To all whom it may concern:

Be it known that I, CHARLES H. PAINE, a resident of Englewood, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Collapsible or Folding Boats, of which a description is fully set forth in the following specification, taken in connection with the accompanying drawings.

The object of my invention is to provide a collapsible or folding boat which shall when in use combine the requisite strength and durability and which shall also be very light in weight and capable of being knocked down and folded and packed within a small space, so that little room may be required to store it and so that it may be easily carried about from place to place by the person using it.

My invention relates to boats of the kind which have flexible outer skins or coverings, such as canvas or other pliable materials, stretched upon a suitable framework, and it is my purpose to produce a boat which shall be of very simple construction, consisting of few parts, and easily set up or folded.

In the drawings, Figure 1 is a partial longitudinal sectional elevation. Fig. 2 is a plan view, the longitudinal ribs and the spreaders being shown in dotted lines. Fig. 3 is a detailed drawing showing a transverse section at x’x’ of Fig. 2 with my preferred form of spreader in position. Fig. 4 is a plan view of the boat when knocked down and partially folded. Fig. 5 is a partial plan view showing the top of the covering cut away a most to the ends of the boat. Fig. 6 is a partial plan view of my invention applied to a boat with blunt ends. Fig. 7 is a detail showing my preferred form of spreader folded ready for packing.

Like letters of reference indicate like parts throughout.

In general terms my invention may be described as a boat consisting of an outer flexible covering made in the desired shape and stretched upon a framework consisting of a number of longitudinal ribs, the ends of the ribs not being fastened together or confined except by the outer covering and one or more thwarts or transverse spreaders intermediate the ends of the ribs, which force the middle portions of the ribs apart, while the ends of the ribs are kept together by the outer covering, thus causing the ribs to bend or bow and giving to the boat its shape.

I will now describe more particularly my preferred manner of construction and mode of application of my invention.

My boat consists of an outer covering A, as shown in the drawings, a number of longitudinal ribs B, and one or more thwarts or transverse spreaders C.

The outer covering A is made of any suitable flexible waterproof material, such as canvas or the skins of animals, which is made up in the shape and size which it is desired that the boat shall assume when the proper form is given to it in the manner hereinafter described, the top or deck of the covering A being cut away to any desired extent—for example, so as to form either a small cock-pit, as shown in Fig. 2, or a practically open boat, as shown in Fig. 5—it being unnecessary to leave merely enough of the top of the covering at the extreme ends to keep the ends of the ribs in place. Upon the inside of the covering A are sewed or otherwise fastened longitudinal casings D of material similar to that of which the covering is made, the number of the said casings corresponding to the number of longitudinal ribs to be used and the length of the same being approximately one-third of the length of the boat.

The longitudinal ribs B, of wood or other resilient material, may be made in one continuous piece or a number of pieces joined together by joints such as are shown at b or any other suitable connector; but I prefer to make them in three sections, as shown, for convenience in packing. It is also preferable to make the ribs B circular in cross-section, so that their spring may be equally exerted against pressure in any direction, and tapered slightly toward their ends to reduce their weight. The total length of each rib B should be somewhat less than the inside length of the covering A, and the number of ribs to be used will depend upon the size and strength of the boat desired to be produced. I have found, however, that good results are obtained by using four longitudinal ribs.

Any convenient form of spreader may be used; but I have shown in Fig. 3 my preferred form, which consists of the arms c' c'', pivoted together by bolts e e, provided with thumb-nuts f f; Fig. 2. The ends of the arms c' c'' are provided with notches to engage with the ribs B when the spreader C is
in position, and when not in use the spreader can be folded, as shown in Fig. 7, by loosening the nuts \( f \) and closing up the arms. In setting up my boat the covering A is first laid out flat. Then the central sections of the ribs B are inserted into the casings D, the said casings serving to keep the ribs B in position and at the same time to protect them from injury by being stepped upon when the boat is in use. The end sections of the ribs B are then put in position and connected firmly to the middle sections by means of the joints \( b \), the total length of each rib being somewhat less than the inside length of the covering A, and thus allowing the end sections of the ribs B to be pushed far enough toward the ends of the boat to clear the ends of the joints \( b \) and then to be brought back into the joints. When all of the ribs B have been inserted, the spreaders C are put in position and set up, the notched end of each arm of C engaging with one of the ribs B. The ribs B are thus forced apart amidships and the covering A is distended.

As the extreme ends of the ribs B are confined by the covering A the ribs B (when the spreaders force the ribs apart amidships) are bent or bowed in a long curve from end to end of the boat, and inasmuch as the ends of the ribs B are not connected together or confined except by the covering A, the said ribs have a spring action which is distributed throughout their length and which constantly tends to keep the covering A tightly stretched over the frame, thus giving great resiliency to the whole structure.

The construction above described provides a boat which can be made very strong and at the same time very light and durable and which by reason of the simplicity of its construction and the small number of parts and the absence of the necessity of the adjusting devices usually requisite in such constructions is easy to build and easy to set up or knock down. The construction is also well adapted to withstand shocks or blows from collisions with other objects, for, as will readily be seen, if a blow is received upon the exterior of the boat the part struck will readily yield to the blow without breaking, while the shock of the blow will be taken up by the whole structure by virtue of the spring of the ribs resulting from the ends of the ribs being independent of each other. Another advantage resulting from my peculiar construction is that the spring of the ribs is constantly exerted to keep all parts of the cover fully distended, thus doing away with the necessity of making the cover so that it will exactly fit the framework and of supplying adjusting devices to take up the slack when the cover stretched.

I have described above the form in which I have found it best to embody my invention; but I do not wish to limit myself to the particular form shown so far as the particular construction of the parts is concerned.

I am aware that collapsible boats have been made with flexible covers stretched upon frames consisting of longitudinal ribs and thwart or transverse spreaders; but in all boats of this type heretofore used a stem and a stern post or equivalent devices have been employed, to which the ends of the ribs have been fastened in such manner that advantage could not be taken of the spring of the ribs to distribute the shock of a blow and to constantly tend to stretch the outer covering and to do away with the necessity of precise adjustment of the parts of the framework and exact fitting of the cover. I therefore desire to claim, broadly, in this application a boat in which the spring of the ribs is permitted to be constantly exerted to distend the outer covering.

What I claim is:

1. A boat having a flexible covering, a plurality of resilient longitudinal ribs extending substantially from end to end of the boat, the ends of which are free to move independently of each other, and one or more transverse spreaders, substantially as shown and described.

2. A boat consisting of a flexible cover, a plurality of resilient longitudinal ribs extending substantially from end to end of the boat, the ends of which are free within the covering and terminate near the ends of the boat, and one or more transverse spreaders intermediate of the ends of the ribs, substantially as shown and described.

3. In a boat, the combination of a flexible covering, a plurality of resilient longitudinal ribs extending substantially from end to end of the boat, the ends of which are free within the covering and terminate near the ends of the boat, and one or more spreaders intermediate of the ends of the ribs, substantially as shown and described.

4. In a boat, the combination of a flexible covering, a plurality of resilient longitudinal ribs extending substantially from end to end of the boat, the ends of which are free within the covering and terminate near the ends of the boat, and means for expanding the ribs against the covering, and causing them to exert a constant spring-pressure thereon, substantially as shown and described.

5. A boat consisting of a flexible covering, a plurality of resilient longitudinal ribs extending substantially from end to end of the boat, and means for expanding the ribs against the covering, and causing them to exert a constant spring-pressure thereon, substantially as shown and described.

6. A boat, comprising a flexible covering,
stretched upon a framework consisting of a plurality of resilient longitudinal ribs, the ends of which are free within the covering, and one or more transverse spreaders intermediate the ends of the ribs, which hold the ribs apart amidships, while the ends of the ribs are kept together by the narrower ends of the covering, substantially as shown and described.

CHARLES H. PAINE.

Witnesses:

JOHN C. KERR,

M. LAWSON DYER.