

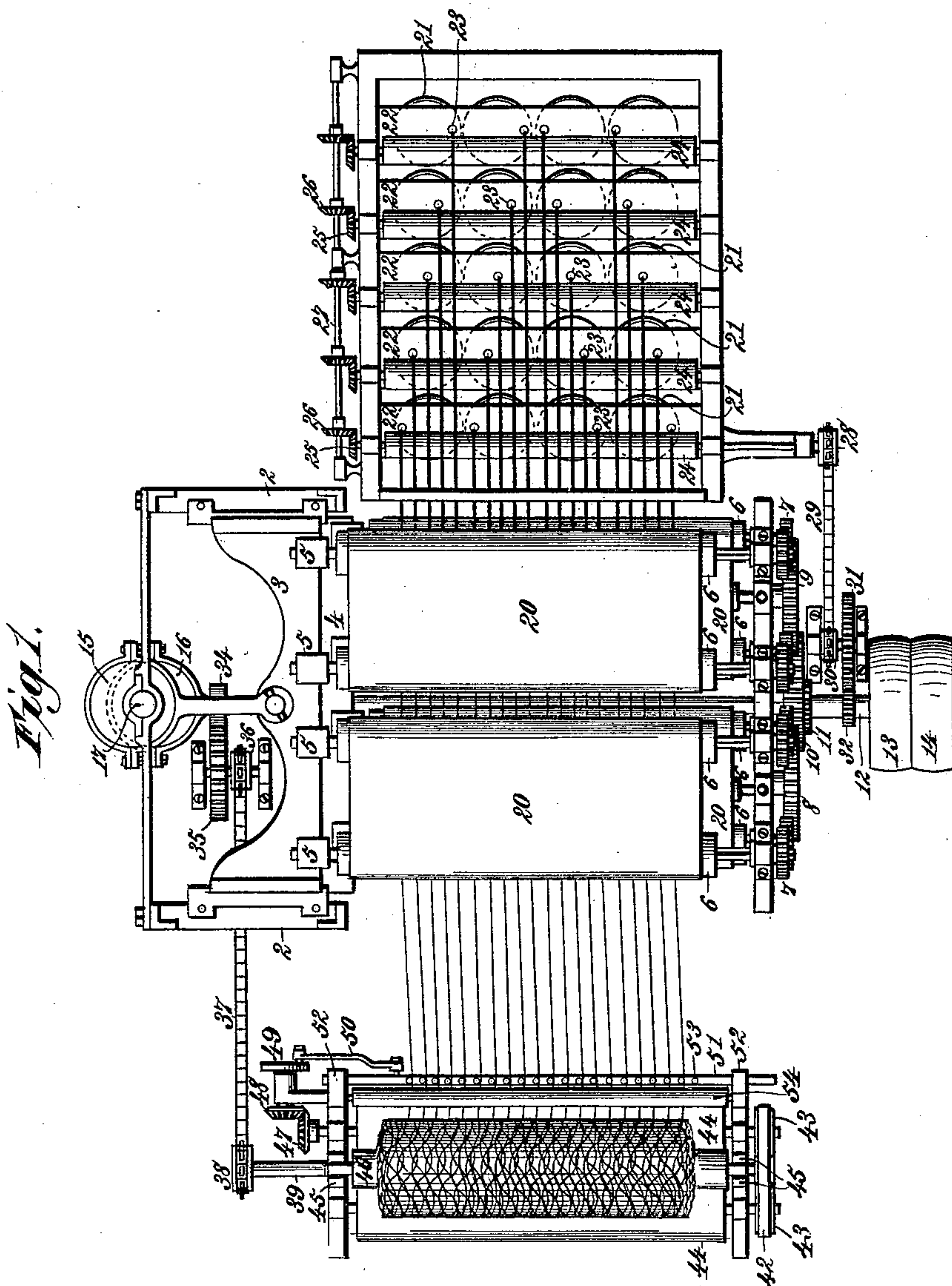
(No Model.)

2 Sheets—Sheet 1.

J. V. PALMER.
METHOD OF CARDING COTTON.

No. 405,904.

Patented June 25, 1889.



Witnesses:
Robert Ervatt,
J. A. Rutherford.

Inventor:
Jesse V. Palmer.
By James L. Norris
Atty.

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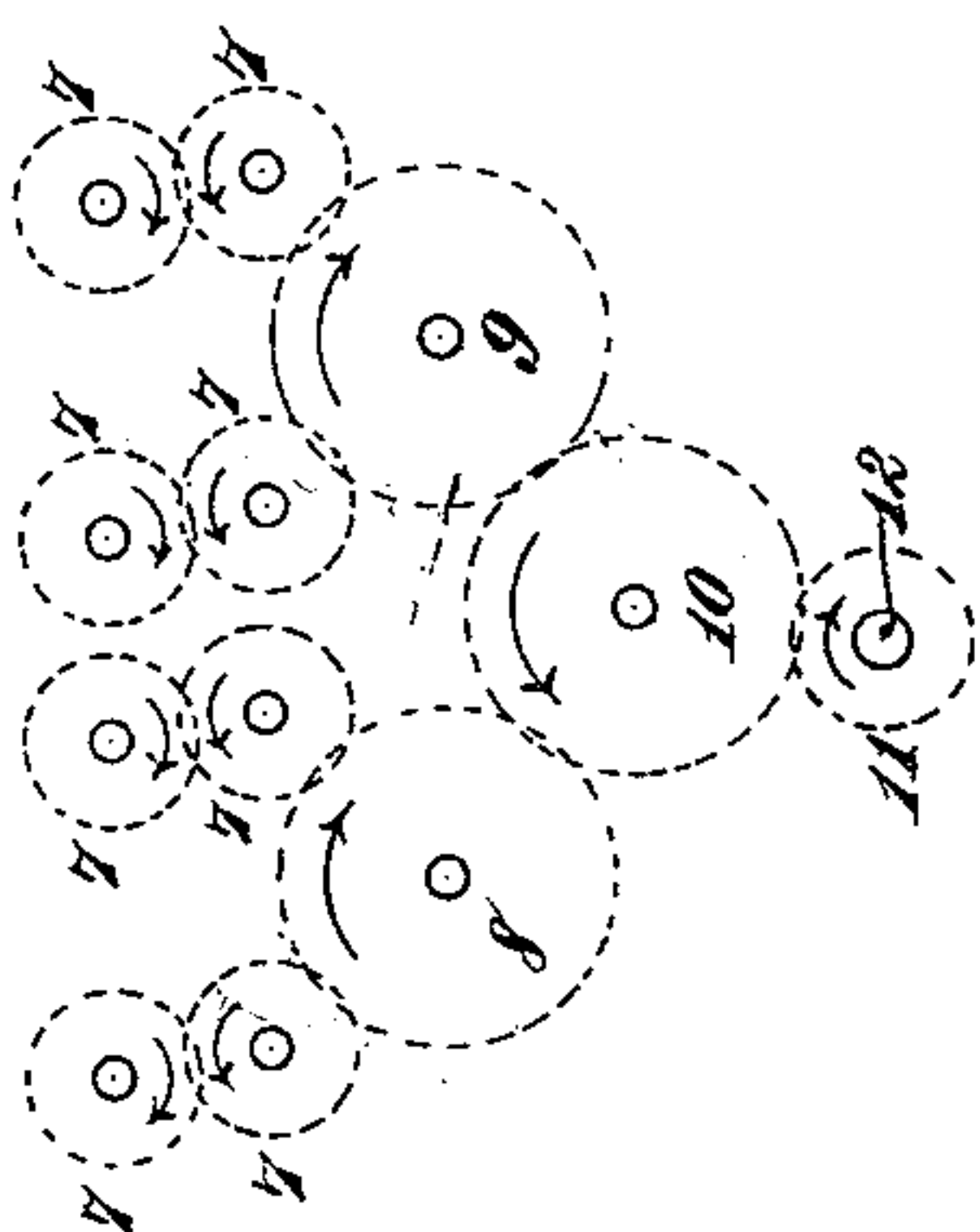
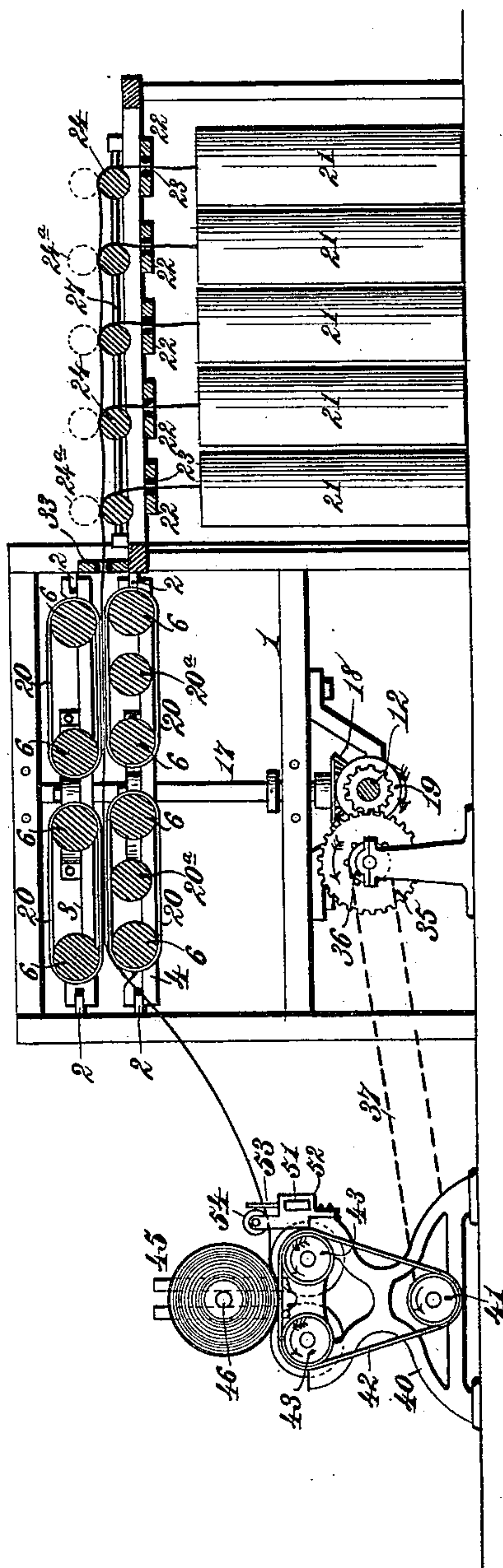


Fig. 3.

Fig. 2.



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UNITED STATES PATENT OFFICE.

JESSE V. PALMER, OF GREENWICH, NEW YORK.

METHOD OF CARDING COTTON.

SPECIFICATION forming part of Letters Patent No. 405,904, dated June 25, 1889.

Application filed December 27, 1888. Serial No. 294,757. (No model.)

To all whom it may concern:

Be it known that I, JESSE V. PALMER, a citizen of the United States, residing at Greenwich, in the county of Washington and State of New York, have invented new and useful Improvements in the Method of Carding Cotton, of which the following is a specification.

My invention relates to the preparation of cotton for spinning in the production of cotton yarn for use in the manufacture of knit underwear and hosiery; and the invention consists in a method of preparing cotton for spinning, which consists in carding on cotton-cards and doubling the cotton, as usual in the carding of cotton, and delivering it from the can of the doubler, railway-head, or drawing-frame either direct to a wool-finishing card or to a rubbing and winding apparatus intermediate said can and wool-finishing card, as hereinafter set forth.

In carrying my invention into effect I prefer to employ between the doubler, railway-head, or drawing-frame and the wool-finishing card an apparatus comprising an upper and a lower series of rollers that reciprocate endwise or longitudinally in opposite directions, and in their rotation carry belts or aprons for rubbing and condensing the cotton slivers as they are passed onward to the take-up or winding roller or spool, on which they are wound preparatory to being subjected to the action of the wool-finishing card. This apparatus for rubbing and winding the slivers is illustrated in the annexed drawings, in which—

Figure 1 is a plan, and Fig. 2 a vertical longitudinal section, of such apparatus, partly in section. Fig. 3 is a diagram of the gearing for rotating the rollers that carry the aprons between which the slivers are rubbed.

In the preparation of wool for manufacture into yarns it commonly is passed through a first breaker-card, a second breaker-card, and a finisher-card, being delivered by the latter in the form of rovings ready to be spun into yarn. In the first breaker-card the wool after having been acted upon by the worker-rolls and accumulated on the doffer to form the fleece is combed from the latter, and the loose-

ly-compacted sliver is wound or coiled upon a roller or spool. A number of spools containing slivers from the first breaker-card are placed upon the creel at the feeding end of the second breaker, which is similar in construction to the first, and delivers the material in the form of a sliver, which is similarly wound upon a roll or spool. The slivers from the second breaker are fed to the finisher-card in the same manner as those from the first breaker are fed to the second breaker; but in the finisher-card the fleece from the doffer is subdivided into a number of strips, which are separately rolled or compacted into rovings, the latter being wound upon suitably disposed and actuated jack-spools.

In the wool-carding machines the material as it passes around with the main cylinder is subjected to the action of a series of worker-rolls whose surfaces rotate in close proximity to that of the main cylinder.

In a cotton-carding machine the material is carried by the main cylinder past a series of bars or flats having toothed surfaces adjacent to the surface of the main cylinder, and either mounted in fixed supports or carried by bands or chains by the movement of which they are slowly traversed around a portion of the circumference of the main cylinder.

Cotton-carding machines are provided with automatically-operating devices by which the top-flats are raised in predetermined order and cleansed of the accumulation of dirt and short fibers that lodge among the teeth thereof, the cleaning or stripping being performed during the regular working of the feed.

In the case of wool-cards, where it is desired to clean or strip the same, the machines have to be stopped and the various rollers separately cleaned by hand.

The doubler, railway-head, and drawing-frame, referred to herein, are of ordinary construction, which is so well known that it need not be illustrated or further referred to.

Heretofore in the manufacture of cotton yarn for knit underwear and hosiery the fleece has been prepared on a lapper for the first breaker wool-card, and the slivers from such card have ordinarily been spooled onto a large spool for the second breaker wool-card,

the slivers from the latter being spooled again for the wool-finishing card. In spooling a great many splicings are necessary, which causes uneven spots in the yarn; and, owing to the fact that wool-carding machines are not provided with self-strippers or other cleaning devices, in the carding of cotton by the use of such machines the slivers are imperfectly cleaned, the carding machinery becomes choked or clogged and requires to be cleaned daily, and there is consequently a great loss of time and labor and an imperfect product.

In some cases where the cotton has been passed through wool breaker and finisher cards it has first been passed through a cotton-card. However, whenever the cotton is passed through a breaker-card, the partial twisting of the fibers around the axis of the sliver formed from the fleece delivered from the breaker-card results in the fibers being strained or broken in the recarding operation, or at least their strength being impaired. Moreover, should for any reason the sliver not pass uniformly through the trumpet of the breaker-card it will be formed with uneven portions, resulting in defective yarn. The cost of running the various machines referred to, it may be added, is considerable. These objections I obviate by employing a cotton-carding machine of any ordinary or well-known construction, a doubler, railway-head, or drawing-frame, and a wool-finishing card, either without a rubbing mechanism between the doubler and finishing-card, as hereinafter explained, or in connection with an apparatus located between the doubler and the wool-finishing card, for the purpose of rubbing and winding the slivers for said wool-finishing card, the wool-breaker cards being dispensed with, thereby avoiding all all unnecessary strain on the slivers, effecting a thorough separation of leaves, seeds, and other extraneous matter by means of the cotton-carding mechanism, and producing compact, evenly-rubbed, and separately-disposed slivers, which are smoothly wound in readiness for the action of the wool-finishing card preparatory to spinning. By this treatment I can employ a lower grade of cotton and produce a better quality of yarn than can be produced by the use of wool-carding machinery throughout.

With some high grades of cotton having extra long staple and little waste I find that the rubbing can be omitted and the cotton be fed to the wool-finishing card direct from the cans that receive the slivers from the doubler or drawing-frame. This can be done by employing between the can of the doubler or drawing-frame and the wool-card the well-known Apperly feed (shown in Letters Patent to Apperly and Clissold, No. 18,888, dated December 22, 1857) heretofore employed only for taking the sliver from a wool-

breaker card to another breaker-card or to a wool-finisher card.

By subjecting the slivers to a rubbing action before they are subjected to the final carding operation the fibers are made compact or are condensed, made smooth and cylindrical, much stronger, and better enabled to withstand the drawing action of the winding mechanism and the subsequent unwinding and feeding to the wool-finishing card.

In the accompanying drawings I have shown a rubbing and winding or take-up mechanism adapted for use in practicing my invention.

Referring to the drawings, the numeral 1 designates a suitable frame provided on one side with laterally-projecting guides 2 for upper and lower horizontal cross heads or plates 3 and 4, carrying journal-boxes 5, in each of which is engaged one end of a rub-roll shaft, there being two series of rub-rollers 6, an upper series and a lower series, arranged and actuated in a manner similar to that described in Letters Patent No. 238,329, granted to James Barker, March 1, 1881. The opposite ends of the several rub-roll shafts are loosely feathered in pinions 7, which are driven by gears 8 and 9, and an intermediate gear 10 from a pinion 11 on a main driving-shaft 12, that is suitably supported at the lower part of the machine-frame and provided with fast and loose pulleys 13 and 14, as usual. The cross-heads or horizontal plates 3 and 4 are respectively connected with oppositely-arranged eccentrics 15 and 16 on a vertical shaft 17, that is supported in suitable bearings, and provided near its lower end with a miter-gear 18, that is driven through a similar gear 19 on the main driving-shaft. By means of the shafts 12 and 17, gears 18 and 19, and oppositely-arranged eccentrics 15 and 16 the cross-heads 3 and 4 and connected upper and lower series of rub-rolls 6 are alternately reciprocated in opposite directions, the connection of the rub-roll shafts with the pinions 7 being such that the several rub-rolls will have imparted to them a simultaneous rotary and endwise movement. As shown, there are four rub-rolls 7 in the upper series and four in the lower series, and in each series said rolls are connected in pairs by endless aprons or broad belts 20, extending the entire length of the several pairs of rolls. These rub-rolls 7 and their endless aprons 20 are arranged in such proximity that the lower surfaces of the aprons in the upper series and the upper surfaces of the aprons in the lower series are nearly in contact, and as these nearly-contacting surfaces are caused to move in the same direction it is obvious that they will feed forward the slivers that are delivered to them, as presently explained. At the same time the endwise or longitudinal reciprocation of the upper and lower series of rub-rolls 7 in opposite directions, and the consequent corresponding lateral movement of the aprons 20,

will cause a rubbing action to be exerted on the slivers, whereby they are compacted or condensed, increased in strength, and made smooth and somewhat cylindrical. If desired, the aprons 20 may be provided with tightening-rollers 20^a, as shown in Fig. 2.

The slivers that are acted on as above described are delivered to the aprons 20 from cans 21, that received said slivers from the doubler, railway-head, or drawing-frame, which latter mechanism, being well known, does not require illustration.

The cans 21, after receiving the slivers, are placed in parallel rows, as shown in Fig. 1, beneath a series of guides 22, that are supported horizontally in the machine-frame 1 at the feed end of the aprons 20, which guides 22 consist of parallel slats or bars having eyes 23 for the passage of the slivers. Each guide-bar is provided with as many guide-eyes 23 as there are cans in the row immediately beneath said bar, one guide-eye being over some part of each can, and the guide-eyes of the several bars are so located and arranged that no guide-eye of any bar will be in line with a guide-eye of another bar. It will thus be seen that the several slivers will be delivered from the cans 21 in different lines, lapping by each other and separately disposed throughout their entire length, thus obviating contact between the slivers and keeping them apart, so that they will be rubbed separately but simultaneously. Above each guide-bar 22, parallel with and slightly in advance of its guide-eyes 23, is a feed-roller 24, and on one end of each of these feed-rollers is a miter-gear 25, meshing with one of a series of miter-gears 26 on a shaft 27, supported longitudinally at one side of the machine-frame. One of the feed-rollers 24 has the opposite end of its shaft extended and provided with a sprocket-gear 28, through which all the feed-rollers are driven by means of a chain belt 29 from a sprocket-gear 30 on a shaft or stud carrying a spur-gear 31, that receives motion from a pinion 32 on the main driving-shaft. The slivers are thus fed to the apron 20 by and over the feed-rollers 24, and, if desired, the said feed-rollers may be supplemented by pressure-rollers 24^a, as shown by dotted lines in Fig. 2, though these pressure-rollers are not essential. If desired, a guide-bar 33, having eyes or openings for the passage of the slivers, may be arranged between the feed-rollers 24 and the rubbing-aprons.

On one end of the driving-shaft 12 is a pinion 34, through which is driven a spur-gear 35 on a short shaft or stud carrying a sprocket-gear 36, which is connected by a chain belt 37 with a sprocket-gear 38 on the extended end of a shaft 39, that is journaled in the frame 40 of a winding or take-up machine located in advance of or near the delivery end of the rubbing mechanism hereinbefore de-

scribed. The opposite end of the shaft 39 carries a band-wheel 41, that is connected by a band or belt 42 with band-wheels 43 on the shafts of two rollers 44, that are journaled side by side in the upper part of the winding-machine frame. The ends of this winding-machine frame are provided with vertically-slotted standards 45 for receiving the journals of a winding-roller 46, that is located just above and between the rollers 44, which thus serve as a bed for said winding-roller and for the slivers wound thereon. One of rollers 44 has its shaft extended at one end and provided with a miter-gear 47, that drives a miter-gear 48 on the shaft of a disk 49, which is suitably supported at one end of the winding-machine and connected by a pitman 50 to a reciprocating bar 51, supported in guideways 52 on the rear of said machine. This reciprocating bar 51 is provided with vertical guide-pins 53, between which the slivers from the rubbing mechanism are delivered to the winding-roller, a holding-down roller 54 being located in front of the guide-pins 53 for the purpose of preventing the ends of the slivers from flying upward. The winding-roller 46 receives motion from frictional contact with the rollers 44 and rises in the slotted standards 45 as the slivers are wound. It will be observed that the reciprocating movement of the bar 51, with attached guide-pins 53, between which the slivers pass, results in causing said slivers to be laid on the winding-roller 46 in waving or serpentine lines lapping over each other without coming in parallel contact, and thus making a solid spool. When the winding-roller is filled, it is removed by breaking out, as usual, and replaced by another, while the filled roller taken from the winding-machine is carried to the wool-finishing card, to which the slivers are fed in the usual way. The wool-finishing card delivers the slivers to the jack-spools ready for spinning into yarn.

While I have illustrated appropriate mechanism for rubbing the slivers before delivering them to the wool-finishing card, I would have it understood that I do not confine myself to the use of the mechanism described and shown, as any other suitable rubbing devices may be employed, and in some cases, as before mentioned, the rubbing of the cotton at this point can be omitted and the slivers be fed direct to the wool-finishing card from the cans 21, in which they are deposited by the doubler, railway-head, or drawing-frame.

What I claim as my invention is—

1. The method of preparing cotton for spinning, which consists in carding and doubling the same, as usual, and delivering the slivers from the can of the doubler, railway-head, or drawing-frame to a wool-finishing card, substantially as described.

2. The method of preparing cotton for spin-

ning, which consists in carding and doubling
the same, as usual, then rubbing the slivers
separately, and then subjecting them to the
action of a wool-finishing card, substantially
5 as described.

3. The method of preparing cotton for spin-
ning, which consists in carding on cotton-
cards, doubling the slivers, as usual, rubbing
the doubled slivers separately previous to the

last carding operation, and then subjecting to
the fibers to a final carding operation, sub-
stantially as described.

In testimony whereof I have affixed my sig-
nature in presence of two witnesses.

JESSE V. PALMER.

Witnesses:

JAMES L. NORRIS,

JAMES A. RUTHERFORD.