(No Model.) 3 Sheets—Sheet 1.

J. E. ATWOOD.

SPINNING FRAME.

No. 338,216. Patented Mar. 16, 1886.

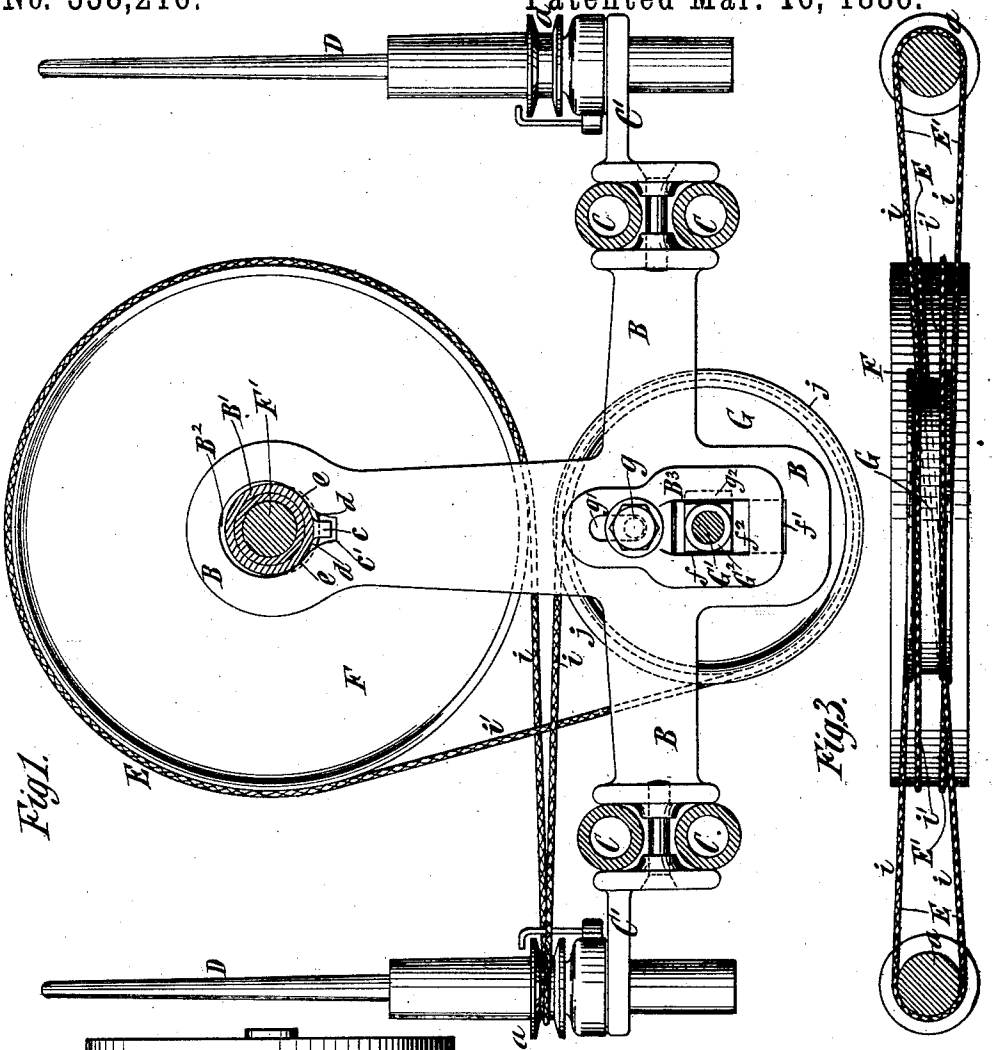


Fig. 1.

Fig. 3.

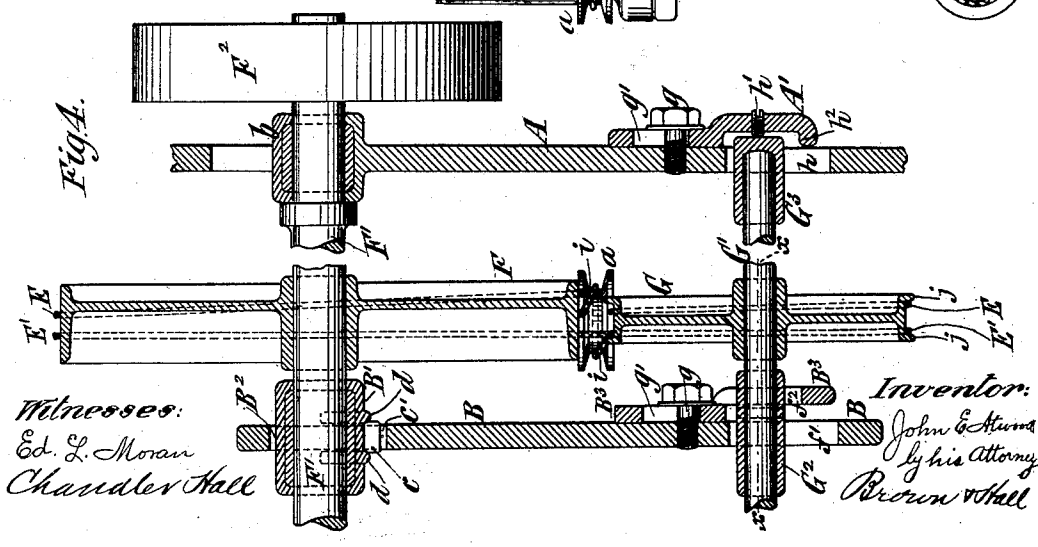


Fig. 4.

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N. PETERS. Photo-Lithographer, Washington, D. C.

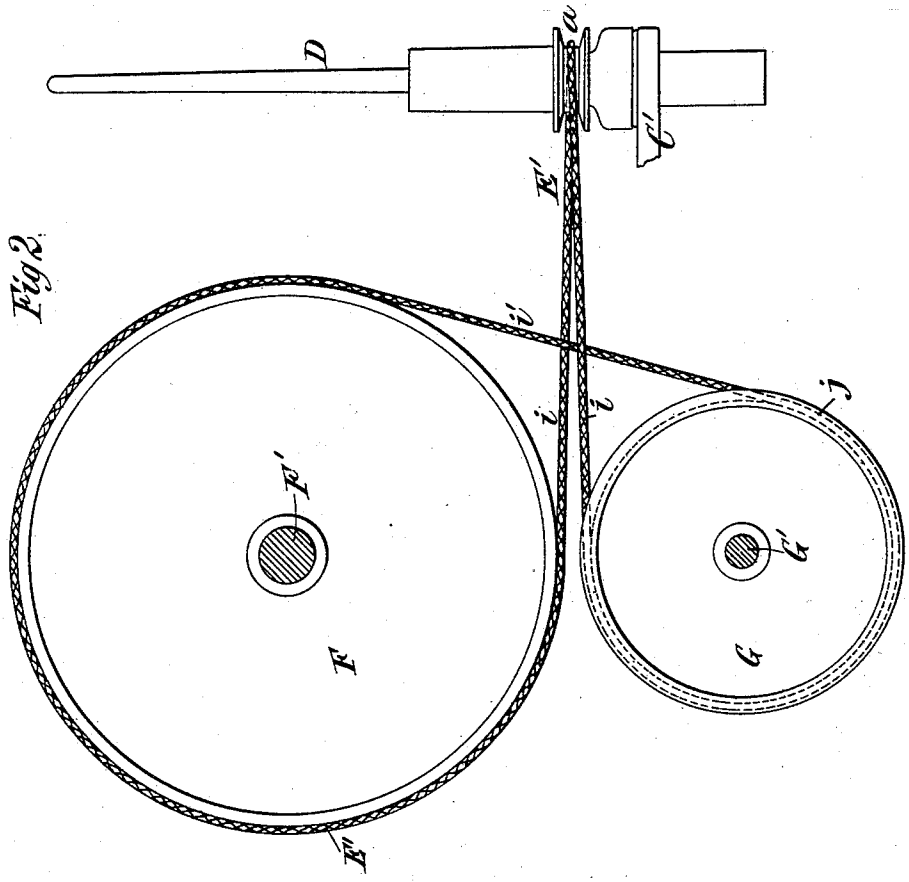
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J. E. ATWOOD.

SPINNING FRAME.

No. 338,216. Patented Mar. 16, 1886.

Fig 2.



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J. E. ATWOOD.

SPINNING FRAME.

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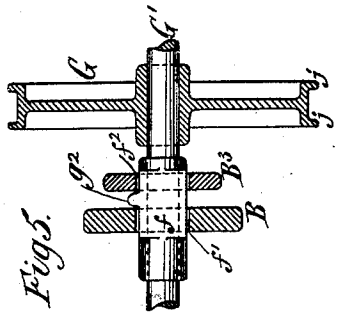


Fig5.

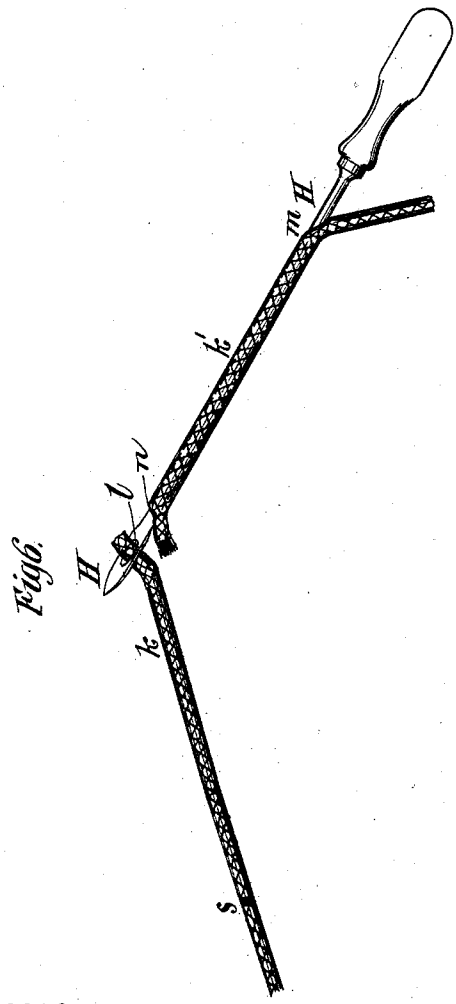


Fig6.

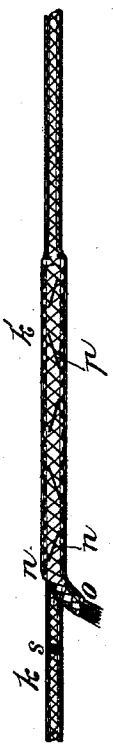


Fig7.

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UNITED STATES PATENT OFFICE.

JOHN E. ATWOOD, OF STONINGTON, CONNECTICUT.

SPINNING-FRAME.

SPECIFICATION forming part of Letters Patent No. 338,216, dated March 16, 1886.

Application filed November 17, 1883. Serial No. 112,023. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. ATWOOD, of Stonington, in the county of New London and State of Connecticut, have invented a new and useful Improvement in Spinning-Frames, of which the following is a specification.

My invention relates to the spindle-driving mechanism of spinning-frames, including the uniting of driving-bands whereby the spindles are driven.

The invention consists in the combination, with a driving-pulley and a guide and tension pulley having parallel axes and supports for the driving-pulley, the guide and tension pulley being arranged below the driving-pulley, of two spindles arranged at opposite sides of said pulleys and having their whirls in a horizontal plane about midway vertically between said pulleys, two driving-bands, one for each spindle and each encircling both of said pulleys and the whirl of a spindle and comprising two portions, which extend horizontally between the said whirl and adjacent sides of said pulleys, and a portion extending directly from one pulley to the other and passing between the two horizontal portions of the band, and bearings wherein the said guide and tension pulley is capable of rising and falling, the guide and tension pulley serving to maintain a proper tension on the bands and accommodate itself to the length thereof and to properly direct the portions of the bands. By this combination of parts I am enabled to use a very long band in a narrow spinning-frame without danger of any portion of the band rubbing or chafing on other portions, and to take up any stretch in the band and keep it under proper tension.

The invention also consists in various novel details in the construction of the boxes for the shaft, whereon are placed the guide and tension pulleys above described, and in a novel manner of combining the said boxes with bearings, wherein they may move vertically.

The invention also consists in a novel construction of boxes for a shaft whereon the several spindle-driving pulleys are placed, and in a novel manner of combining said boxes with the frame of the machine.

The invention also consists in a tubular driving-band composed of fibrous material having one end portion entered directly into the other extreme end thereof and sheathed or telescoped within the other end portion without looping or tying, and additionally secured together by sewing through both end portions.

In the accompanying drawings, Figure 1 is a transverse vertical section of such portions of a spinning-frame as are necessary to illustrate my invention, said frame having a row of spindles on each side, the band for driving the spindle on the left side of the machine only being shown and the band for driving the spindle on the right side of the machine being omitted for the sake of clearer illustration. Fig. 2 represents the spindle, which is on the right-hand side of Fig. 1, with the band and pulleys necessary to drive it. Fig. 3 is an inverted plan of the driving-pulley and guide or tension pulley employed in driving the two spindles, which are opposite each other in the machine, together with the two driving-bands and a horizontal section of the spindle-whirls around which said two bands pass. Fig. 4 is a vertical section of a portion of the spinning-frame in a plane lengthwise thereof, the two shafts on which are the driving-pulleys and guide and tension pulleys being broken to reduce the length of the figure. Fig. 5 is a horizontal section on the dotted line *x x*, Fig. 4. Fig. 6 is a perspective view of the two end portions of a driving-band and a tool employed to unite them, said figure illustrating the operation of uniting the end portions; and Fig. 7 is a side view of the end portions after they are united.

Similar letters of reference designate corresponding parts in all the figures.

A designates one of the end standards of the spinning-frame, and B is one of the intermediate supports wherein are arranged bearings for the shafts, which extend lengthwise of the machine. Any number of these intermediate supports may be provided between the two end standards. On opposite sides of the machine are spindle-rails, each consisting of a pair of parallel rods or tubes, C, to which the intermediate supports, B, and the spindle-supporting brackets C' are secured, substantially as shown and described in my application for Letters Patent filed July 17, 1883, and of which the serial number is 101,042.

D designates the spindles, which are arranged in two rows on opposite sides of the machine and which are provided with the usual whirls, *a*.

E E′ designate the spindle-driving bands, of which there is a separate one for each spindle, and which each encircle a driving-pulley, F, a guide and tension pulley, G, and the whirl *a* of a spindle. There is one driving-pulley, F, and a guide and tension pulley, G, for the two spindles which are opposite each other in the machine.

All the driving-pulleys, of which there are as many as there are pairs of spindles, are arranged on a driving-shaft, F′, which carries at one end a pulley, F^2, for the reception of a driving-belt; but obviously a long driving drum or cylinder might be substituted for separate driving-pulleys, as is often done in spinning-frames, and such a cylinder would be the equivalent of the driving-pulleys. The driving-shaft F′ rotates in bearings or boxes *b* fixed upon or formed integral with the end standards, A; but the boxes B′ in which the shaft is mounted at the intermediate supports, B, are so constructed and connected with said supports that they will readily adapt or adjust themselves to the line of the shaft, while they are held against turning or shifting endwise.

By referring to Figs. 1 and 4 it will be seen that the box B′, here shown, is of circular form and is provided at the under side with a downward projection, *c*, while near the middle of its length are other projections or swells, *d*, which extend partly around the box, as shown in dotted lines, and are separated by a distance about equal to the thickness of the support B. The box B′ is arranged in an opening, B^2, in the support B, which is slightly larger than the box, so that the box, with its projections or swells *d*, may be introduced endwise through the openings. When the box is in place it rests upon the two bearing-surfaces *e e*, formed by the lower edge of the opening B^2, as shown in Fig. 1. Its projection *c* enters a notch or recess, *c′*, in the support B, whereby the box is held against turning, and the two projections or swells *d* straddle the support B, as shown in Fig. 4, and hold the box against moving endwise out of the opening B^2.

The construction of the box B′ and the manner in which it is held in place is advantageous, because it dispenses with all bolts or other securing devices, and allows the box to readily adjust itself to the shaft, and also because it enables these parts to be assembled and applied to each other with but little labor and expense.

Below and parallel with the shaft F′ is a second shaft, G′, on which are secured a number of the aforesaid guide and tension pulleys G, and this shaft is so supported that it, with all the guide and tension pulleys which it carries, is capable of moving upward or downward to a limited extent, and for a purpose hereinafter described.

At the intermediate supports, B, the shaft G′ is fitted to boxes G^2, which are square or flat sided for a portion of their length, as shown at *f* in the horizontal section, Fig. 5. In the intermediate support, B, is an elongated opening, *f′*, to which the square portion *f* of the box G^2 is fitted, and in which said box may move up and down, the box being held against turning by the square portion *f*. To the side of the support B is adjustably secured a bracket or hanger, B^3, which has also an elongated opening, f^2, in which the box is received. The bracket or hanger B^3, forms a stop to limit the downward movement of the shaft G′, and as it is secured to the support B by the screw or bolt *g* passing through the slot *g′* the bracket or hanger may be adjusted downward, so as to arrest the downward movement of the shaft G′ at any desired point.

Upon the side of the box G^2 is a projection, g^2, (shown in Fig. 5 and dotted in Fig. 1,) which is received between the support B and the bracket or hanger B^3, as shown in Fig. 5. The adjacent sides of the support B and the bracket or hanger B^3 therefore form stops to the projection g^2 and hold the box G^2 against movement endwise.

In order to hold the shaft G′ against movement endwise in the boxes G^2, I apply to the end of the shaft an end box or cap, G^3, (shown in Fig. 4,) which is received in an elongated opening, *h*, in the end standard, A. To the outer side of said end standard a bracket, A′, is secured by a screw, *g*, passing through a slot, *g′*, and in this bracket is fixed a set-screw, *h′*, which bears against the end box or cap, G^3, and holds the shaft G′ against longitudinal movement.

As the bracket A′ is adjustably secured to the side of the end standard, it may be raised or lowered to bring the set-screw *h′* opposite the end box, G^3, whatever be its position vertically, and there secured. On the bracket A′ is a lip or shoulder, h^2, which forms a stop to limit the downward movement of the box G^3 and shaft G′.

I will now describe the arrangement of the driving-bands and the method of uniting their ends: The band E (shown in Fig. 1) drives a spindle on the one side of the machine, and the band E′ (shown in Fig. 2) drives an opposite spindle on the other side of the machine. Both these bands encircle the same driving-pulley, F, and guide and tension pulley, G; but I have shown the band E′ in a separate view, for the sake of clearer illustration. A description of the passage of one band will apply to both. The whirl *a* of the spindle is in a horizontal plane about midway between the two pulleys F G and the bands E E′. Each comprise two portions, *i i*, which extend horizontally between the whirl and adjacent sides of the pulleys F G, and a portion, *i′*, which extends directly from one pulley to the other, and which passes between the two horizontal portions *i i*. Each guide and tension pulley G is provided with flanges *j*, which are placed at a distance apart less than the diameter of a

spindle-whirl, *a*, and these flanges prevent the portion *i'* of the band from rubbing or chafing on the horizontal portions *i i* of the band.

From the foregoing description it will be seen that each guide and tension pulley is hung in the two bands which encircle it, and the weight of all the guide and tension pulleys, with their shaft and its boxes, is supported by the driving-bands and all said parts can gravitate downward as the bands stretch, as they will do, more or less. It will therefore be seen that the guide and tension pulleys, being hung in the bands, will maintain a proper degree of tension on the bands and accommodate themselves to the length thereof, and also serve to properly direct the portions *i i i'* of the bands. These driving-bands are similar in their arrangement to those shown and described in the application for Letters Patent filed July 9, 1879, by John E. Atwood and Eugene Atwood, and I here claim such an arrangement of band only when used in connection with a guide and tension pulley hung in and supported by the band. I do not, however, desire to be limited in the use of my combination of a driving-pulley and a rising and falling guide and tension pulley to a band encircling the pulleys and whirl, as shown, and comprising the portions *i i i'*.

The method of uniting the ends of the band, which is tubular, is illustrated by Figs. 6 and 7. They are united by entering one end portion, *k*, directly into the other extreme end, and thus sheathing or telescoping the end portion, *k*, wholly within the other end portion, *k'*, without looping or tying, and in uniting them I make use of a needle or tool, H, having an eye, *l*, near the point.

In preparing the bands I preferably first stretch them to such a degree that they will stretch but little, if any more, when in use, and the bands are then cut the uniform length, and are marked near the end *k*, as shown, at the point *s*, the length from the point *s* to the end *k'*, which is the farther end, being the length which it is desired that the band should have when its ends are united. The tool or needle H is then inserted at the point *m* and through the end portion *k'*, and protruded therefrom at the point *n* at a little distance from the extreme end of the portion *k'*. The end portion, *k*, is now threaded into the eye *l*, and the tool or needle is withdrawn from the portion *k'*, thereby sheathing or drawing the portion *k* into said portion *k'* until the mark *s* on the portion *k* is coincident with the end *k'*. I prefer to enter the portion *k* at a little distance from the end of the portion *k'*, for then there will be no liability of the loose ends or fibers of the portion *k'* being turned back and drawn or tucked into the part *k'* by the entrance of the part *k*, as would be the case if the part *k* were entered at the extreme end of the part *k'*. Of course, if the part *k* is entered at a distance from the extreme end of the part *k'* a loose end or tag, *o*, will be formed; but this will speedily whip or wear off in the use of the band, leaving the band so uniform and smooth that it is difficult to tell where its ends are united.

It will be seen from Fig. 7 that the band, when its ends are united, has the mark *s* at a little distance from the point *n*, where the part *k* enters the part *k'*, and that said mark is coincident with the extreme end of *k'*. The band will then be of the length desired.

When tension is applied to the band, the part *k'* will be contracted upon and caused to hug the part *k* to such an extent that the ends will not be drawn apart; but for greater security I may sew or stitch through the two parts, as shown at *p* in Fig. 7.

I am aware that it is not new to splice a wire rope having a hemp heart or core by unlaying the end portions of the strands at the two ends of the rope, then relaying the strands of each end portion into the scores formed by unlaying the strands of the other end portion of rope, and finally removing from each end portion of rope portions of the heart or core, and inserting thereinto the strands of the other end portion.

I am aware that it is not new to unite the ends of a tubular band by inserting each end portion through a transverse perforation formed near the other end of the band and then doubling said end portion backward on itself and sheathing it within the portion of the band from which it proceeds. Neither do I claim in my present invention a tubular band having the end portions looped together, and sheathed each within the portion of the band from which it proceeds, as described in Letters Patent No. 296,377, granted April 8, 1884, to J. E. Atwood and E. Atwood.

My present band differs from those above described, because there is no looping together or tying or interlocking of the two end portions, but one end portion is entered directly into the other extreme end, and is sheathed or telescoped within the other end portion. When the ends are thus united the band is of more nearly uniform size throughout, and there are no lumps or enlarged portions thereon.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with a driving-pulley and a guide and tension pulley having parallel axes and supports for said driving-pulley, the said guide and tension pulley being arranged below said driving-pulley, of two spindles arranged at opposite sides of said pulleys, and having their whirls in a horizontal plane about midway vertically between the said pulleys, two driving-bands, one for each spindle and each encircling both of said pulleys and the whirl of a spindle, and comprising two portions, *i i*, which extend horizontally between said whirl and adjacent sides of said pulleys, and a portion, *i'*, extending directly between said pulleys and passing between the two horizontal portions of the band, and bearings wherein said guide and tension pulley is capable of rising and falling, whereby the

guide and tension pulley is caused to maintain a proper tension on said bands and accommodate itself to the length thereof, and also serves to properly direct the bands, substantially as herein described.

2. The combination of the driving-pulley F and its support, the two spindles D and their whirls *a*, the two driving-bands E E′, each comprising the horizontal portions *i i* and the portion *i′*, the guide and tension pulley G, hung in the said bands and below the driving-pulley F, and provided with flanges *j*, the shaft G′ or journals for said guide and tension pulley, and bearings wherein said guide and tension pulley may rise and fall, whereby the guide and tension pulley is caused to maintain a proper tension on the bands and properly direct the same, all substantially as herein described.

3. The combination of the driving-pulley F, the shaft F′, the box B′, fitted thereto and provided with the projection *e*, and the projections or swells *d*, and the intermediate support, B, having an opening, B^2, larger than said box, and the recess *e′* in the under side of said opening, whereby the said box is held both against turning and moving longitudinally in said opening, all substantially as herein described.

4. The combination of the guide and tension pulleys G, the shaft G′, on which they are placed, the box G^2, fitted to said shaft and constructed with the projection g^2, and the support B, having an elongated opening, *f′*, wherein the said box may rise and fall, and constructed with shoulders or stops between which the projection g^2 is held, substantially as herein described.

5. The combination of the guide and tension pulleys G, the shaft G′, the box G^2, and support B, having an elongated opening, *f′*, wherein said box may rise and fall, and the bracket or hanger B^3, adjustably secured to the support B, and having an elongated opening, f^2, receiving said box, all substantially as herein described.

6. The combination, with the guide and tension pulleys G and shaft G′, and boxes and bearings intermediate between the ends of said shaft and providing for the rise and fall thereof, of the end box or cap, G^3, applied to the end of the shaft, the standard A, having an opening, *h*, receiving said box or cap G^3, and the bracket or support A′, having an adjustable connection with said standard and provided with the set-screw *h′*, for bearing against said end box or cap, all substantially as herein described.

7. The tubular driving-band composed of fibrous material, having one end portion entered directly into the other extreme end thereof and sheathed or telescoped within the other end portion without looping or tying, and having the end portions additionally secured by sewing through them both, substantially as herein described.

JOHN E. ATWOOD.

Witnesses:
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