

P. HARDMAN.
TENSION COMPENSATOR FOR DOUBLING MACHINERY.
APPLICATION FILED FEB. 5, 1908.

908,255.

Patented Dec. 29, 1908.

3 SHEETS—SHEET 1.

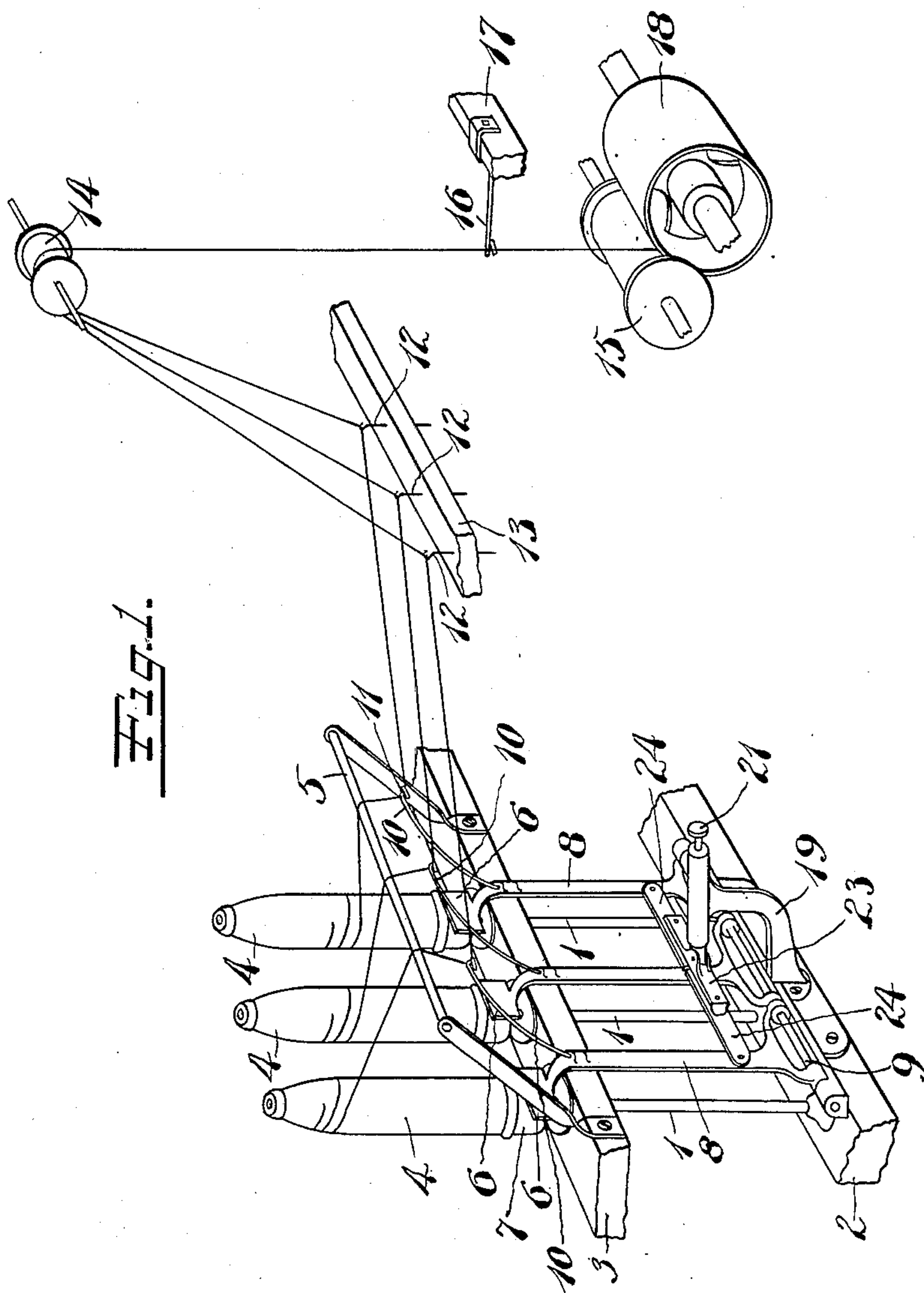


Fig. 1.

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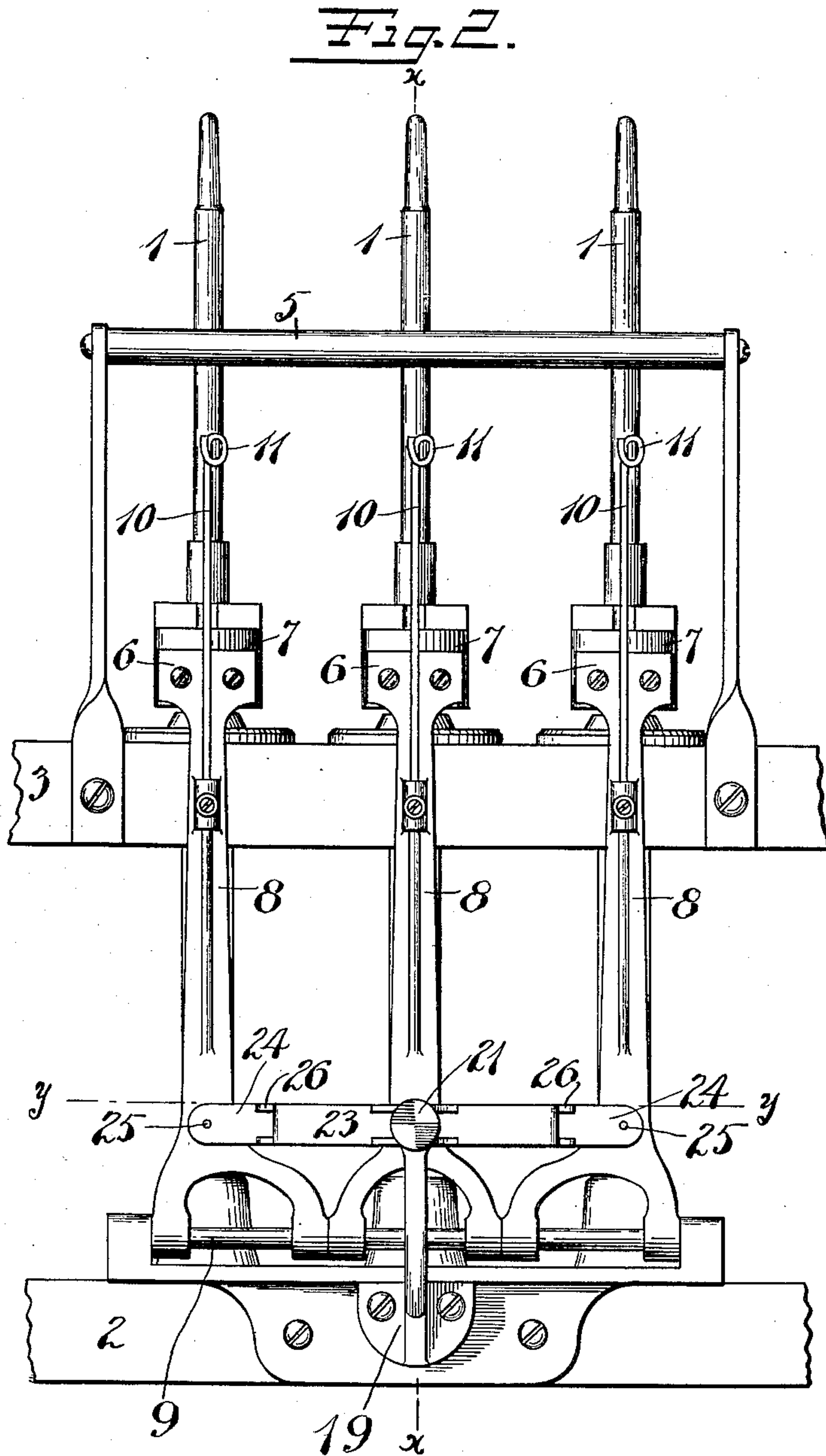
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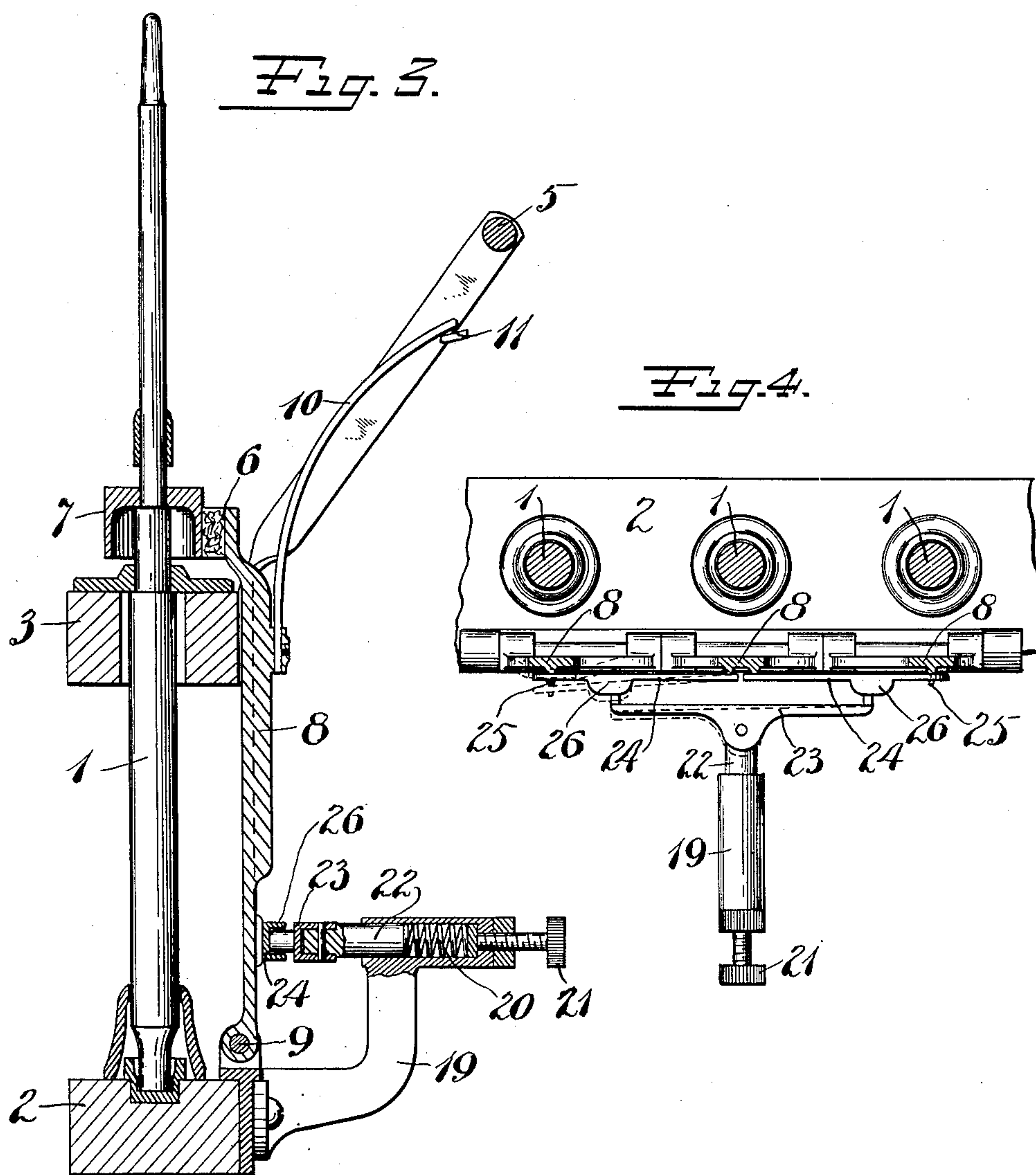
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UNITED STATES PATENT OFFICE.

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TENSION-COMPENSATOR FOR DOUBLING MACHINERY.

No. 908,255.

Specification of Letters Patent.

Patented Dec. 29, 1908.

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To all whom it may concern:

Be it known that I, PETER HARDMAN, a citizen of the United States, residing at Willimantic, Windham county, State of Connecticut, have invented certain new and useful Improvements in Tension-Compensators for Doubling Machinery, of which the following is a full, clear, and exact description.

My invention relates to thread manufacture and particularly to a machine for "doubling" the yarn in the manufacture of thread.

The object of the invention is to provide means for equalizing the tension of the several strands of yarn as they run from the supply bobbins to the spool on which they are being wound.

In the accompanying drawings, Figure 1 is a diagrammatic view in perspective, conventionally illustrating my invention as in use. Fig. 2 is a front elevation of the tension mechanism, on a relatively enlarged scale. Fig. 3 is a sectional view of Fig. 2 on the plane of line $x-x$. Fig. 4 is a sectional view on the plane of the line $y-y$.

1—1 are spindles.

2 is the lower spindle rail.

3 is the upper spindle rail.

Each spindle has an upward extension arranged to carry the bobbins 4—4.

5 is a supporting rod over which the yarn leads after leaving the bobbins 4.

6—6 are brakes arranged to bear respectively against cylindrical enlargements 7—7 on the spindles 1—1. Each of these brakes 6 is carried by a brake-bar or arm 8, pivoted, for example, on the lower rail 2, as shown at 9—9.

10—10 are loop wires leading from each of the brake-bars and suitably connected thereto. In the end of each of these wires 10 is an eye 11. These eyes 11 are arranged below the supporting rod 5.

12—12 are drop wires. 13 is a carrier for said drop wires.

14 is a pulley guide.

15 is a spool.

16 is a thread guide carried by traverse bar 17. The thread guide is located between the pulley 14 and spool 15. The spool 15 is driven in any suitable way, for example, by a driving drum 18.

The so-called "doubled" yarn is wound upon the spool 15, and the particular means for guiding the yarn or driving the spool is

immaterial. In threading the apparatus the yarn is led from the bobbins over the supporting-rod 5. It is then looped through the eyes 11 in the brake wires, thence through the drop wires 12 over the pulley 14, through guide 16, to spool 15. The yarn is drawn from the bobbins 4 by the pulley spool 15.

If, for any reason, one of the spindles 1 should turn less freely than another, it would tend to put more tension upon that strand leading from the bobbins carried thereby. It is to effectively equalize and compensate for this uneven condition and to secure a uniform tension of the several strands being "doubled", that this invention is designed. To that end I provide a means whereby the brakes 6—6—6 will be under the control of the respective strands.

19 is a bracket carrying a suitable spring mechanism arranged to bear against the several brake bars 8 with a uniform pressure. In the particular form shown, a single spring 20 is employed.

21 is a tension adjusting screw.

The spring 20 works against a plunger 22, which carries at its forward end a hinged cross-bar 23.

24—24 are two bridging bars arranged to span the gaps between the brake-bars 8, being supported on the bars respectively by pins 25—25. The ends of the hinged cross-bar 23 engage in sockets 26—26 on the bridging bars 24 in such a manner as to transfer the pressure of the spring 20 first to the bridging bars and thence to the brake-bars 8—8. The faces of the brakes proper may be provided with any desired brake-shoe material, such as leather.

In normal operation each of the brakes bears lightly and uniformly against the cylindrical part 7 of the spindle. If for any reason the tension of the yarn leading from any one of the bobbins is greater than it should be, this increased tension will have the effect of drawing its respective brake-shoe away from the cylindrical part 7 of the spindle, thus letting it run more freely and immediately giving up the necessary slack to provide a tension uniform with the strands leading from the other bobbins. This drawing back of one brake-shoe forces the plunger 22 against spring 20 and increases the tension of the latter. This additional tension will obviously be distributed back through the bridging bars of the other brake lever or levers in the groove, thereby slightly in-

creasing the tension on the other spindle, tending to retard their action for the moment. By this means a very quick and responsive equalizing action is attained. It will always be impossible to secure a plurality of spindles in a machine of this type which will run with absolutely the same freedom. This is one cause of variation in tension. Furthermore, variations in the amount of yarn on the different spindles will always tend to produce a relative variation in tension of strands leading therefrom. This would come about by the different speeds of the bobbins, owing to the different diameters, determined by the bulk of thread thereon. These and other causes in machines of this character will always produce variations in tension of the strands leading from the bobbins, so that it is only by the addition of a compensating and tension-equalizing means such as described herein, or an equivalent device, that uniformity of tension in all of the strands will be secured. The great advantage, therefore, will be apparent to the mechanic skilled in the art, by reason of the fact that practically all danger of imperfect stock is eliminated by the employment of this mechanism.

By reference to Fig. 4 it will be seen that the sockets 26 are located somewhat nearer the outer ends of the bridging-bars 24—24 than the inner ends thereof. That is, because in this particular arrangement shown there are three brackets employed. Were some such provision not made it would require more power to relieve the middle brake than the end brakes, since the middle brake must force back both of the bridging-bars 24—24. To relieve one of the end brakes, one of the bridging-bars 24 only tilts back, as shown in dotted lines in Fig. 4. By this or an analogous arrangement the spring pressure applied to the several brakes is always uniform, and as a result the tension of each of the yarn ends leading from the bobbins will be maintained substantially uniform.

While I have shown the mechanism in the preferred form, obviously it may be modified in many respects without departing from the spirit and scope of the invention, for example, while three spindles are shown, the invention is applicable where two or more are employed.

It will be noted that the tension control is effected by arranging the yarn support and the eyes on the several brakes, and the drawing-off means, so that the same are out of line. This variation in alinement may, of course, be modified at will, so long as a variation in tension in any one or more of the strands leading from the respective bobbins will relieve the brake action.

What I claim is:

1. In a machine of the character described, a plurality of independent bobbin

spindles, a separate brake for each spindle, means cooperating with a plurality of said brakes and controlled by the yarn leading from the said spindles to simultaneously relieve the braking action on one of said spindles and produce a relatively increased braking action on another of the spindles.

2. In a machine of the character described, a plurality of independent bobbin spindles, a separate brake for each spindle, means cooperating with a plurality of said brakes and controlled by the yarn leading from the said spindles to simultaneously relieve the braking action on one of said spindles and produce a relatively increased braking action on another of the spindles, said means including bridging mechanism extending from one brake to another.

3. In a machine of the character described, a plurality of independent bobbin spindles, a separate brake for each spindle, means cooperating with a plurality of said brakes and controlled by the yarn leading from the said spindles to simultaneously relieve the braking action on one of said spindles and produce a relatively increased braking action on another of the spindles, said means including bridging mechanism extending from one brake to another, and a spring bearing on said bridging member in such a manner as to transmit its force to the brakes controlled thereby.

4. In a machine of the character described, a plurality of independent bobbin spindles, a separate brake for each spindle, means cooperating with a plurality of said brakes and controlled by the yarn leading from the said spindles to simultaneously relieve the braking action on one of said spindles and produce a relatively increased braking action on another of the spindles, said means including bridging mechanism extending from one brake to another, and an adjustable spring bearing on said bridging member in such a manner as to transmit its force to the brakes controlled thereby.

5. In a machine of the character described, a plurality of bobbin spindles, a separate brake for each spindle, means for causing said brakes to normally exert a drag on each of said spindles respectively, means for connecting the yarn leading from each spindle to its respective brake, and means whereby an increased tension on one strand will relieve the braking pressure on its respective spindle and simultaneously produce a relatively increased braking pressure on another spindle.

6. In a machine of the character described, a plurality of bobbin spindles, a single means to draw yarn from a plurality of said spindles, a separate brake for each spindle, and means to cause each brake to normally retard its respective spindle, said brakes being independently controllable by

the strands of yarn leading from the several spindles to produce a relative variation in the drag of the brakes upon the spindles respectively and means coöperatively connecting said brakes, whereby a relative decrease in the braking action of one brake will produce a relative increase in the braking action of another brake.

7. In a machine of the character described, a plurality of independent bobbin spindles, a single means to draw yarn from a plurality of said spindles, coöperating means to normally retard the rotation of said spindles including mechanism controllable by the several strands of yarn leading from said spindles respectively to relieve the retarding action of one or more of the brakes and increase the retarding action of another brake, to compensate for any relative variation in tension in the yarn itself as it leads to the yarn drawing means.

8. In a machine of the character described, a plurality of bobbin spindles, a

plurality of brakes adapted respectively thereto, a bridging bar for at least two of said brakes, a tension device for said bar arranged to exert pressure thereon to be transmitted thereby to said brakes, and means controllable by the yarn leading from said spindles whereby a decreased braking action on one spindle produces a relatively increased braking action on the other spindle, and vice versa.

9. In a machine of the character described, a plurality of bobbin spindles for carrying yarn, a brake for each spindle, a tension device in common to two or more of said brakes, and means for controlling said tension device by the separate strands of yarn leading from said spindles to produce a relative variation in the braking action on said spindles.

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Witnesses:

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