

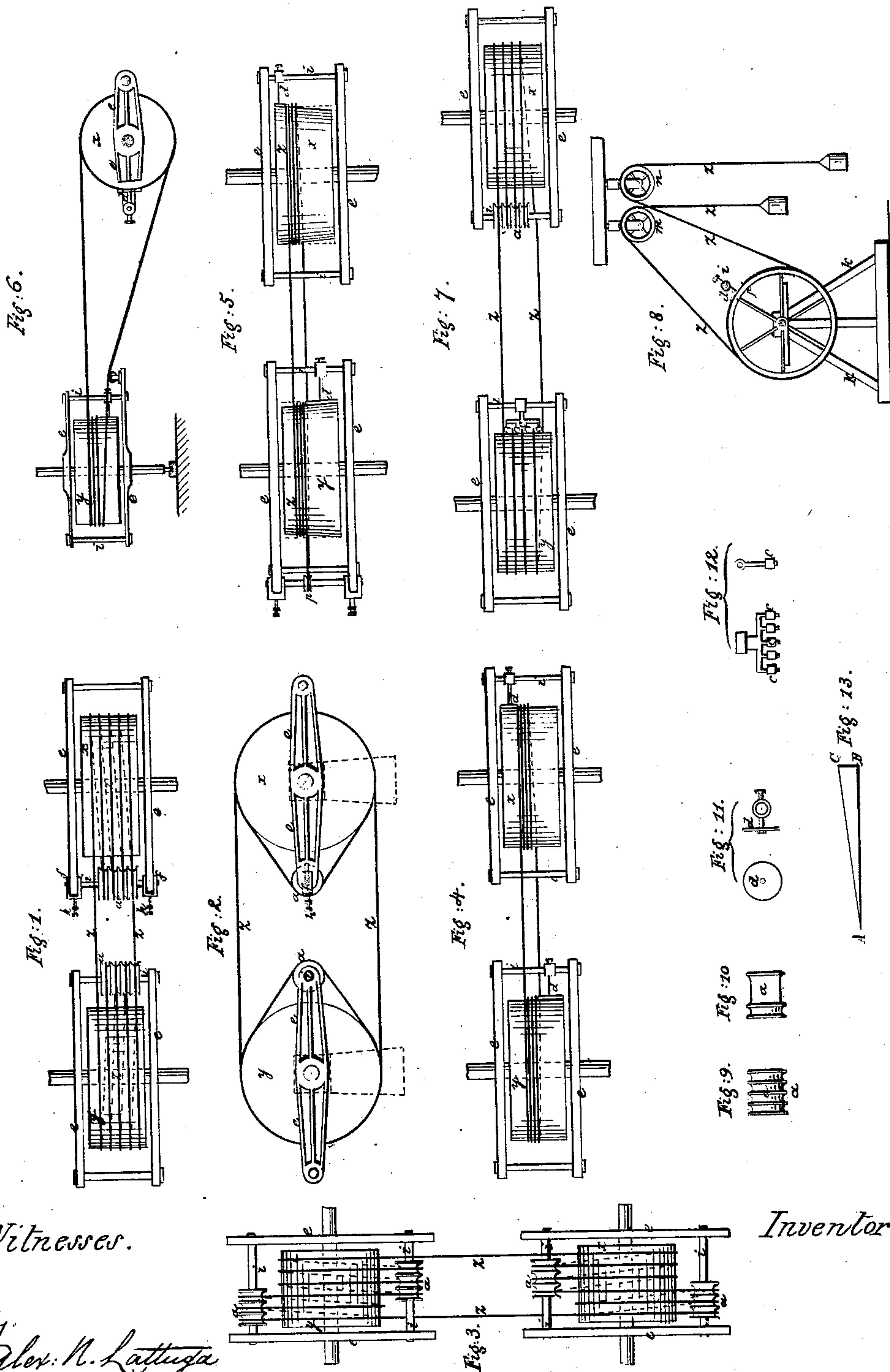
(No Model.)

S. DENNIS & A. SAMPER.

Apparatus for Transmitting Motion.

No. 243,226.

Patented June 21, 1881.



Witnesses.

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# UNITED STATES PATENT OFFICE.

STEPHEN DENNIS AND ANTONIO SAMPER, OF PARIS, FRANCE.

## APPARATUS FOR TRANSMITTING MOTION.

SPECIFICATION forming part of Letters Patent No. 243,226, dated June 21, 1881.

Application filed March 8, 1881. (No model.) Patented in France July 29, 1879.

*To all whom it may concern:*

Be it known that we, STEPHEN DENNIS and ANTONIO SAMPER, of Paris, France, have invented Improvements in Apparatus for Transmitting Motion; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed sheet of drawings, forming a part of the same.

10 This invention relates to improvements on the invention the subject of former Letters Patent dated 16th July, 1879, as a communication from the said Stephen Dennis and Antonio Samper and Julio Valenzuela. As described in the specification filed in pursuance of the said Letters Patent, the invention had for its object the transmission of motion by means of bands, ropes, or chains wound spirally on drums or surfaces receiving rotary motion.

20 The accompanying sheet of drawings illustrates examples of modifications of the aforesaid invention provided with the improvements which form the subject of the present invention.

25 Figures 1, 2, 3, 4, 5, 6, and 7 show arrangements of the mechanism in which an endless cord or band is employed; Fig. 8, the arrangement in which a band with free ends is used. Fig. 9 shows the original guide-roller. Figs. 30 10, 11, and 12 show three modifications of the guide-roller. Fig. 13 represents the least amount of conicality that should be given to the drums or pulleys when the guide-rollers shown in Fig. 11 are used, in order that the mechanism shall work in the most perfect manner possible.

35 In the former patent above mentioned the band passed under the guide-roller, between it and the drum or pulley, with which it remained always in contact, the coils being separated by the spaces between the grooves of the guide-roller; but it will be observed, in the accompanying drawings, that the band is now applied in spiral coils, either open or separated from one another, or not so separated, as in Figs. 4 and 5; but when the coils of the band are separated they are passed over the guide-

roller, as in Figs. 1, 2, and 3. The band may thus be wound either in close or open coils, and either over or under the grooved guide-rollers. The guide-rollers may also be placed laterally to the band, as hereinafter described.

Figs. 1, 2, 3 show the original form of guide-roller *a*, as before stated, the band *z* being so applied as to pass over the said guide-rollers.

Fig. 9 shows the guide-roller alone.

Fig. 10 shows a modification of the guide-roller *a*, in which the grooves are reduced to a single one, thereby permitting the band to be wound in close coils, provided it passes over the guide-roller, and enabling the number of coils on the pulleys or drums to be increased, as represented at one side of Fig. 7.

The guide-rollers shown in Figs. 11 and 12 are in reality two different arrangements of the same modification, their use depending on the mode of winding the band. When wound in open coils the guide-rollers are short tubes turning loose on studs, and embracing the several coils laterally, as shown in Fig. 7 in the other case, when the band is wound in close coils; but a single loose wheel, *d*, is employed, as shown in Figs. 4, 5, 6, and 8.

40 In order to transmit motion with the band passing over one of the grooved guide-rollers, as in Figs. 1, 2, and 3, a slight degree of tension should be given to the band, and for this purpose a convenient tension device is shown applied to the arms of the frames carrying the guide-roller in Fig. 1. A single tension device is sufficient for each band, even if it be applied to many machines. The said tension diminishes if the adhesion of the band be increased. By this means, also, all sorts of pulleys may be used, such as straight, convex, conical, fluted, grooved, &c., and they may be made of wood.

45 In order to transmit motion when guide-rollers, Figs. 11 and 12, are used, if the band is not exactly the proper length the tension device above mentioned must be applied; but in order not to lose power only the one slack coil of the band is taken up, as shown in Fig. 5.

The guide-rollers shown in Figs. 7 and 12, consisting of small loose tubes, and the single



guide-wheel, Figs. 4 and 11, may be applied in connection with straight, smooth pulleys or coned pulleys.

Fig. 13 shows graphically the rule for finding the angle of the least amount of conicality that can be given to the pulleys, if they are to be made conical. The horizontal A B equals the width of the face of the pulley. The vertical B C equals the diameter of the band when wound in close spirals, or the width of the groove in the guide-roller when wound in open coils. The hypotenuse A C represents the cone—that is to say, the inclination to be given to the pulley-face, in order that it shall work perfectly. A greater degree of conicality may also be given to the pulley.

In order to apply the guide-rollers shown in Fig. 12 the pulleys should be very conical and the spiral coils very open, in order to permit of increasing the size of the tubes forming the guide-rollers. The diameter of the latter may also be increased by withdrawing the stud which forms their axis.

When the single guide-wheel (shown in Figs. 4, 5, and 11) is used the coils of the band are quite close together, as shown in the drawings.

When conical pulleys are employed, as shown in Fig. 5, the cones should be reversed, the one to the other, and in winding the band the leading part should be on the larger diameter of the cone, as represented in Fig. 5, in order that the band shall be maintained in position. The pulleys should be rather wide, in order that the band shall not run off when the power is stopped in case the band is slack, or the pulleys should have a flange at the smaller ends. The band will work without a tension device if it is exact length, or with a small tension device, *f*, if it is not exact. When the small lateral guide-rollers shown in Fig. 12 are used the band may be either tight or slack. When the band is wound tight round the pulleys, as is the case when the guide-rollers Figs. 11 and 12 are used, tension may be applied to the band without any loss of power, and when the guide-rollers Figs. 9 and 10 are used by passing the band over them loss of power is avoided by winding the band, as shown in Figs. 1 and 2.

Bands or ropes of all kinds may be employed, including iron-wire ropes, and two or more may be used together, the coils being two or more in number and differently arranged, according to the circumstances of the case.

One or several guide-rollers may be used, and they may be differently arranged with regard to the pulleys, except in the case of the single guide-wheels. In the latter case, Figs. 4 and 5, that of the driving-pulley may be advanced a fourth of its circumference from the point where the band leaves the pulley, while the other should be placed at from one-half to to three-fourths the circumference from the corresponding point.

The guide-rollers may be mounted on the pulley-shafts, or at a distance from said shafts. In the first case they must be so mounted as to remain stationary in position. In short, there are many ways of winding the bands and of applying the guide-rollers, all the modes of applying the invention not being illustrated here.

The term "bands or ropes," when used herein, is intended also to comprehend a chain, cord, &c.

From what has been above explained it follows that by employing the set of small lateral guide-rollers shown in Fig. 12 the transmission of the power or motion may be interrupted without the use of loose pulleys by employing a loose band and a tension device, which may be applied to act on the band or not at will. In other words, it is the band which is made loose, instead of the pulley.

The right is reserved of using all kinds of bands or ropes, whether endless or with free ends.

Fig. 8 shows an arrangement of mechanism in which the rope or band has two free ends, and, according to this figure, the one end ascends while the other descends. By employing the grooved guide-rollers or the series of small lateral guide-rollers, Fig. 12, one only is required, whereas if a different kind of guide-roller is employed two would be required to each pulley to enable the motion to be reversed. This arrangement of rope with free ends is applicable in numerous cases—for example, in loading and unloading vessels, in working mines and other analogous situations whereby an economy of time, space, and power is obtained. The weight of the rope and lifting-hook answers the purpose of the small tension device necessary when the rope passes over the guide-roller, and consequently the rope must have a considerable number of coils in order to avoid the use of a heavy rope.

Fig. 6 shows the mode of transmitting motion from a horizontal to a vertical shaft.

In all the figures of the drawings, *x* is the driving and *y* the driven pulley; *z*, the band or rope for transmitting the power; *a c d*, the guide-rollers; *e*, the arms of the frame in which these rollers are mounted; *f*, the tension devices provided with screws *h*; *i*, the spindles of the guide-rollers.

In Fig. 8 *k* is the frame of the windlass, *p* the drum, and *m* and *n* the two standing pulleys over which the fall of the rope passes.

We claim—

1. In an apparatus for transmitting motion, a guide-roller journaled in bearings adjustably secured to the frame, whereby the tension of the band can be regulated, substantially as set forth.

2. In an apparatus for transmitting motion, the combination, with the drums *x y* and the band *z*, of the guide-roller *a*, secured to the shaft *i*, which is journaled in adjustable bear-

ings *f h*, substantially as and for the purpose set forth.

3. In an apparatus for transmitting motion, the combination, with the drums *x y* and the  
5 band *z*, of the guide-rollers *p d*, the former provided with adjustable bearings and the latter adjustably secured to the frame, so as to act

laterally on the band, substantially as and for the purpose set forth.

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