

2. Sheets. Sheet 1.

## Making Rope Packing.

No. 112,651.

*Patented Mar. 14. 1871.*

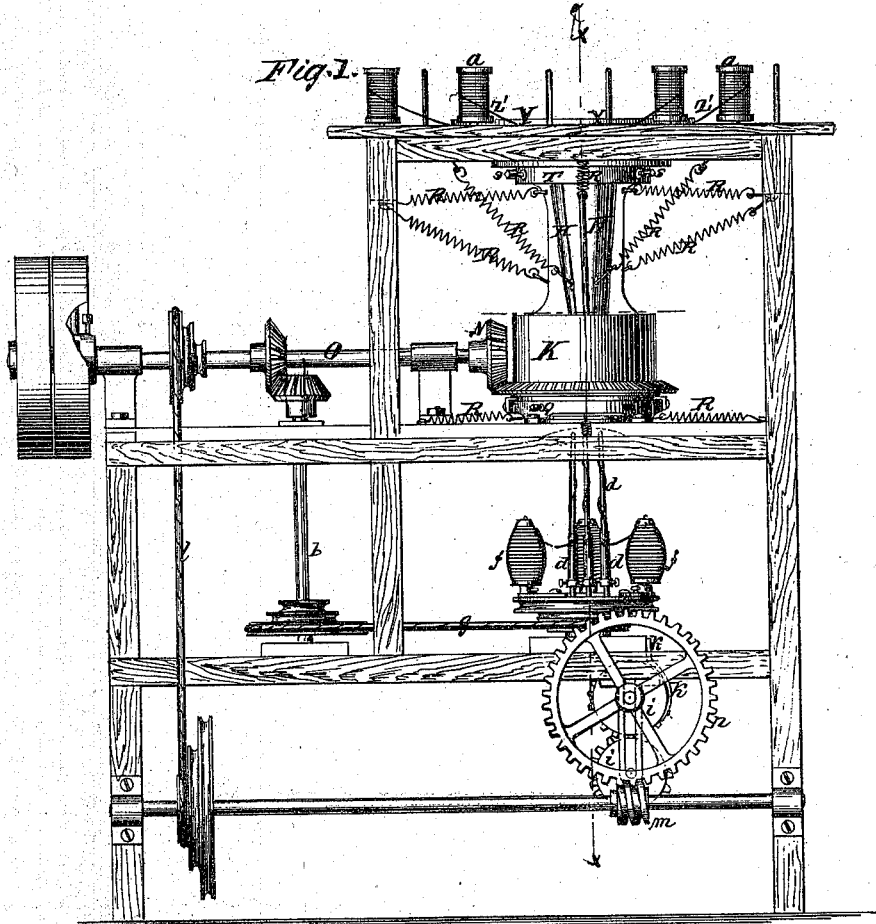
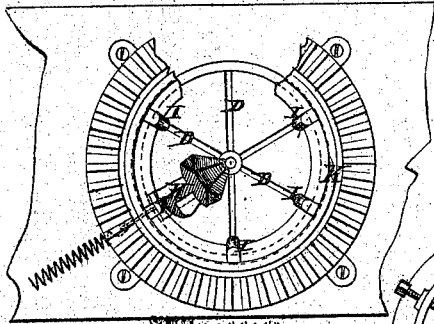
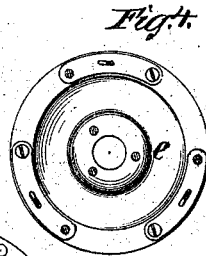


Fig. 2.

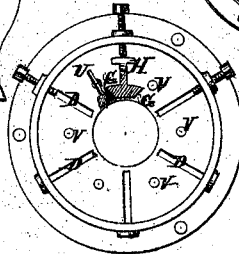


**Witnesses:**

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*Fig. 3.*



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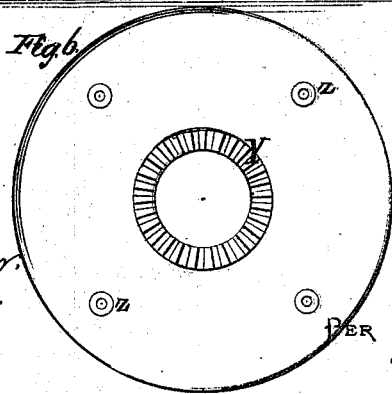
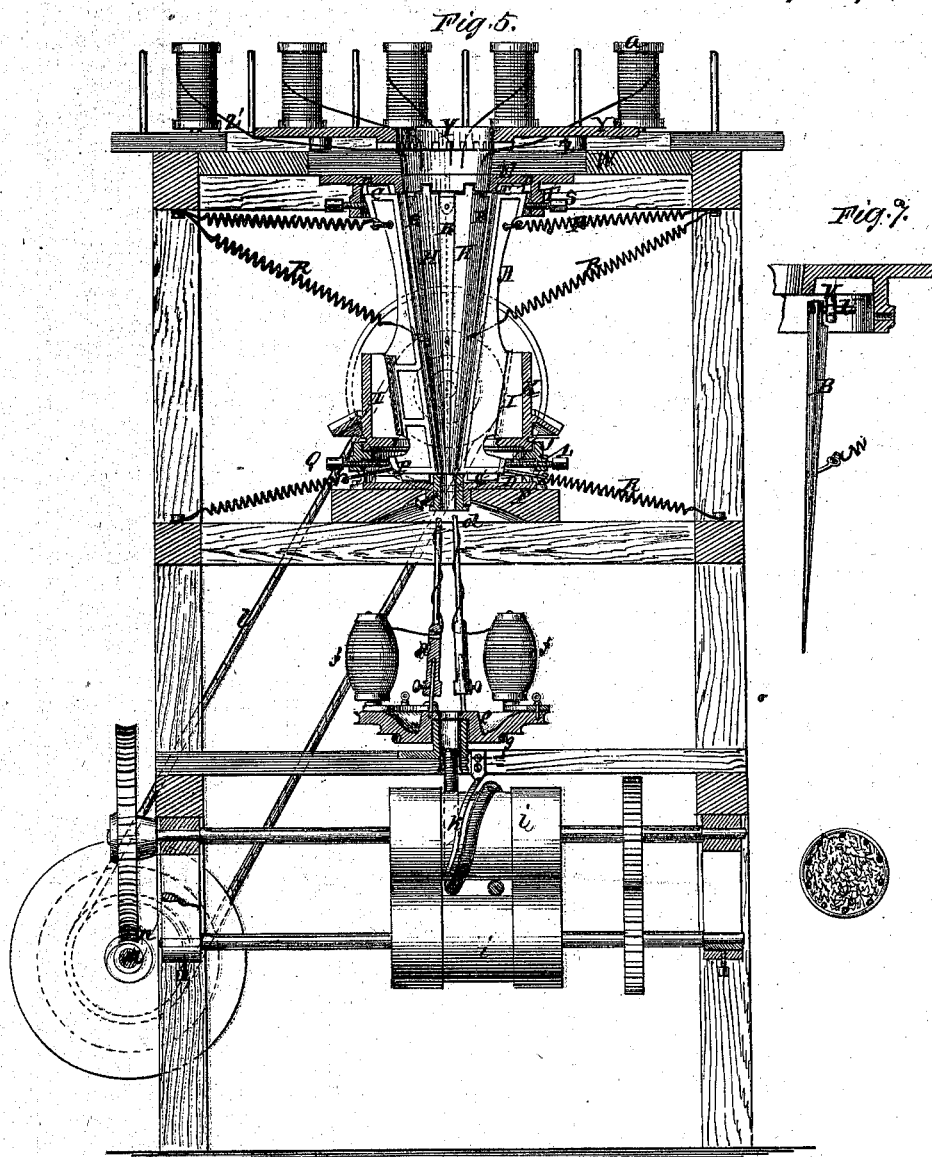
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Stevens & Lindsley, 2, Sheets, Sheet 2.

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN MACHINERY FOR FORMING PACKING FROM ASBESTUS AND OTHER FIBROUS MATERIALS.

Specification forming part of Letters Patent No. **112,651**, dated March 14, 1871.

*To all whom it may concern:*

Be it known that we, CHASE A. STEVENS, of the city of New York, in the county and State of New York, and ISAAC LINDSLEY, of Paw-tucket, in the county of Providence and State of Rhode Island, have invented new and Improved Machinery for Forming Ropes for Packing and other Purposes; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification.

This invention relates to improvements in apparatus for forming ropes, or structures in the form of ropes, of fibrous substances of any kind; but it is more particularly intended to provide apparatus specially adapted for forming packing, in the form of ropes and cords, of asbestos and other mineral fibers, from loose fibers, without twisting, for packing steam-engines, pumps, and the like. The invention consists, mainly, in a vertical compressing apparatus of long bars or staves, arranged to inclose a space having the form of an inverted cone, said bars or staves having to-and-fro radial movements imparted to them by suitable mechanism, to compress the fiber fed into the said space and deliver it in the form of a rope or cord, or in square, octagonal, or flat form, through a hole at the lower ends of said staves. The invention also comprises a combination, with the said compressing apparatus, of spool-holders and yarn-guides, for holding and delivering yarn or cord to the fiber as it is fed through the apparatus and compressed for working in with the rope for strengthening it to resist tensile strain. The invention also comprises a combination, with the said compressing apparatus, of apparatus for covering the said rope with twine or thread, or winding twine or thread around it, to confine the fibers in the compressed form in which they are delivered; and it also comprises a combination, with the said compressing apparatus, of a pair of rolls and a guide for receiving the finished rope and conducting it away.

Figure 1 is a side elevation of our improved machine. Fig. 2 is a horizontal section through

the compressing apparatus, taken on the line *xx* of Fig. 1, looking downward. Fig. 3 is a view of the part shown at the same section, looking upward. Fig. 4 is a horizontal section of the covering or binding apparatus. Fig. 5 is a sectional elevation taken on the line *xx* of Fig. 1. Fig. 6 is an under-side view of the top plate. Fig. 7 is a detail view of one of the compressing-bars and its support and guide at the upper end, and Fig. 8 is a transverse section of the rope packing made by this machine.

Similar letters of reference indicate corresponding parts.

The compressing bars or staves comprise two kinds, A and B, which are arranged around a vertical axis to form a kind of funnel for the reception of the fiber to be compressed and worked into the cord or rope at the wide upper end, and gradually compress it into the form and size required as it works down to and escapes at the orifice at the lower end. The said bars are widest at the top, and narrow down to a point, or nearly so, at the bottom, as is required in order to inclose the said conical space. The bars A have horizontal ribs C at each end, which work in radial grooves D in the plates E F, in which they are supported and guided in their radial movements. The edges G of these plates are oblique to the planes of their greatest breadth, making them much narrower at the inside than at the outside, and they have the projections H on the outsides, near their lower ends, to be acted on by the long vertical tappets I of a deep vertical ring, K, resting and turning in the annular recess J of a ring, L, rising up from the base-plate F, said ring K having a toothed rim, M, in which a pinion, N, works to turn it, said pinion being on the main driving-shaft O. At the lower ends these bars have other projections, P, against which the temper-screens screw through the ring L, to limit the backward movement of the said bars, which are caused by springs R, attached one to each end. The upper ends also work against adjusting-screens S, supported in the ring or flange T of the plate E. The bars B are made in the triangular-pointed

shape represented in Fig. 7, to fit the triangular spaces formed between the bars A by the oblique sides G, in which they lie, being suspended at the upper ends by stud-pins U, working in eye-studs V on the ring T. The plate E is supported on the under side of the top W of the frame, through which is a hole as large as the space within the compressing-bars at the upper end; and above the top W is a broad plate, X, also having a similar hole, and the series of radial grooves Y around said hole on the lower side. This plate is supported a little above the top W by studs Z, to provide space for the twisted threads or cords Z', of animal or vegetable or other fiber, to be incorporated with the ropes to be formed by introducing them from spools a to the condensing apparatus through the grooves Y, so that they pass down along the sides of the compressing-bars, and become embedded in the substance of the rope longitudinally at suitable distances apart for increasing the tensile strength. The rope or cord of packing thus formed is delivered through the nozzle b in a hole in plate F at the lower end of the compressor, and passes between two or more fliers, d, on a horizontally-revolving table, e, carrying bobbins f of binding cord or twine, which is wound on the packing as it passes along by the said fliers, which are driven by a cord, g, working from the counter-shaft h, which is driven from the main shaft, or it may be by any other means. Below this table e, which has a hole in the center for the cord to pass through, is arranged a pair of drawing-rollers, i, over which or one of them the said rope or packing-cord passes, and is delivered to any receiving apparatus. K is a guide fitted against the side of one of the rollers, and suitably arranged to cause the rope to wind spirally around it, to prevent it from contact with itself when it is first received upon the roll, which, by the rubbing of the two parts together, would displace the binding cord or twine. These rollers are driven from the main shaft by the cord l, shaft m, and worm-gears n; but they may be driven in any approved way. All the moving parts are geared to have the proper speed relatively to each other.

While this compressing apparatus is spe-

cially adapted for compressing the mineral fiber of asbestos, amianthus, hornblende, and the like into a rope-like structure, it may also be used with good results in connection with twisting apparatus for making ropes of vegetable or animal or other fiber, by compressing it in the same way into a rope or sliver, and delivering to a spinning apparatus, such as a flier or other equivalent device adapted for spinning, and placed below the nozzle, in place of the covering apparatus here shown, and we propose to make such use of it.

In the manufacture of the packing, the fiber may be compressed upon and around a central core of cord or twine, or any strong fiber, which may take the place of the cords Z', the said cord being fed down into the compressor at the center from a spool above, or in any approved way.

The compressor may be arranged horizontally instead of vertically, if preferred; but we prefer to arrange it as here shown.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. The funnel-shaped fiber-compressor, consisting of the two sets of staves or bars, arranged for having the simultaneous to-and-fro radial movements, substantially as specified.
2. The combination, with the compressing staves or bars, of the plates E F, having the radial grooves D, substantially as specified.
3. The combination, with the said compressing staves or bars, of the tappet-ring K and springs R, substantially as specified.
4. The combination, with the compressor, of the cord-guide X Y, substantially as specified.
5. The combination, with the compressor, of the covering-fliers d and bobbin-carrier e, substantially as specified.
6. The combination, with the compressor, of the drawing-rolls, substantially as specified.
7. The combination, with the drawing-rolls, of the guide K, substantially as specified.

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