oil and moisture resistant and be able to support these loads. It must absorb shock and transmit power without stretching, wearing or in any way losing its effectiveness.

It is an object of this invention to provide a woven material made of fibers which are oil and moisture resistant, have high abrasion resistance, as well as high strength, and when properly impregnated, have all of these qualities increased to a considerable degree.

A further object of this invention is to provide a special weave in which all of the threads perform equally so that the total strength is the sum of the strengths of the individual yarns.

Various other objects and advantages will be apparent as the nature of the invention is more fully disclosed.

The nature of the invention will be better understood by referring to the following description, taken in connection with the accompanying drawing in which:

FIG. 1 is an elevation of a portion of a picker check strap mechanism with shuttle in initial position;

FIG. 2 is a perspective view of the picker check strap;

FIG. 3 is an enlarged warpwise section of the weave;

FIG. 4 shows a portion of the loom in front elevation with two harness straps over pulleys; and

FIG. 5 is a perspective view of a harness strap.

Referring to the drawing more in detail, the fabric weave is shown in FIG. 3 as a four ply weave having stuffer yarns **10** disposed centrally and with first and second ply filler shots **11** and **12** above the stuffer yarns **10** and third and fourth ply filler shots **13** and **14** below the stuffer yarns.

The stuffer yarns **10** and filler shots **11** to **14** may be composed of any suitable material which is capable of bonding to an impregnant, such as cotton, nylon, rayon, Orlon or Dacron, a polyester of ethylene glycol and terephthalic acid, preferably in spun staple form.

The warp yarns are composed of spun Dacron which has a high tensile strength, and are so woven that the warp yarns are all equally stressed. More specifically, a warp yarn **15** is woven over and under successive upper ply filler shots **11**. A second warp yarn **16** is woven between first filler yarns **11** and **12**, then over second filler yarn **11**, between third filler yarns **11** and **12**, under fourth filler yarns **12**, between fifth filler yarns **11** and **12** and so on in a repeated pattern.

A third warp yarn **17** is woven as a double chain with the warp yarn **16**. The yarn **17** passes between first filler yarns **11** and **12**, under second filler yarn **12**, between third filler yarns **11** and **12** and over fourth filler yarns **11**. The yarns **16** and **17** bind the first and second plies together.

A fourth warp yarn **18** passes between first filler yarns **12** and **13**, then extends upwardly over second filler yarn **12**, then downwardly between the third filler yarns **12** and **13** and under the fourth filler yarn **13**, then between the fifth filler yarns **12** and **13** and so on. A fifth warp yarn **19** forms a double chain with the warp yarn **18** to bind the second and third plies together.

A sixth and seventh warp yarn **20** and **21** is woven as a double chain similar to the warp yarns **16** and **17** to bind the third and fourth plies together, and an eighth warp yarn **22** is woven as a chain over and under successive filler yarns **14** of the bottom ply.

The above weave is somewhat open to provide interspaces for the impregnating resin which is of the elastomeric type having great flexibility, such as neoprene latex. Borden Chemical Company makes a neoprene latex No. 610–40 which is suitable for this original impregnation.

The fabric is thoroughly impregnated with the neoprene latex or polyurethane which is air dried at room temperature. A surface coating of acrylonitrile styrene copolymer latex, for example, that made by Naugatuck Chemical Company, designated as Lotol 5433 is then applied to one or both sides of the fabric. This is again air dried at room temperature and is then press cured at 320° F. for from fifteen to twenty minutes, depending on fabric thickness.

This combined impregnation affords internal pliability and freedom of movement. It reduces the build-up of heat through internal friction and prevents oil and moisture from being absorbed into the fabric.

The surface coating produces a balanced friction that allows the harness straps and check straps to move in their respective areas with little resultant wear, yet they are shock resistant enough to absorb the power that must be diffused or transmitted through their use.

The use of this strip as a picker stick check strap for a loom is illustrated in FIGS. 1 and 2.

FIG. 2 shows the strap **25** having holes **26** at each end to receive securing bolts. In FIG. 1 the strap **25** is mounted below a lay beam **27** by links **28**.

A picker stick **29** extends into a shuttle loom **30** carrying a shuttle **31** shown in position to be shot through a warp seal.

The strap **25** forms a stop at both ends of the stroke

of the picker stick **29**. Due to the non-abrasive surface the resilience and the high tensile strength of the strip it has a relatively long life on high speed looms where the shock load is high.

FIGS. 4 and 5 show the use of a strap **35** of the above material as an actuating strap for a heddle frame. The strip **35** is connected by links **36** to a heddle frame **37**. The strip passes over a pulley **38** and the other end is connected by an adjustable link **39** to a heddle actuating bar **40**. In a wide loom a pair of such strips may be used, connected to opposite sides of the heddle frame.

In both of the above examples the tensile strength of the strip is equal to the sum of the tensile strength of the individual yarns because the yarns are all equally stressed and each supports its share of the load. Of course the number of plies can be increased or decreased according to the end use of the strip. For smaller forces the stuffer yarns **10** may be omitted.

The impregnating resin bonds the various warp yarns into a unitary structure and the surface coating improves the wear of the product.

Various other uses will be apparent to a person skilled in the art.

What is claimed is:

A fabric strip having high tensile strength, flexibility and wear resistance, comprising a multiple ply weave composed of a central layer of straight parallel stuffer yarns constituting tension members, a pair of filler yarns disposed in inner and outer plies on each side of said straight stuffer yarns, a pair of chain warp yarns binding together the filler yarns of each pair of inner and outer plies, an additional pair of chain warp yarns binding together the filler yarns of the two inner plies and extending between the straight stuffer yarns, and additional chain warp yarns woven with the filler yarns of each outer ply, said warp yarns being spun from fibers composed of a polyester of ethylene glycol and terephthalic acid, a flexible elastomeric resin selected from the group consisting of neoprene and polyurethane in the cured state impregnating said fabric and a surface coating of acrylonitrile styrene copolymer covering at least one surface of said fabric to impart abrasion resistance.

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