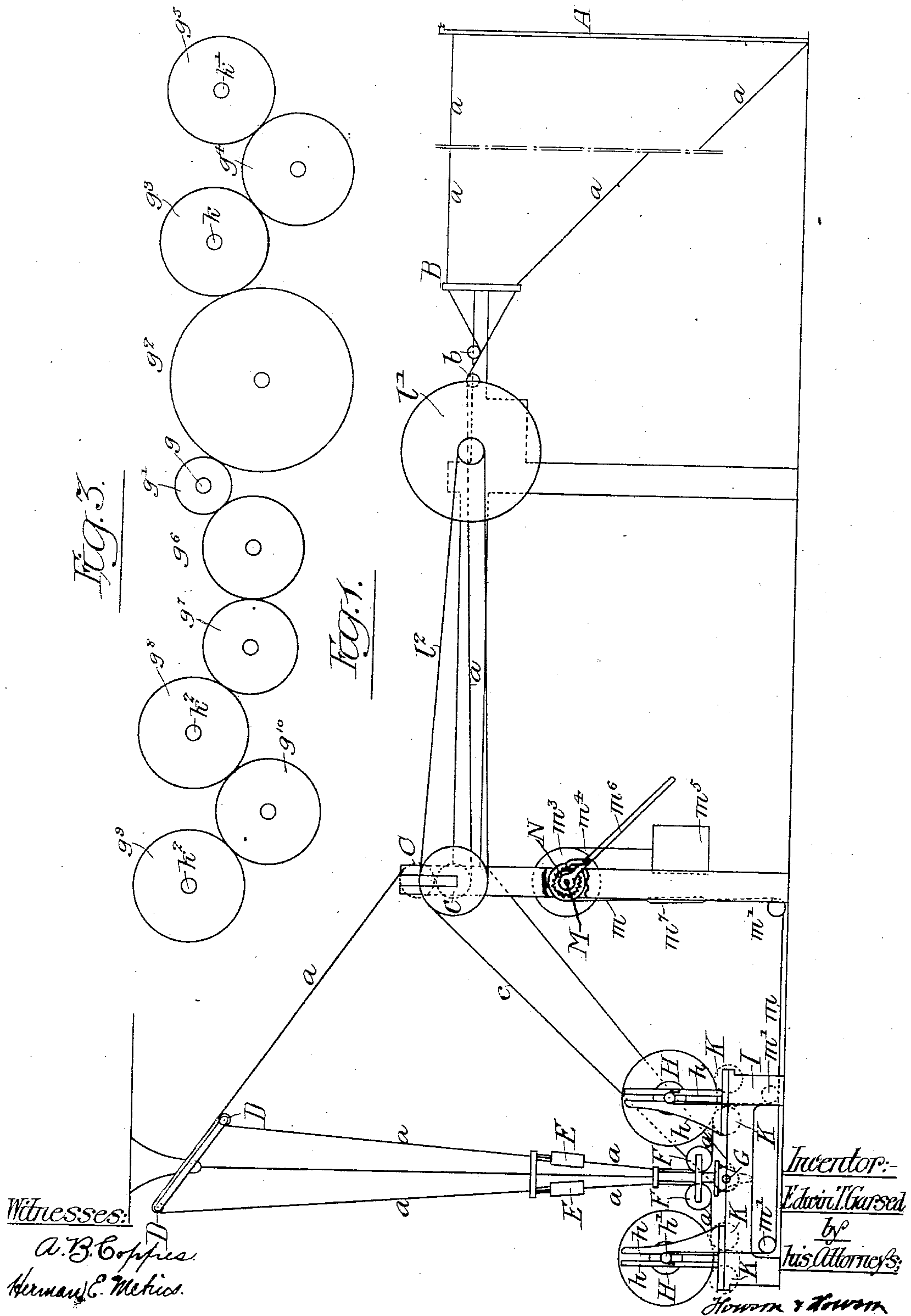


E. T. GARSED.
WARP BALLING MACHINE.

(Application filed Dec. 10, 1901.)

(No Model.)

2 Sheets—Sheet 1.



No. 713,424.

Patented Nov. 11, 1902.

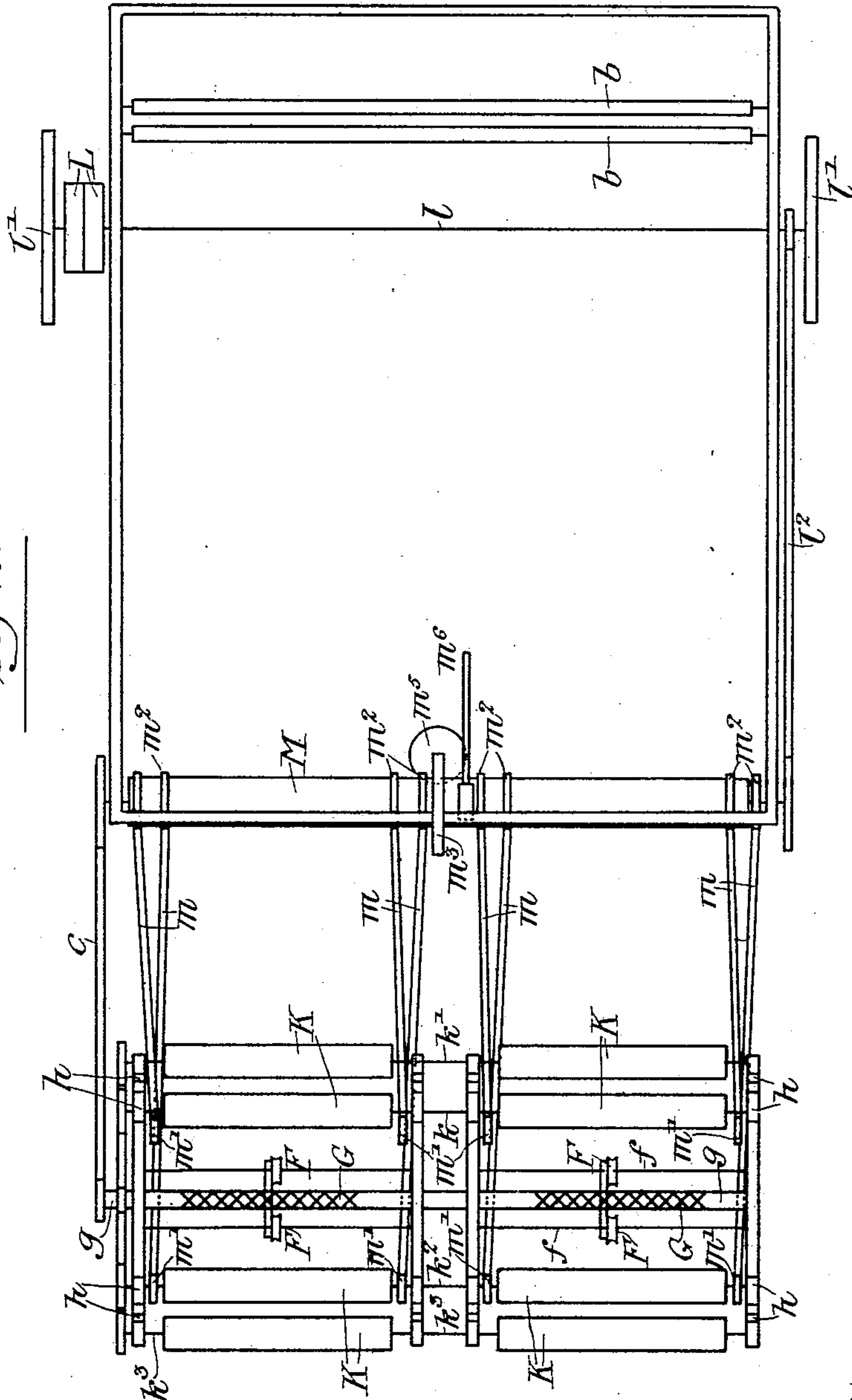
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WARP BALLING MACHINE.

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(No Model.)

2 Sheets—Sheet 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

EDWARD T. GARSED, OF GREENSBORO, NORTH CAROLINA.

WARP-BALLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 713,424, dated November 11, 1902.

Application filed December 10, 1901. Serial No. 85,369. (No model.)

To all whom it may concern:

Be it known that I, EDWARD T. GARSED, a citizen of the United States, residing in Greensboro, North Carolina, have invented certain Improvements in Warp-Balling Machines, of which the following is a specification.

My invention relates to certain improvements in warp-balling machines for simultaneously winding or forming a number of balls of yarn under conditions of tension, temperature, &c., which shall be so nearly identical that there will be practically no variation in the lengths of the various strands of material upon the balls so formed. This object I attain as hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation showing diagrammatically the relative arrangement of the various parts of my improved machine. Fig. 2 is a plan view of the machine, also showing the parts diagrammatically, the nip-rolls, carrier-rolls, cones, and rolls for the warps being removed; and Fig. 3 is a diagrammatic representation of the train of gears for driving the ballers, these having been omitted from the previous figures for the sake of clearness.

In making a single warp of a relatively large number of strands it is necessary to use more than one ball of yarn to supply the requisite number of strands, and since even under the most favorable circumstances there are variations in the tension, temperature, and other conditions under which these balls are wound their lengths will also vary, causing a greater or less amount of waste from the loss of the ends necessarily cut off when the yarn is wound on a beam. It is to prevent this unequal length and consequent waste that the present machine has been devised.

In the above drawings, A represents the end of a creel containing the spools on which individual strands of yarn are wound. From this strands of yarn *a* are drawn through an eye-board B and between rolls *b*. From here the said strands of yarn *a* are passed, all in one plane, toward and between weighted nip-rolls C C, (shown in dotted lines,) and thence over carrier-rolls D, preferably suspended from the ceiling, where the yarn is divided into a num-

ber of warps—in the present instance four. From here it passes to cones or tubes E for winding a wrapping-cord spirally around each of said warps. The four warps now pass around guide-pulleys F, which are moved to and fro on their shafts *f* by means of a traverse-screw G, from here going direct to wooden shells or rollers H, on which they are wound. It will be seen that a single traverse-screw is used to drive all four guide-pulleys, and in view of the fact that the mechanism involved in this form of apparatus is well known in the art as applied to single balling-machines it is not deemed necessary to describe it in detail.

The wooden shells on which the balls are wound have a square hole through which extends a square shaft provided with cylindrical ends, these being confined between vertical standards *h*, carried on the frame I of this part of the machine. These shells H and afterward the balls, when the machine is in operation, are carried upon balling-rolls K, (shown in dotted lines in Fig. 1,) and have driving mechanism arranged as illustrated in Fig. 2. From this latter figure it will be seen that the machine is provided with a driving-pulley L on a shaft *l*, which is in turn provided with fly-wheels *l'*. From a sprocket-wheel upon this shaft a chain belt *l''* extends to a sprocket-wheel upon the shaft of the lower of the nip-rolls C, and a chain belt *c* connects a second sprocket-wheel on this nip-roll shaft with a sprocket-wheel upon the shaft *g* of the traverse-screw G.

In order that the balling-rolls K may be positively driven without the possibility of slipping, I connect them by a train of gears, preferably arranged as shown in Fig. 3. From this it will be seen that a single large gear g^2 meshes directly with a gear g' upon the traverse-shaft *g* and also meshes with a gear g^3 , fixed to the shaft *k* of one of the balling-rolls K. This latter in turn drives its companion balling-roll K through an intermediate gear g^4 , meshing with a gear g^5 upon the shaft *k'* of said roll. For the propulsion of the second set of balling-rolls a gear g^6 meshes with the gear g' upon the traverse-shaft *g* and drives the gear g^7 , while this meshes in turn with a gear g^8 upon the shaft *k^2* of one of the other

balling-rolls k . This latter, similarly to that on the other side of the machine, is connected to a gear g^9 upon the shaft k^2 of its companion balling-roll through an intermediate gear g^{10} .

5 In order that an equal and uniform tension may be had at all times upon the warps while they are being wound, flexible steel bands m are provided, each of these having at one end a U-shaped saddle or hook passing over round-
10 ed portions of the shafts h' , carrying the wooden shells H . If desired, these ends of the bands may be fastened to some fixed portion of the machine—as, for example, one of the standards h . These bands are all then
15 led over suitable guide-pulleys m' to pulley-wheels m^2 . (Shown in Fig. 2.) The latter are fastened to a single shaft or roller M , running the whole width of the machine, which has in addition a pulley m^3 , having fastened
20 to it a steel band m^4 , carrying at its end a weight m^5 .

Any desired form of mechanism operated by a lever m^6 with a pawl and ratchet, as shown at N in Fig. 1, may be employed to
25 raise and lower the shaft or roller M in order to accommodate its position to the changes in position of the steel bands m , due to the variation in the diameters of the several balls as the warps are wound upon them.

30 Should there be any variation in the diameters of the wooden shells upon which the warps are wound, so that the tension-bands m would not all be under the same strain, this difference can be equalized or done away
35 with altogether by means of turnbuckles m^7 , one of which is provided somewhere in the length of each of said tension-bands.

In operation a number of strands of yarn sufficient to make four balls are drawn from
40 the spools in the creel and made to pass between a single pair of nip-rolls, beyond which they are divided into four sets or separate warps. As these warps pass from the rolls D to the guide-pulleys F they are wound with
45 wrapping-cords in the well-known manner, after which they are directed or laid upon the wooden shells by said guide-pulleys, so as to form even and properly shaped balls. Each of these warps is wound under precisely simi-
50 lar conditions, for it will be seen that the balling-rolls K are driven at equal speeds by gearing which precludes the possibility of slipping. Further, the shafts upon which the four independent balls are formed are
55 made to exert a substantially uniform and equal tension upon the warps by means of the mechanism shown, so that the length of each of the warps of said four balls is practically the same. Again, it is to be noted that
60 the four balls, being wound at the same time and place, are exposed to the same variations of temperature, and therefore the variations in lengths of material upon them will be simultaneous and equal. It will of course be
65 understood that these balls are preferably kept together from the time they are formed until the yarn is wound on the beam, it be-

ing advisable to pass them together through the sizing and dyeing machines.

As a result of the use of this machine when 70 yarn is finally wound upon the beam the several sets of ends will be almost exactly of the same length, the amount to be cut off being therefore reduced to a minimum in a manner not hitherto known to the art. 75

I claim as my invention—

1. A warp-balling machine provided with means for simultaneously winding a number of balls, in combination with a tension device having members operative upon all the balls, 80 and a single device for exerting tension upon the warps whereby these latter are all subjected to the same tension while they are being wound, substantially as described.

2. In a machine for simultaneously winding 85 a number of warps, the combination of rolls upon which said warps are wound, driving mechanism operating said rolls whereby they are all compelled to make equal numbers of revolutions in a given time, and mechanism 90 including a member or members operative upon each of the said rolls and having a common actuating device whereby each is subjected to the same retarding action and the tension upon all the warps is maintained 95 equal, substantially as described.

3. In a warp-balling machine, the combination of nip-rolls, guide-pulleys, a shaft for traversing said pulleys, a number of independent rolls upon which the warps are to be 100 wound, means for simultaneously turning said rolls at equal speeds, flexible bands operative upon the rolls tending to retard rotation of the same, and means common to all of said bands whereby they are maintained 105 in a condition of tension, substantially as described.

4. In a warp-balling machine, the combination of nip-rolls, guide-pulleys and rolls on which warps are to be wound, means for driv- 110 ing the said rolls, means common to a plurality of said guide-pulleys for traversing the same, and means for wrapping the warps while they are passing from the nip-rolls to the guide-pulleys, substantially as described. 115

5. A warp-balling machine having nip-rolls, a plurality of sets of balling-rollers, mechanism connecting the sets of rollers whereby motion of the same relatively to one another is prevented, means for driving said 120 mechanism, independent rollers for the warps, and guide-pulleys having a common traverse-shaft with means for retaining an equal tension upon said rollers for the warps, substantially as described. 125

6. In a warp-balling machine, the combination of nip-rolls, independent guide-pulleys, a traverse-shaft for operating the same, a number of balling-rollers, means for driv- 130 ing the said balling-rollers at equal speeds, independent rollers upon which the warps are wound, a tension-band operative upon each of the said balling-rollers, a shaft to which all of said bands are connected, and means con-

stantly tending to rotate said shaft, whereby said bands are maintained in a condition of tension, substantially as described.

5 7. In a warp-balling machine, the combination of nip-rolls, independent guide-pulleys, a traverse-shaft for operating the same, a number of balling-rollers, means for driving the said balling-rollers at equal speeds, independent rollers upon which the warps are
10 to be wound, a tension-band operative upon each of said balling-rollers, a shaft to which all of said bands are connected, means constantly tending to rotate said shaft whereby said bands are maintained in a condition of
15 tension, and means for wrapping a cord around each warp, the same operating simultaneously with the balling mechanism, substantially as described.

20 8. In a warp-balling machine, the combination of mechanism for simultaneously winding a number of balls upon rolls, means actuated from a single source for maintaining the different warps at an equal tension and

means for applying wrapping-cord to the said warps, said means operating simultaneously 25 with said mechanism, substantially as described.

9. In a warp-balling machine, the combination of nip-rolls, rollers for the reception of the warps, each having a shaft upon which it 30 is carried, guides for the ends of said shafts, whereby they are permitted to move vertically, flexible bands passing over said shafts, a single shaft to which all of said bands are connected and a weight acting to turn said 35 shaft, whereby said bands are maintained in a condition of tension, together with means for turning the rollers at equal speeds, substantially as described.

In testimony whereof I have signed my 40 name to this specification in the presence of two subscribing witnesses.

EDWARD T. GARSED.

Witnesses:

F. W. CONE,
JNO. GRAY BYNUM.