No. 711,093. Patented Oct. 14, 1902.

H. W. BRACKEN.

SPINDLE DRIVING MECHANISM.

(Application filed Apr. 4, 1902.)

(No Model.)

Fig: 1.

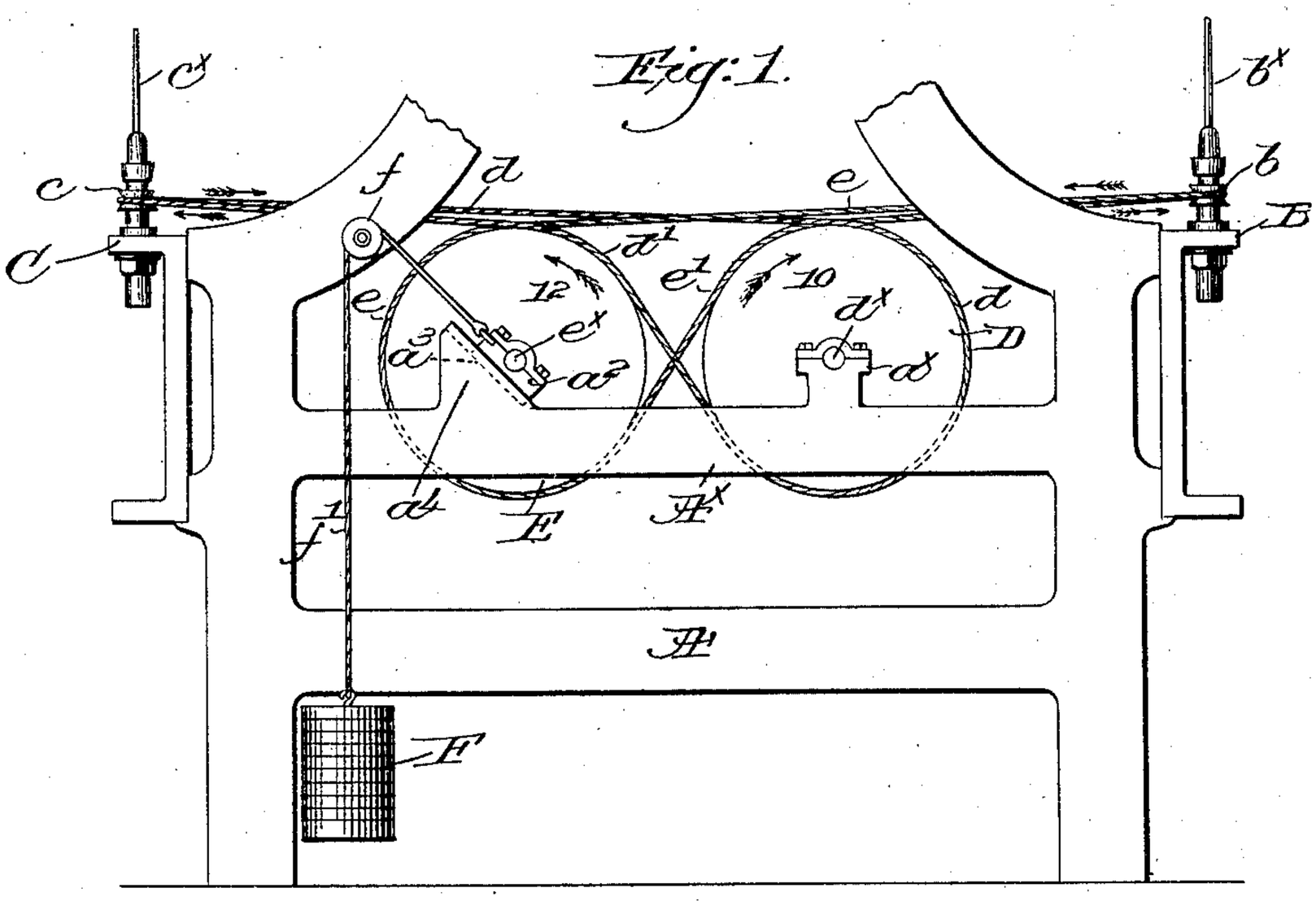
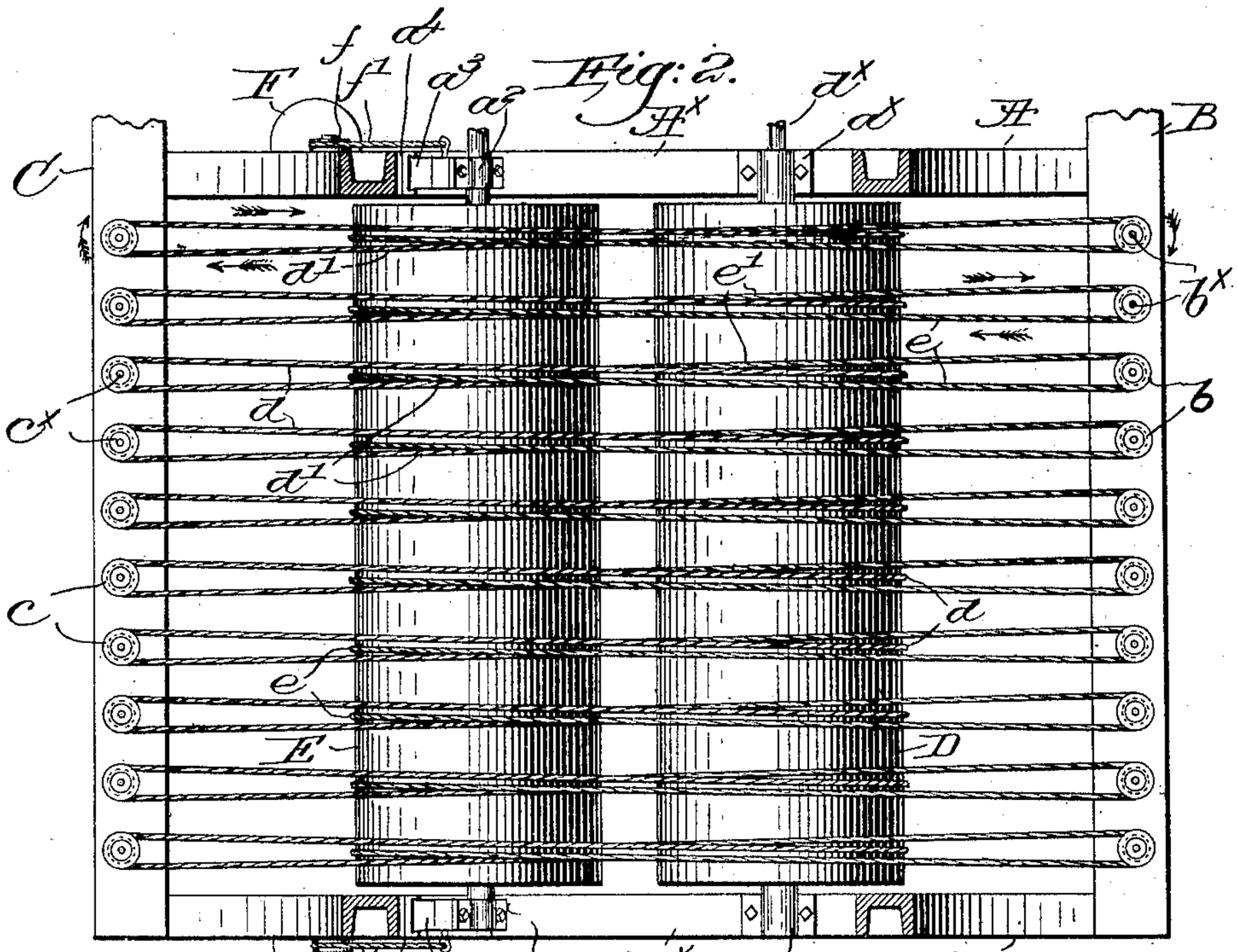


Fig: 2.



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UNITED STATES PATENT OFFICE.

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SPINDLE-DRIVING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 711,093, dated October 14, 1902.

Application filed April 4, 1902. Serial No. 101,331. (No model.)

To all whom it may concern:

Be it known that I, HOWARD W. BRACKEN, a citizen of the United States, and a resident of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Spindle-Driving Mechanism, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to spinning, twisting, or similar machines wherein fibrous material is wound upon rotating spindles; and it has for its object the production of novel mechanism for driving the spindles of such machines. Heretofore in machines of this character the spindles have been driven in various ways—as, for instance, by a rotating drum or cylinder, which transmits motion to the bands in engagement with the whirls of the spindles. So far as I am aware such cylinders have been mounted in fixed bearings, and it is well known that the bands vary individually as to their tension and also in mass according to the dampness or dryness of the weather and also between starting up the mill in the morning and afterward when the mill is in regular established operation.

To start up the machinery in a spinning-room requires considerably more power than is necessary to thereafter maintain it running—say an hour after it has started—and it has been found that this difference is principally due to the fact that the driving-bands contract over night, and so require more power to drive the frames. After the latter have been run for a while the bands stretch somewhat and the power required to run the frames decreases. This additional power has been estimated at twenty-five per cent. of the total power required to drive the frames, and obviously the maximum power which is necessary to start up and establish the running of any given number of frames must be provided, notwithstanding the fact that such maximum power is entirely unnecessary within a short time after starting up.

By my present invention I provide means for driving the spindles in such manner that the bands are subjected to substantially uniform tension in mass and also to approximate more nearly to a uniform tension of the individual bands.

The various novel features of my invention will be hereinafter described, and particularly pointed out in the following claims.

Figure 1 is an end elevation of a portion of a spinning, twisting, or similar frame with one embodiment of my invention applied thereto; and Fig. 2 is a top or plan view thereof, the shaft of the main or positively-actuated driving-cylinder being broken off and the usual rotating mechanism omitted, as it forms no part of my present invention.

While I have herein shown my invention applied to a short frame or to a section of a long frame, it is to be understood that the principle involved will be the same whatever the length of the driving-cylinders and whether each cylinder is continuous or made in several sections, according to the length of the frame, or for other reasons.

The end frames A, spindle-rails B C at the front and back of the frame, respectively, the two sets of rotatable spindles $b^\times$ $c^\times$, mounted in said rails, respectively, and the whirls b c may be and are all of usual or well-known construction, as may be the other parts of the frame not herein shown and forming no part of my present invention. A cross-girth $A^\times$ of each end frame supports two like driving cylinders or drums D E, the former having its journals $d^\times$ rotatably mounted in fixed bearings $a^\times$ on the cross-girths $A^\times$, while the journals $e^\times$ of the cylinder E are rotatably mounted in movable journal boxes or bearings a^2, which are slidably mounted in guideways a^3 on seats a^4, secured to or forming part of the cross-girths $A^\times$. The guideways a^3 are shown as having undercut sides to prevent any lifting tendency of the bearings a^2, and said guideways are preferably made inclined at an angle of substantially forty-five degrees sloping toward the fixed bearings $a^\times$. The cylinders D E, which may be termed the "main" and "auxiliary" cylinders, respectively, are arranged with their axes in parallelism and midway between the two sets of spindles $b^\times$ $c^\times$, and in actual practice the cylinders are so set that

naturally their tops would be about three-fourths of an inch below a horizontal plane passed through the centers of the spindle-whirls. As herein shown, the spindles are driven by individual bands, the spindles $c^{\times}$ being driven by endless bands d, passed around the main cylinder D and the whirls c, the lower runs, as d', of the said bands being carried over and contacting with about one-sixth of the circumference of the auxiliary cylinder, as clearly shown in the drawings. The spindles $b^{\times}$ are driven by endless bands e, passed around the auxiliary cylinder E and the whirls b, the lower runs, as e', of said bands being carried over and contacting with about one-sixth of the circumference of the main cylinder D. Arrows 10 and 12, Fig. 1, show the rotation of the two cylinders, and it will be manifest therefrom that the rotative motion transmitted to the cylinder E by the contact of the lower runs d' of the bands d is assisted by the contact of the lower runs e' of bands e with the surface of the main cylinder D. The latter cylinder is directly and positively driven from any suitable source of power (not shown) connected by belting or gearing with the journal $d^{\times}$ of said cylinder. While the main cylinder D is thus directly driven, the auxiliary cylinder E is indirectly driven therefrom through the medium of the contacting lower runs of both sets of bands d and e.

A sheave f is shown mounted on each end frame, and over each sheave a cord or other flexible band f' is passed, one end of each being secured to a bearing a^2, while its other depending end has attached to it an adjustable weight F. The tension of the bands e tends to draw the cylinder E toward the cylinder D, and the downward pressure of the lower runs of the bands d tends to depress the cylinder E, the resultant of such forces acting substantially along the direction of the guideways a^3 downward, and this tendency is resisted by the weights F, which act upon the cylinder in the opposite direction. By regulating or adjusting the weights the tension exerted upon the sets of driving-bands by the cylinder E can be varied according to circumstances with great accuracy.

It will be manifest that after shutting down, the contraction of the bands in the mass will act with greater or less force, according to the amount of contraction, to draw the auxiliary cylinder E downward against the pull of its lifting means; but such movement slightly reduces the pressure of the cylinder on the bands d, and by its movement toward the spindles $b^{\times}$ the bands e are slightly slackened, the result as a whole being a compensation for the contraction of the bands, so that their tension remains substantially the same. When the frame has been started and run for a time and the bands slacken, the auxiliary cylinder is then moved away from the main cylinder and upward against the lower runs of the bands d, so that the stretch or extension of both sets of bands will be compensated and the tension maintained substantially uniform. While the tension of the bands in the mass is thus maintained with substantial uniformity through varying conditions, there is also a tendency to approximate more nearly to a uniform tension of the individual bands. Inasmuch as the band tension is maintained substantially unform by my invention, it follows that the power required to drive the frame is made more uniform, and as a considerable additional power for starting is rendered unnecessary a saving in power is effected.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In spinning, twisting and similar machines, two opposed sets of spindles, driving-bands therefor; main and auxiliary driving-cylinders, arranged in parallelism between the sets of spindles; fixed bearings for the main, positively-driven cylinder, the driving-bands from each set of spindles passing around the driving-cylinder farthest therefrom and with their lower runs in contact with a portion of the circumference of the other cylinder, whereby rotation of the auxiliary cylinder is effected by the joint action of both sets of driving-bands; movable bearings for the auxiliary cylinder, guideways for said bearings, inclined at an angle of substantially forty-five degrees, and means to oppose the bodily movement of the auxiliary cylinder due to the conjoint action thereupon of the tension exerted by both sets of driving-bands.

2. In spinning, twisting and similar machines, two opposed sets of spindles, driving-bands therefor; main and auxiliary driving-cylinders of the same diameter, arranged in parallelism between the sets of spindles; fixed bearings for the main, positively-driven cylinder, the driving-bands from each set of spindles passing around the driving-cylinder farthest therefrom and with their lower runs in contact with a portion of the circumference of the other cylinder, whereby rotation of the auxiliary cylinder is effected by the joint action of both sets of driving-bands; movable bearings for the auxiliary cylinder, inclined guideways for the bearings, and adjustable means acting directly upon and to govern the bodily movement of said cylinder relatively to its own set of spindles and to the lower runs of the bands passing around the main cylinder, to thereby subject all of the bands, in mass, to substantially uniform tension.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HOWARD W. BRACKEN.

Witnesses:

CLARE H. DRAPER,

FRANK J. DUTCHER.