Jan. 4, 1966 R. F. BIRD 3,226,861

STRETCHING RACK

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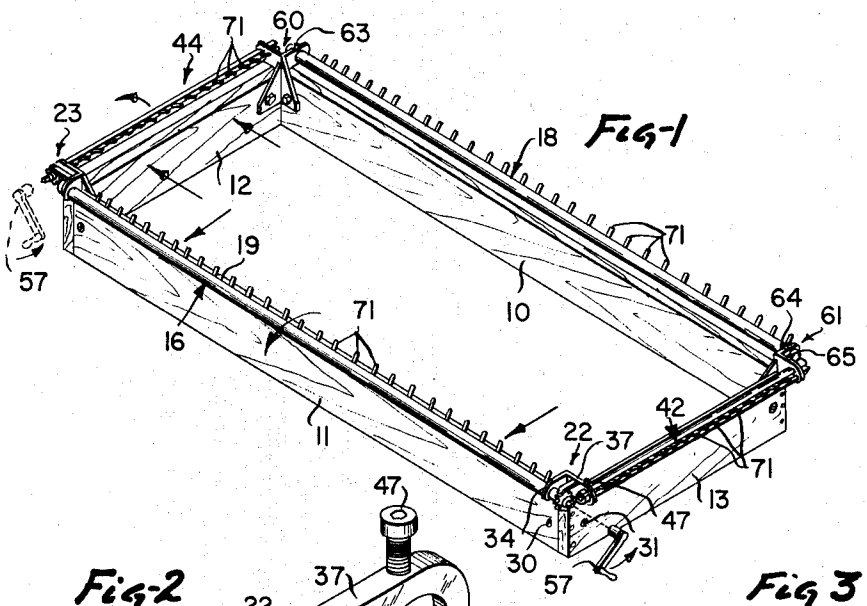


Fig-1

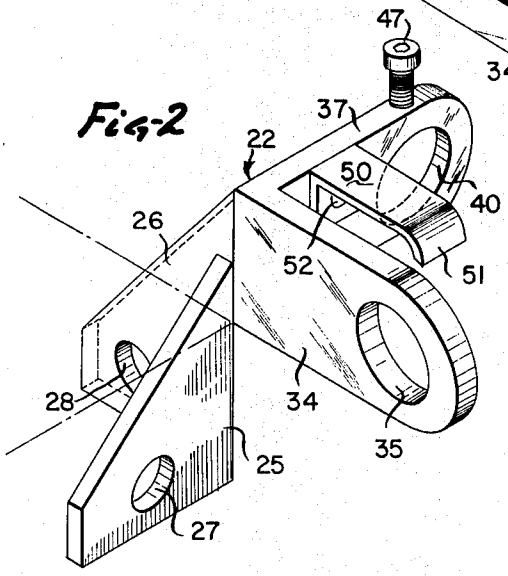


Fig-2

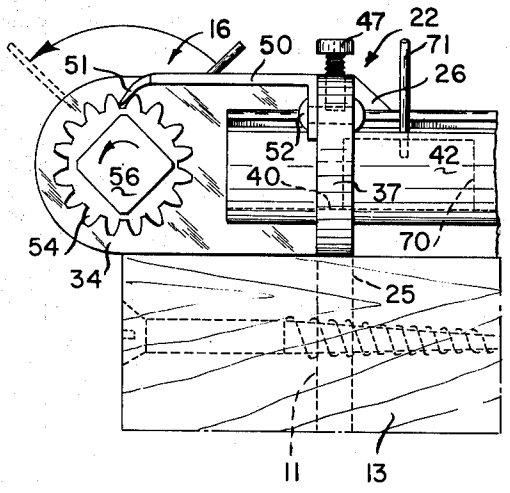


Fig 3

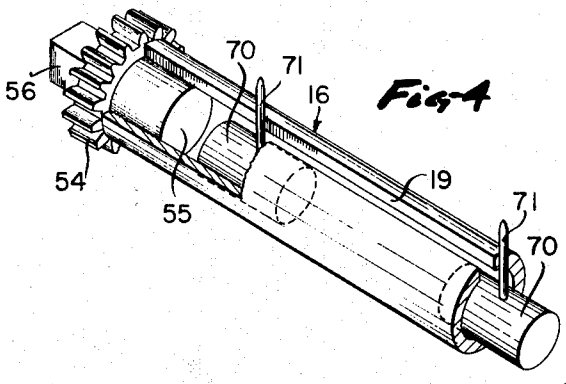


Fig-4

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Fig-5

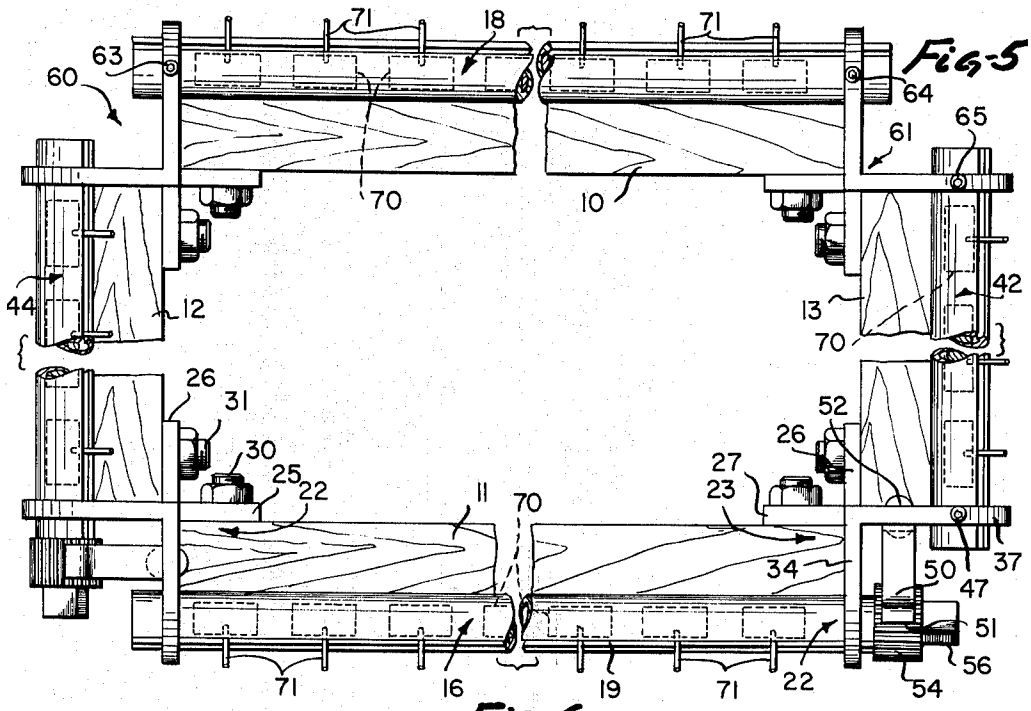


Fig-6

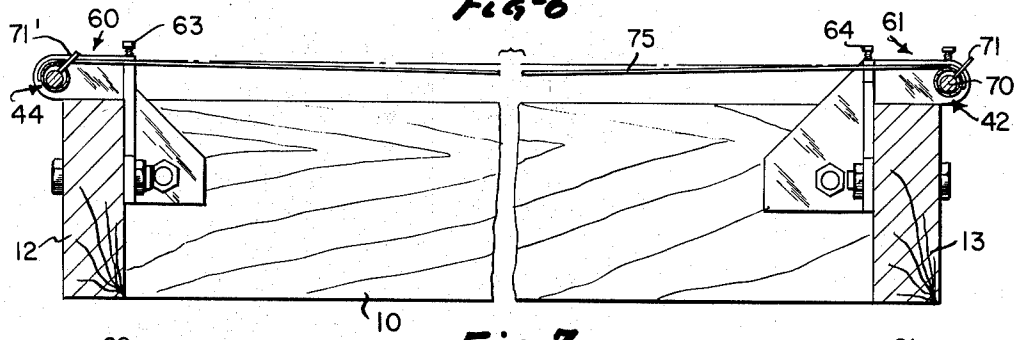
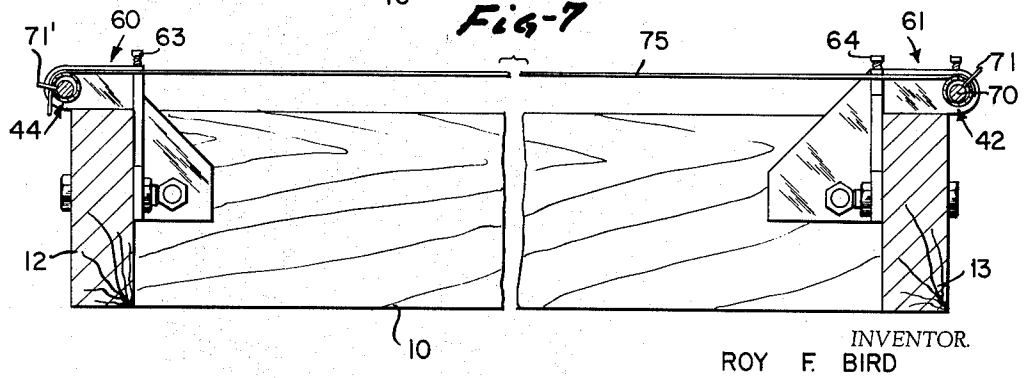


Fig-7



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United States Patent Office 3,226,861 Patented Jan. 4, 1966

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STRETCHING RACK

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Filed Aug. 20, 1963, Ser. No. 303,230
4 Claims. (Cl. 38—102.91)

This invention relates to a stretching frame or rack for stretching various materials such as rugs, cloth material or canvasses on which portraits are to be painted. The invention may also be used for stretching needlecraft work or for stretching any other comparable or similar work.

The primary object of the invention is to provide a simplified, but extremely effective and economical stretching rack for the purposes stated and furthermore, one that is capable of stretching the material in two directions that are normal to each other. The material may be stretched in both directions simultaneously, if desired.

Another object is to facilitate and make easy and simple the placing of the material on the rack and the execution of the stretching operations.

Another object is to provide means embodied in the stretching rack for holding the material which means are automatically movable to accommodate to the stretching of the material in both directions without wrinkling or binding. In other words, the material is stretched smooth, evenly and taut, the realization of this result in the operation being one of the objects of the invention.

A preferred exemplary form of the invention is described in detail hereinafter. The manner in which the above objects are achieved in the preferred embodiment will be apparent from the detailed description and annexed drawings. Further objects and advantages of the invention will be apparent from the detailed description and drawings wherein:

FIGURE 1 is a perspective view of a preferred form of the invention;

FIGURE 2 is a detail view of one of the corner bracket assemblies used;

FIGURE 3 is a detail view of one of the corner brackets showing pawl and ratchet holding means;

FIGURE 4 is a detail view partly in section of an end part of one of the tubular holding and stretching means;

FIGURE 5 is a plan view partly broken away of the form of the invention shown in FIGURE 1;

FIGURES 6 and 7 are longitudinal sectional views of the rack illustrating its operation.

Referring to FIGURE 1 of the drawings, this figure shows an exemplary preferred form of the invention wherein it takes the form of a rectangular frame or rack made of wooden side members **10** and **11** and wooden end members **12** and **13**. These members are attached together into a rectangular structure as shown by means of nails or dowel pins or in any other suitable manner. The material to be stretched is placed over this frame or rack and is held and stretched as will be described.

For holding and stretching the material, there are provided adjacent the upper edges of the side members **10** and **11**, tubular holding means as designated at **16** and **18**. These tubular means may by way of example be aluminum tubes or pipes of perhaps ⅞" external diameter and ⅝" internal diameter. Each has a longitudinal slot as designated at **19** in the tubular member **16**, the slot not being visible in the tubular member **18**. The tubular member **16** is rotatable about its axis and the tubular member **18** is fixed.

The tubular member **16** is rotatably mounted at its ends in end brackets, as designated at **22**, and **23**, which are supported at corners of the rack or frame. FIGURE 2 shows the corner bracket **22** in detail. It is of integral construction comprising two wings **25** and **26** having openings **27** and **28**, these wings extending at right angles to each other so as to be adapted to fit into a corner of the frame in the manner illustrated in FIGURE 5. The bracket is held in place by bolts **30** and **31** extending through the wings **25** and **26**, as may be seen in FIGURE 5. The bracket **22** has an integral extending lug **34** having an opening **35** in which is journaled the end of the tubular member **16**. This lug extends in a plane parallel to that of the wing **26**. The bracket **22** has another extending lug **37** extending at right angles to the lug **34** and having an opening **40** in which is received the end of one of the tubular holding members at the ends of the rack. These tubular holding members are identified by the numerals **42** and **44**. They are positioned just above the end members **12** and **13** and extend parallel to the end members. They are of the same construction as the side tubular holding means or members **16** and **18**. The lug **37** of bracket **22** receives the end of the tubular holding means **42** in opening **40** and the member **42** is non-rotatably held therein by means of a setscrew **47** which may be turned by means of an Allen head wrench or the like. Extending from the lug **37** parallel to the lug **34** is a steel spring bracket **50** the end of which is turned down as shown at **51** so that it forms a pawl. This bracket may be attached to the lug **37** by rivets or the like as shown at **52**. The pawl **50** cooperates with a gear or cogwheel **54** secured to the end of the tubular member **16**. The gear or cogwheel **54** has a short extending integral shaft **55** which is inserted into the end of the tubular member **16**, as shown in FIGURE 4, and is welded therein. On the other side of the gear or cogwheel **54** is a square projection **56** of a size to be received in a socket in an operating crank **57**, as shown in FIGURE 1. The crank **57** may be fitted onto the projection **56** for turning the tubular member **16** for a purpose as will be described presently. The tubular member **16** may be restrained from rotation by means of the pawl **50–51** engaging the teeth of the gear or cogwheel **54**, as shown in FIGURE 3.

The corner bracket **23** is similar in all respects to the bracket **22** and, therefore, will not be described in detail. The end tubular member **44** may be turned by a crank such as the crank **57** in the same manner as the tubular member **16** is turned.

Corner brackets are provided at the other two corners of the frame or rack as designated at **60** and **61**, these brackets being the same in all respects as the brackets **22** and **23** except that they are not equipped with means for manually turning the tubular members supported thereby. The bracket **60** has a setscrew **63** corresponding to the setscrew **47** for restraining the tubular member **18** against rotation and the bracket **61** has a similar setscrew **64** for this purpose. The bracket **61** has an additional setscrew **65** corresponding to the setscrew **47** for restraining turning movement of the tubular member **42**.

All of the tubular members **16**, **18**, **42** and **44** are equipped with holding means or members for holding the material to be stretched and these members are movable or slidable to accommodate the stretch of the material in both directions. The details of the holding members are shown in FIGURE 4. The holding members comprise plugs, as designated at **70** which slidably fit within the bores of the tubular members as illustrated in FIGURE 4. These plugs may be made of wood or other suitable material and they have extending from them metal pins, as designated at **71** which protrude outwardly through the elongated slots as shown in FIGURE 4. These plugs are fairly closely spaced, as for example in a tubular member or pipe 40 inches long there would be approximately 30 plugs with pins to hold the material. These plugs may be one inch in length, for example. The slots such as shown at **19** may be just wide enough to accommodate the pins

71. As will be observed, all of the tubular members **16**, **18**, **42** and **44** are similarly equipped with the sliding holding means in the form of the sliding plugs **70** and pins **71**.

From the foregoing the manner of use of the stretching rack or frame will be apparent to those skilled in the art. The material to be stretched is placed over the frame with edge parts secured of held by the pins **71** in the sliding holding members **70** within the tubular members at the sides and ends, as described. The tubular members **18** and **42** are in the position as shown in FIGURES 1, 5, 6 and 7, and do not rotate, being held by their respective setscrews. FIGURES 6 and 7 illustrate the operation of the rack in stretching material in the longitudinal direction having reference to a rack of the shape of FIGURE 1. FIGURE 6 shows the material **75** to be stretched in slack condition before the tubular member **44** has been rotated by the crank **57**. FIGURE 7 shows the material **75** in taut or stretched condition after the tubular member **44** has been rotated by the crank **57**. As will be observed, the pins, as designated at **71'** in FIGURES 6 and 7 have been rotated to stretch and draw the material taut. It will be observed that while this is being done the material is being held along the side edges by the plugs and pins **71** in the tubular members **16** and **18**. As the material is stretched, the plugs **70** are free to slide in the tubes **16** and **18** so that they and the pins **71** accommodate themselves to the stretching of the material so as to prevent any wrinkling, buckling or binding along the edges of the material. It is stretched smoothly, evenly and tautly so that the desired result is achieved most effectively.

Stretching in the transverse direction is accomplished in a similar manner by rotating the tubular member **16** by the crank **57**. When this is done the plugs and pins **71'** in the end tubular members **42** and **44** slide similarly in order to accommodate the position of the holding means to the stretch of the material. Stretching may be done simultaneously in both directions, if desired. As may be observed, the particular means for holding the material while it is being stretched are such that there is no wrinkling, buckling or binding of the material so that a smooth, even, uniform and taut stretch is realized in both directions very effectively. The amount of stretch is determined by the amount of rotation imparted to the tubular members **16** and **44** and they may be held in any rotated position as described above by the means as described above. That is, illustratively, the pawl **50–51** is engaged with a tooth of the cog or gear wheel **54** to hold the tubular member from rotating and may be released by hand. By way of example, the cog or gear wheel **54** may have 16 teeth.

From the foregoing, those skilled in the art will observe that the invention as described herein achieves and realizes all of the objects and advantages as enumerated in the foregoing as well as having many additional advantages which are apparent from the detailed description. The invention is of very simple, rugged and economical

construction although it is extremely effective for its purpose. It is capable of making possible the stretching of many different types of material very uniformly and evenly and to a desired degree of tension without wrinkling, buckling or binding, but on the other hand with a smooth, even, uniform stretch. The material may be held in any desired condition of stretch in the manner described.

The foregoing disclosure is representative of a preferred form of the invention and is to be interpreted in an illustrative rather than a limiting sense, the invention to be accorded the full scope of the claims appended hereto.

I claim:

1. A stretching rack for stretching materials in directions transverse to each other comprising a frame having sides and ends, means adjacent to but spaced from the sides for holding the material to be stretched at a plurality of points, means adjacent to but spaced from the ends for holding the material to be stretched at a plurality of points, means whereby the said holding means adjacent one side only may be operated to stretch the material between the sides, means whereby said holding means adjacent one end only may be operated to stretch the material between the ends, said holding means adjacent the sides and ends of the frame comprising spaced holding elements securable to the material to be stretched at the said spaced points, and means whereby each of the holding elements is individually free to move in a direction along the sides and ends respectively to accommodate the stretching of the material comprising tubular members having sliding means therein which are guided in the tubular means, each of said sliding members carrying one of said holding elements.

2. A device as in claim **1** wherein the said frame is rectangular having four corners and including an integral bracket mounted in each corner, said brackets having the tubular means journaled therein.

3. A device as in claim **1** wherein each of said tubular means has a slot in it, said sliding members being in the form of plugs slidable in the tubular means, and said holding elements comprising holding pins extending from said said sliding members outwardly through the said slots.

4. A device as in claim **1** including means for rotating one of said tubular means along the sides, and one along the ends about its axis, whereby to exert a stretching effect on the materials to be stretched.

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