July 16, 1957 M. POLLOCK 2,799,494

BUMPER MEANS

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Fig. 1

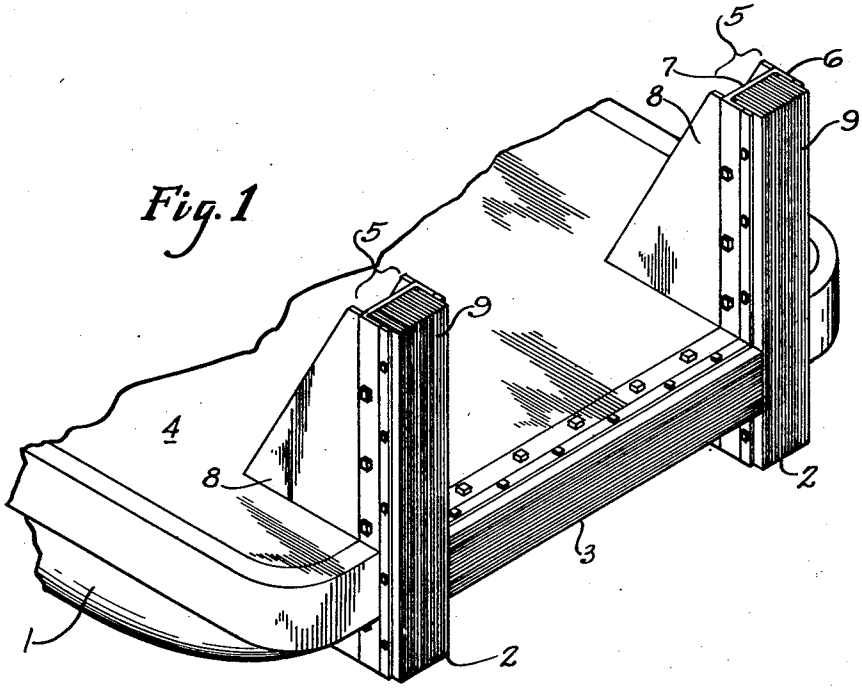
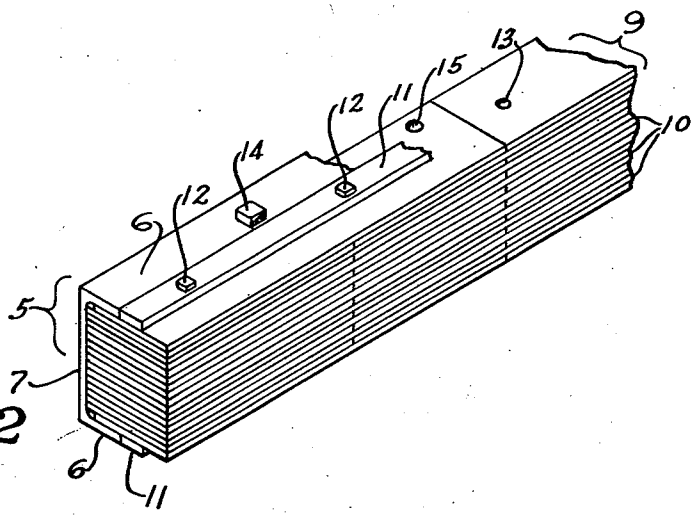


Fig. 2



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BUMPER MEANS

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4 Claims. (Cl. 267—1)

This invention relates to bumper means of the class employing a non-metallic, somewhat yieldable bumper block having a face for contact with the load, and mounted on the structure to have protection therefrom.

The invention is particularly adapted for application to the knees and headboards of ram towboats for contact with the barges which they serve.

Briefly, principal objects of the invention are to provide an improved block unit which may be conveniently factory preassembled from standardized unit pieces for shipment to the job, an improved manner of mounting the unit for service, and an improved manner of cooperation among the parts under their service conditions—all as will more particularly hereinafter appear.

Further objects and advantages will be apparent from the following description taken in connection with the accompanying drawings, wherein:

Fig. 1 is a perspective view of the forward or bow end of ram towboat, with an embodiment of my invention applied thereto; and

Fig. 2 is an enlarged detail of parts appearing in Fig. 1, generally in perspective but with parts broken away, illustrating the construction and relation of the parts in their complete final assembly.

With reference now to the drawings, and first to Fig. 1 thereof, **1** is the hull of a towboat which at its forward end is provided with a laterally spaced pair of vertically extending knees, generally indicated at **2**, and a headboard, generally indicated at **3** horizontally extending at the forward extremity of the hull between the knees. As is usual in the art, the knees extend from approximately the water line, upwardly very substantially above the line of the deck **4**, so that they may serve heavily loaded barges as well as those running light.

As to construction of the knees and headboard, for each knee **2** the towboat is provided with a rigid channel **5**, which may be of rolled section as illustrated, or might be of built-up welded construction, disposed with its flanges **6** forwardly extending and its web **7** transversely extending, and rigidly mounted on the hull **1** as by the bracing of side plates **8** which may be welded to the channels and suitably secured to the hull for the purpose.

A similar channel is suitably rigidly mounted in horizontal disposition between the knee channel **5**, for the headboard **3**.

According to my invention, for each channel I provide a generally rectangular bumper block **9** running the length thereof and of yieldable material and laminated construction.

As appears particularly in Fig. 2, the block **9** is made up of a stack of face to face layers **10** of yieldable material such as a rubber impregnated fabric. Rubber belting may be employed for the purpose, and the layers **10** may be cemented together to better cooperate in transmitting stresses and also resist service conditions. It is not necessary that all layers be of the same thickness, nor

need any layer be formed of a strip which is continuous throughout its length.

More particularly, preferably the block is made up of similar rectangular pieces of the fabric material, including single and double length units arranged in staggered pattern as appearing in Fig. 2, wherein the pieces are arranged in the stack end to end in their layers to provide continuous front and back block faces in which the pieces run edgewise. Each single unit has one end edge disposed at an end edge of a double unit in its layer, and its other end edge at the end of the block.

Each single unit has an opening **13** and another opening **15**, offset therefrom and each double unit has a pair of each of such openings **13** and **15** and is twice the length of a single unit.

Along the outer face of each outermost layer **10** and preferably extending substantially the length thereof, I arrange a relatively narrow clamp bar **11**, preferably of thickness that of the flanges **6**, in assembly with the stack of strips by a series of through clamping bolts **12** extending between the bars through the openings **13** at their spaced intervals along the block. By this arrangement an assembly unit is had including the stack of strips which form the bumper block per se, the clamp bars **11** and bolts **12** by which the strips are positively maintained in their rectangular block formation; and such unit may be factory made as a preassembly for shipment to the location of its installation.

As appears in the drawings, the thickness of the stack of strips is such that the resultant block will fit snugly between the pair of flanges **6** of the channel **5** by which it is to be mounted.

The relative width of the block and clamp bars **11**, and the location of the clamp bars **11**, is such that when insertion of the block into the channel is made, the strips of the block may bottom edgewise against the web **7** of the channel and also the clamp bars may bear upon the adjacent edges of the flanges **6**. Where the channel includes substantial fillets between its web **7** and flange **6** elements, the outer pair of strips in the stack which forms the bumper block may be cut slightly narrower as indicated in the drawings, to provide clearance from the fillets.

Also, the strips extend outwardly of the channels substantially beyond the bars **11** to there present edgewise contact with the load.

The block is secured in the channel by a series of longitudinally spaced mounting bolts **14**, each extending through the flanges **6** of the channel **5** and an opening **15** through the block.

The bolts **14** are located along the bumper in staggered relation to the bolts **12**.

In the completed assembly as illustrated and described, it may be noted that the block presents a working face substantially forward of the metal parts, wherein the strips of yieldable material run lengthwise and are presented edgewise. Opposite edges of the strips are disposed against the web **7** of the channel **5** so that the block substantially bottoms in the channel, the flanges **6** confining that portion of the block therebetween. The clamp bars **11** more snugly clamp that portion of the block between them, whereas that portion of the block extending beyond the clamp bars **11** is unconfined except for such cementing as may be employed if desired, to bind the layers together.

In practice, the openings **13** and **15** for the bolts **12** and **14** respectively, may be preferably slightly oversize for easy insertion of the bolts. Also, it will be appreciated that perfectly coincident bearing of the clamp bars **11** against the flanges **6**, and of the bumper stock itself

against the web **7** of the channel, can be only approximated rather than perfectly attained.

However, in service, effective operation will be substantially as follows:

Upon direct head-on bearing of the load, the block will bear against the web **7** of the channel and its portion extending outwardly beyond the clamp bars **11** may yield with deformation transversely of the strips.

On shifting of the load transversely of the strips, that portion of the block extending beyond the channel may flex in the direction of the shift. This may be accompanied by slight corresponding movement of the clamp bars **11** relative to the channel with lateral sliding on their flanges. If the channel is of rolled section so that the inner edges of its flanges are rounded, that will assist in preserving the outer layers of the block under such conditions.

If the load shifts longitudinally, any yield will be lengthwise of the bumper block, with possible sliding of the clamp bars **11** along their flanges of the channel, but without sliding of the block face against the web of the channel. The staggered relation between the bolts **12** and **14** accommodates such yield with minimum damaging effect upon the block.

The invention having been exemplified as applied to a ram towboat, it will be apparent that the parts are so arranged that the bumper faces of the knees and headboard are disposed in a common plane, as indicated in Fig. 1.

However, it will be appreciated that the invention is applicable to other structures which may include, or whereon may be rigidly secured, channels as described.

Where the block is made up of unit pieces of single and double lengths as above described, and illustrated in Fig. 2, some of the advantages set forth in my copending application Serial No. 380,535, filed September 16, 1953, for "Bumpers," are obtained.

In making the preassembly of layers between the clamp bars **11**, no piece need be placed over more than two of the bolts **12**, so that assembly is easily made.

If adhesive be omitted between the layers or the adhesive lose effectiveness after continued use, then the single units at the ends of the block may have some movement relative to the double units with which they have face to face bearing. Such movement may be slight but still sufficient to relieve tensile stresses which might otherwise tear the fabric.

It may also be noted that the bolts **12** and **14**, in addition to being in staggered relation with each other, are so located that two bolts **12** are most nearly adjacent the ends of the block, there being one fewer of bolts **14** than of bolts **12** along the block. This provides better clamping arrangement of the preassembly for shipment and also permits the freedom above described for the single units at the ends of the stack.

What is claimed is:

1. Bumper means for a structure to be protected thereby, and including rigid rectangular channel means on said structure and facing therefrom, bumper block means, of yieldable material disposed in layers stacked to run with the flange elements of said channel means, with layer edge portions disposed along the web element of said channel means, a pair of clamping bars located along the side faces of said block means immediately adjacent the edges of the flange elements of said channel means, said block means extending from said channel means substantially beyond said bars, a series of longitudinally spaced clamping bolts extending through said bars and said block means for their clamped assembly together as a unit, and a series of longitudinally spaced mounting bolts extending through the flange elements of said channel means and said block means, to secure said unit with said channel means.

2. Bumper means for a structure to be protected thereby, and including rigid rectangular channel means on said structure and facing therefrom, bumper block means of yieldable material having a portion fitting along and within the hollow of said channel means, a pair of clamping bars located along the side faces of said block means adjacent the edges of the flange elements of said channel means, said bumper block means and clamping bars being substantially coextensive, with adjacent corresponding ends, said block means extending from the web portion of said channel means substantially beyond said bars, a series of clamping bolts longitudinally spaced along said channel means and each extending through said bars and said block means for their clamped assembly together as a unit, and a series of mounting bolts longitudinally spaced along said channel means and each extending through the flange elements of said channel means and said block means, said mounting bolts being arranged in staggered relation to said clamping bolts, and said bolts being so arranged that the end two clamping bolts of their said series are nearer to their respective ends of the block, than are the end two mounting bolts of their said series.

3. Bumper means for a structure to be protected thereby, and including rigid rectangular channel means on said structure and facing therefrom, bumper block means of yieldable material having a portion fitting along and within the hollow of said channel means, a pair of clamping bars located along the side faces of said block means adjacent the edges of the flange elements of said channel means, said bumper block means and clamping bars being substantially coextensive, with adjacent corresponding ends, said block means extending from the web portion of said channel means substantially beyond said bars, a series of clamping bolts longitudinally spaced along said channel means and each extending through said bars and said block means for their clamped assembly together as a unit, and a series of mounting bolts longitudinally spaced along said channels means and each extending through the flange elements of said channel means and said block means, each of said mounting bolts being disposed in offset relation between a pair of said clamping bolts.

4. Bumper means for a structure to be protected thereby, and including rigid rectangular channel means on said structure and facing therefrom, bumper block means, of yieldable material disposed in layers stacked to run with the flange elements of said channel means, with layer edge portions disposed along the web element of said channel means, a pair of clamping bars located along the side faces of said block means immediately adjacent the edges of the flange elements of said channel means, said block means extending from said channel means substantially beyond said bars, a series of longitudinally spaced clamping bolts extending through said bars and said block means, for their clamped assembly together as a unit, and a series of longitudinally spaced mounting bolts extending through the flange elements of said channel means and said block means, to secure said unit with said channel means, said layers of said bumper block means including pieces of said material disposed end to end, through each of which at least one bolt of each said series extends.

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