

J. GOOD.
COMBING MACHINE.
APPLICATION FILED AUG. 13, 1910.

1,064,321.

Patented June 10, 1913

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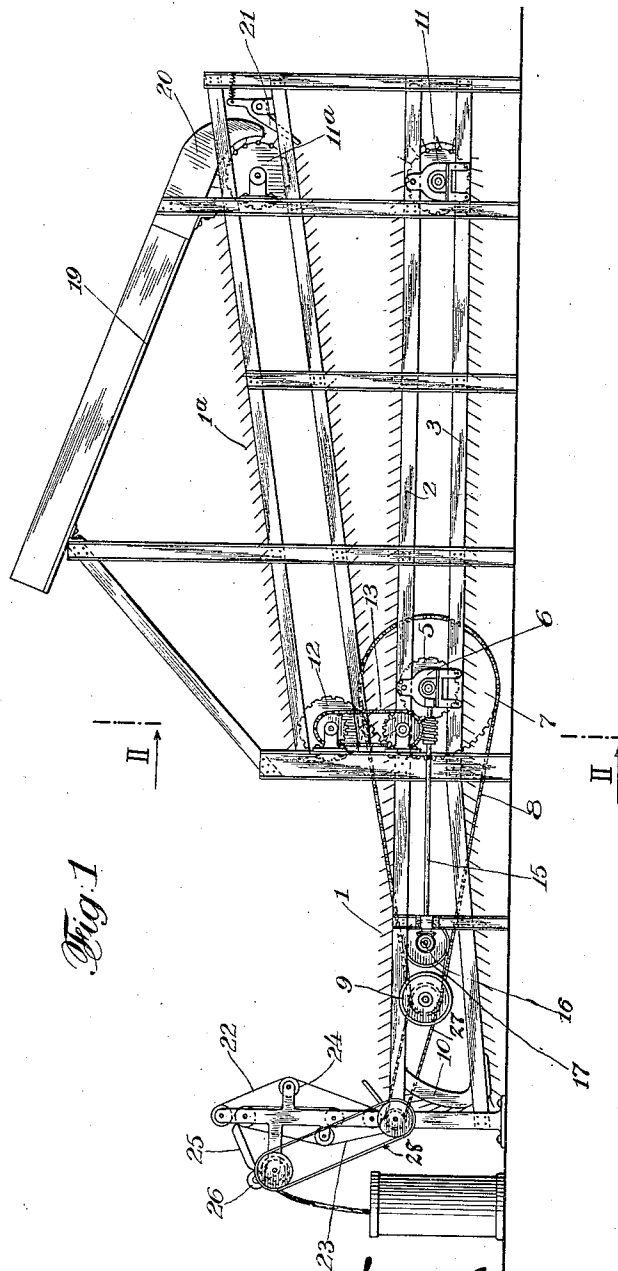


Fig. 1

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Fig. 2

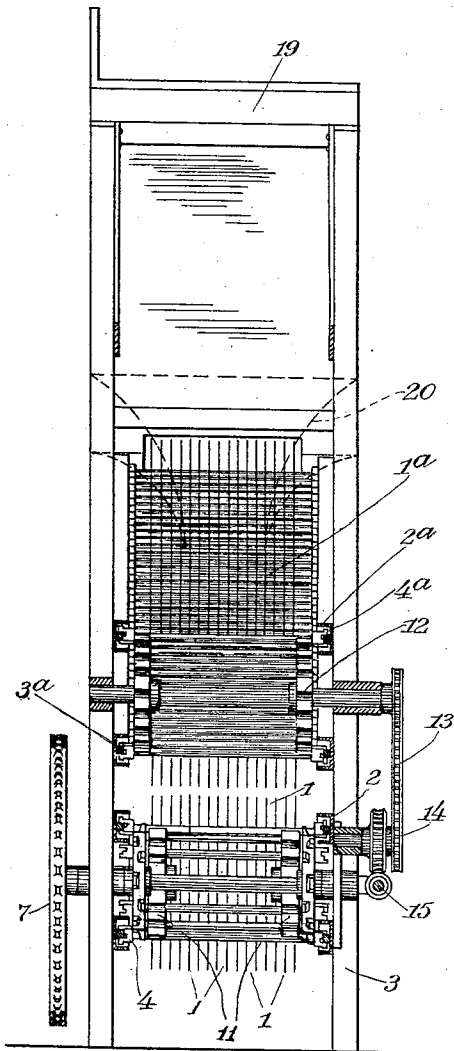
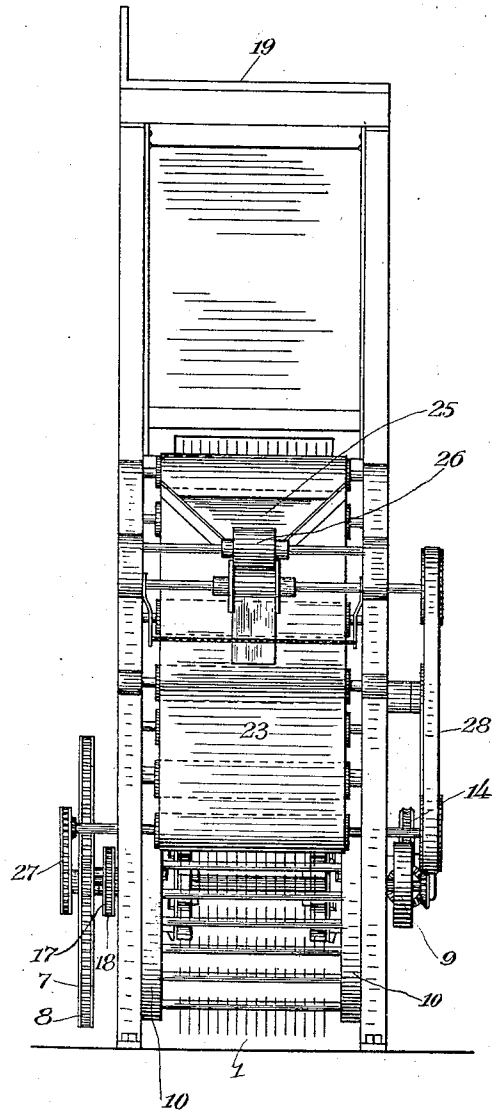


Fig. 3



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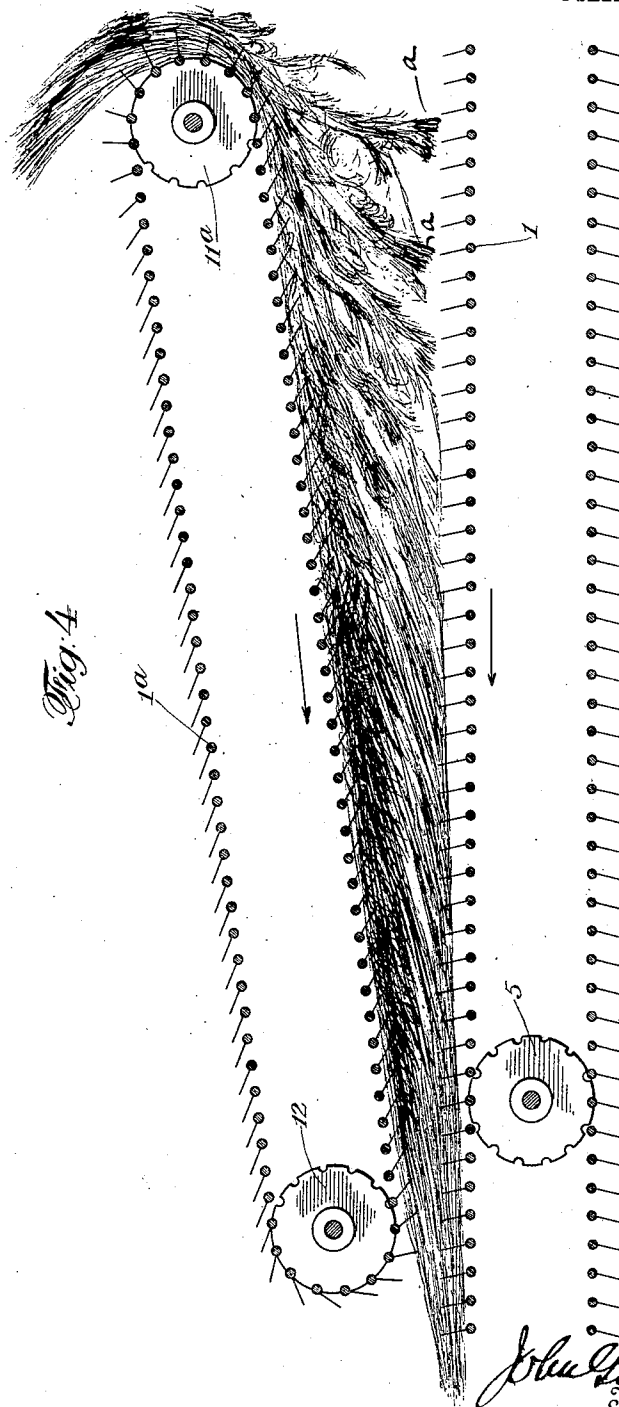
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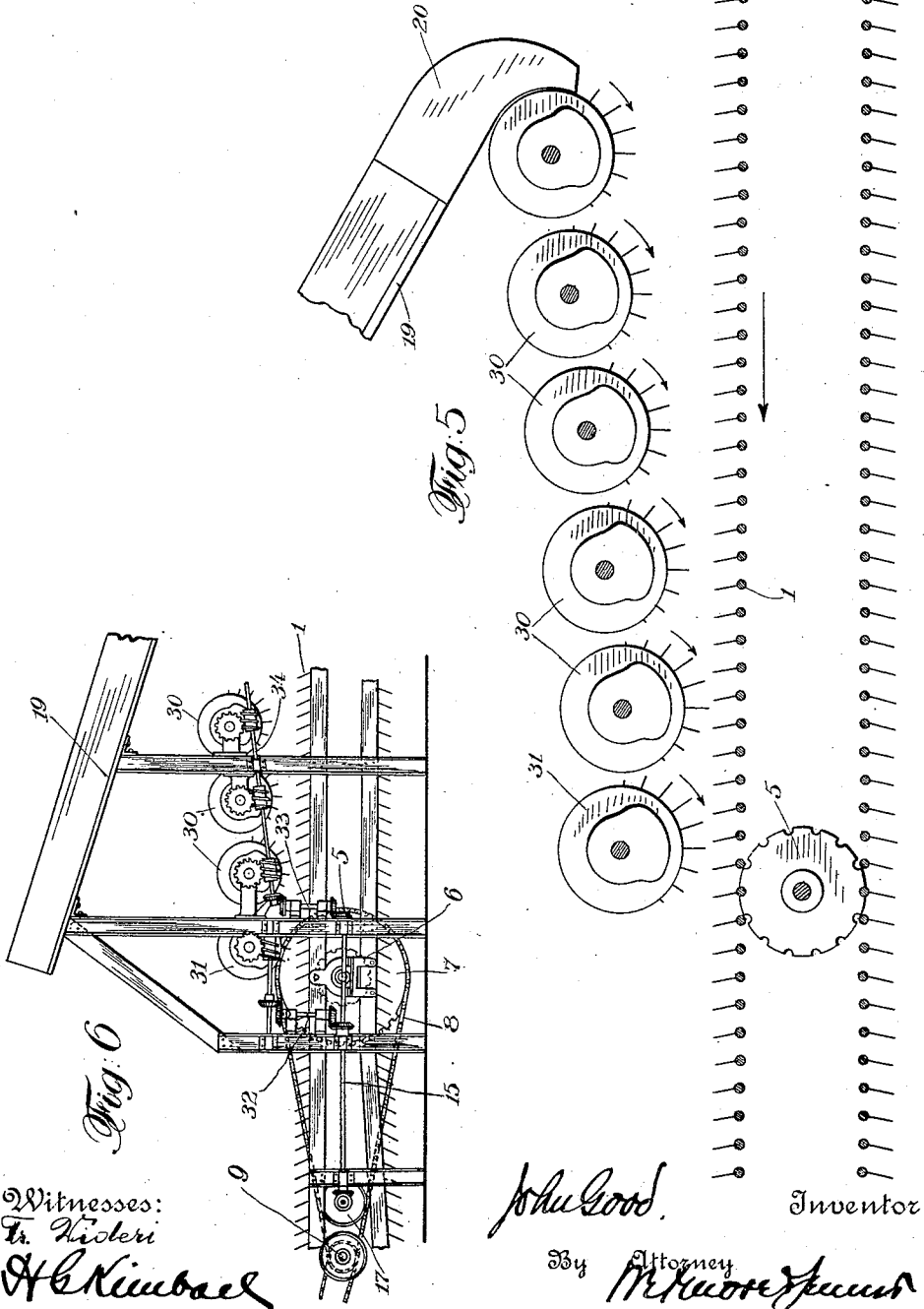
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4 SHEETS-SHEET 4.



UNITED STATES PATENT OFFICE.

JOHN GOOD, OF NEW YORK, N. Y.

COMBING-MACHINE.

1,064,321.

Specification of Letters Patent.

Patented June 10, 1913.

Application filed August 13, 1910. Serial No. 577,068.

To all whom it may concern:

Be it known that I, JOHN GOOD, a citizen of the United States, and a resident of the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Combing-Machines, of which the following is a full, true, and complete specification.

This invention provides a novel and useful means for preparing hemp and other fiber for spinning, the object being to reduce the number of operations required in the manufacture of yarn, that is to say to provide a machine in which raw fiber, as taken from the bale, can be converted by a single or a comparatively few passages therethrough, into a fiber product or sliver sufficiently combed or straightened to be suitable for spinning into commercially suitable grades of yarn. The principle of operation involves the feeding of the fiber or fiber lap into the action of a combing pin train in such manner that a considerable portion of the length or working stretch of the latter will have simultaneous combing action thereon, so as to utilize the maximum combing capacity of the said train and avoid overloading the pins thereof or localizing the load thereon at a single point. The fiber thus acted upon is carried or held on a series or train of pins extending longitudinally with the combing train and constituting a stretch of feeding pins with which stretch the said train coöperates in performing the combing operation. By this arrangement a relatively heavy fiber feed can be supplied to the combing train and the latter can be run at high combing draft producing a correspondingly well-combed product sliver having sufficient body to be capable of continuous mechanical delivery from the machine.

The invention also provides for the reduction of squared or matted ends of fiber and the longitudinal separation of the individual fibers in properly imbricated arrangement, with a corresponding uniformity of the weight or size of the resulting sliver.

Other features of the invention will be apparent to those skilled in this art from the description which follows and the drawings forming part hereof.

The exemplification illustrated in the drawings is a single-head machine, that is to say, one having but a single point for feeding the fiber, but it will be obvious

from the description and the claims that the same principle can be applied equally well, if desired, to multiple-head machines.

In the drawings Figure 1 is a side elevation of a machine embodying the present invention with numerous detail structural parts omitted, however, for sake of clearness. These will be readily supplied by the manufacturer familiar with this kind of machinery. Fig. 2 is a vertical transverse section of Fig. 1 on line II—II thereof; Fig. 3 a front end elevation; Fig. 4 an enlarged schematic section of the feeding and combing trains indicating the operation; Fig. 5 is a similar view indicating the operation of a modified form, and Fig. 6 is a side elevation of the driving gearing of such modified form.

The frame of the machine may be constructed in any suitable manner to support the combing pin train and its driving gearing, and the combing-pin train may be of any suitable construction and mode of operation whereby a train or succession of combing pins can be caused to travel through a fixed path at the requisite velocity. As shown herein, the combing pin train is constituted by a combing chain, such as is familiar in all hemp working machinery. This chain is composed of an endless series of gill-bars linked together and adapted to travel in suitable upper and lower tracks on the machine frame. The ends of the gill-bars are provided with dogs which slide upon cam surfaces or guide-ways adjacent the tracks and control the angle of the pins on each gill-bar with reference to their path of movement, as will be well understood by those skilled in this art. In the drawings the gill-bars are marked 1, their upper and lower tracks structures 2 and 3, respectively, and the dogs, 4. The chain is driven by sprocket wheels 5, which are journaled on brackets 6 on the machine frame at about the middle of the trackway, and engage both the upper and the lower stretches of the chain. The sprocket wheel shaft carries a large sprocket gear 7, geared by a chain 8 to the primary drive shaft 9. The gill-bars of the combing chain are maintained by their respective dogs and the cam guides with their pins set at a forward inclination or rake, as the chain moves through the upper stretch of track, about as shown, and as it reaches the end thereof the rake of the pins is gradually diminished and ultimately

sharply reversed, when the gill-bars pass downwardly into the curved tracks 10 by which they are conducted to the lower or return trackway, as will be readily understood.

5 At the rear end of the return travel the chain is carried over a pair of notched idler wheels 11, by which it is returned to the beginning of the upper stretch, where the pins again take up their previous forward rake.

10 The means whereby the fiber is presented to the action of the combing train, such as just described, are mounted above the upper or operative stretch thereof being supported in uprights of the machine frame in

15 any suitable manner, and such means comprise an inverted train of pins, that is to say, a train of pins which point downwardly toward the upright pins of the lower chain. This inverted train may be formed by cyl-

20 inders or otherwise as later explained, and as shown in Fig. 1 is comprised of an ordinary combing chain, such as the lower chain already described, having gill-bars 1^a, dogs 4^a, and track structures 2^a and 3^a on which it

25 travels. At the rear end it is carried on a pair of notched idler wheels 11^a, like the wheels 11, and at the forward end on a pair of drive sprockets 12 by which it is driven. The shaft of these drive sprockets is jour-

30 naled on the vertical uprights of the frame and chain-gear (13) to a worm-wheel 14, and the latter is driven by a worm shaft 15, bevel-gear (16) to the shaft of a variable or change-speed gear mechanism, illustrated

35 in a conventional way in the drawings, and marked 17. The change-speed gearing is driven by a chain 18 (Fig. 3) from the primary shaft, and it will be understood that it is intended for varying the relative rate

40 of speed between the two trains or chains of pins, the upper chain being driven in any case at the slower velocity.

Above the upper chain of pins there is mounted a feed board 19 which may be flat,

45 but which is preferably inclined downwardly and rearwardly terminating in a curved elbow conduit or chute 20. Bunches of fiber are laid on this feed board and guided into the curved chute, thereby be-

50 coming formed into a continuous lap. By the chute, the lap thus formed is conducted into the pins of the upper train, just described, being assisted thereto by a spring pressed guide 21, and in its passage through

55 the curved chute it becomes inverted, and is taken upon and carried forward by the pins in this inverted position.

The stretch of inverted pins is mounted to travel forwardly and directly over the

60 operative stretch of the upright pins of the combing train, the space between them being unobstructed and forming a combing space extending longitudinally of the machine, so that the fiber or more particularly the for-

65 ward ends of the fiber of the inverted lap

may drop or droop on to the combing train. The position of the fiber in this condition is roughly indicated by Fig. 4, and it will be understood that the difference in motion of the two trains, the combing train being of the faster velocity, results in the combing of the fiber in an obvious manner while it is being advanced by the feeding train. The said train is preferably disposed at an inclination with respect to the combing train so that the combing space referred to converges toward the direction of the combing motion, and the fibers depending therefrom, particularly the forward or matted ends of the fiber, are thus allowed to swing and be battered by the moving combing-pin points when they first encounter them as indicated at *a* in Fig. 4. The matted and gummed together fibers are thus preliminarily separated and loosened, and as the feeding chain advances, they are brought into closer relation to the combing pins, in the narrowing part of the combing space, where they are finally combed and fibers drawn out of the feeding train upon the combing train to be carried by the latter to the delivery head. The rake of the pins of the inverted feeding train is set at a sufficiently reverse angle, as indicated in Fig. 4, to maintain the fiber or the tail ends of the bunches of fiber, upon them throughout their movement, through the combing space and the inclination of the feeding train as a whole is preferably such that the fiber held on the greater part of its stretch will be continuously engaged by the combing pins, the elevation of the feeding end being merely enough to produce the preliminary battering of matted fibers, above described. But it will be understood that while the inclination of the feeding train is a valuable feature of the present invention, it is not essential to the principle of its operation. The combing effect that takes place between the two combing trains may be prolonged, if desired, by extending the inclined feeding train forwardly but parallel with the combing train, as will be presently described. The fibers, combed and drawn off by the combing train, from the snarled, uncombed fibers on the feeding train fall in overlapping relation on the combing pins and move with it to the delivery head, which may be constructed according to any suitable plan. As indicated herein, and preferred, it is a so-called apron delivery head, comprised of two contacting leather belts, 22 and 23, trained over a system of rolls 24 and running in contact with each other from a point on the level of the combing train to an upper point at the top of a short conductor 25. The fiber from the combing train enters the nip of these belts and is carried upward onto the conductor, from thence it passes through the calender rolls 26 and thence into the sliver can.

The apron rolls 24 are driven through sprocket gearing, between the shaft of one of them and the primary shaft, and the calender rolls, by a belt gearing 28 with the same roll shaft as will be readily understood. The proper arrangement of the sprocket gearing just referred to will enable the delivery head to exert more or less draft over the combing train, thereby to attenuate the sliver thereon as desired.

The modified form of Figs. 5 and 6 differs from the machine above described primarily in the substitution for the chain constituting the feeding train, of a series of cylinders shown at 30. These cylinders are of a construction and mode of operation which are thoroughly familiar to hemp machinery builders. They are each mounted on a rotary shaft and provided with cam controlled gill-bars which project their pins outwardly on the lower side of the cylinder and withdraw them into the shell of the cylinder on the upper side. A series of these cylinders is placed side by side above the combing train, and if preferred at a slight angle thereto, so that the downwardly projecting pins thereof constitute an inverted feeding train of the same general functions as the one above described. The fiber supplied to this kind of train is treated in much the same way as has been above described, the actual combining operation taking place throughout a considerable part of the length of the combing chain, and being in the present case susceptible of extension by adding additional cylinders to the forward end of the series. In Figs. 5 and 6, the cylinder marked 31 constitutes such an extension as referred to. This cylinder is separated from the combing pin points by the same distance as the next rearward cylinder 30 and operates to retain any uncombed fiber at this point until it has been further worked. More of the same cylinders can be added as desired to insure thorough combing. The several cylinders of the series may be driven through any suitable arrangement of gearing, as for instance, by bevel gearing from the feed drive shaft 15. In Fig. 6 the supplemental cylinder 31 is driven by bevel gear train 32 and the inclined series of cylinders by a bevel gear train, marked 33, all the cylinders 30 being worm driven from the inclined shaft 34 connected to this latter bevel gearing.

Claims:

1. A combing machine for hemp and like fiber comprising a combing train, a feeding train opposed to said combing train and arranged to supply the fiber to said combing train from successive points along its own length.

2. In a combing machine for hemp or like fiber, a combing train, a series or train of inverted pins mounted above said combing

train with its feeding stretch coextensive with a portion of the length of the latter in combination with means for introducing the fiber into the space between said opposed trains.

3. A combing machine for hemp or like fiber, comprising combing and feeding trains between which the fiber is combed, said feeding train being provided with means for supplying it with the fiber and adapted to advance the said fiber along or over said combing train independently of the action of the latter thereon.

4. A combing machine for hemp or like fiber comprising combing and feeding trains providing a longitudinally extending space between their opposed operating stretches in which the fiber is combed, means for supplying fiber to the end of said feeding train and means for driving said train to advance the fiber through said space during the combing operation.

5. A combing machine comprising a train of upright combing pins, a train of downwardly projecting feeding pins arranged above said combing pins and arranged to provide a combing space between the operative stretches of both said trains, in combination with means for driving said train of combing pins relatively to said train of feeding pins and means for feeding the fiber to said combing space.

6. In a combing machine, the combination of combing and feeding trains arranged at an angle to each other and providing a convergent combing space between their opposed operative stretches, and means for supplying fiber to said feeding train for action by the combing train in said convergent space.

7. In a combing machine, the combination of a train of upright forwardly moving combing pins, having opposed thereto and above the same a train of inverted feeding pins forming a combing space between the operative stretches of said two trains, the pins of said feeding train being set at a reverse angle with respect to the combing movement sufficient to maintain the fiber from falling therefrom.

8. A combing machine for hemp or like fiber comprising a feeding train adapted to hold and carry the fiber to be combed, a combing train coöperating with a stretch of said feeding train to comb the said fiber and adapted to draw out the combed fiber therefrom and support the same, in combination with a delivery means adapted to collect and deliver such combed fibers in sliver form.

9. A combing machine for hemp or like fiber comprising a train of pins adapted to hold and forwardly carry fiber to be combed, a train of forwardly moving combing pins coöperating with a stretch of said first

named train and a sliver-delivery means co-operating with said combing pin train.

10. In a combing machine, an inclined train of pins adapted to hold the fiber to be combed and a horizontal train of combing pins coöperating with a stretch of said inclined train and adapted to draw out and receive combed fibers therefrom, in combination with means for delivering a combed sliver from said train of combing pins.

11. In a combing machine, means for forming a lap of fiber bunches, a train of inverted pins adapted to hold and carry said lap with the forward ends of said bunches on the under side of said train where they may depend therefrom, in combination with a combing train coöperating with the fiber-holding stretch of said inverted train and operative upon said depending ends.

12. In a combing machine, means for forming fiber bunches into continuous lap form, means for conducting and inverting said lap, and an inverted feeding train for holding and carrying the same, in combination with a combing pin train moving at a converging angle with respect to said inverted train and coöperating with the fiber-carrying stretch thereof.

13. In a combing machine, in combination, a feed-board, a train of pins receiving a fiber-lap therefrom, a combing pin train coöperating with the fiber-bearing stretch of said first named train, a delivery head for said combing train and means for driving said trains and delivery head.

14. In a combing machine, in combination a downwardly and rearwardly inclined feed board, a downwardly and forwardly inclined feeding train, a forwardly moving

combing train coöperating with the fiber-holding stretch of said feeding train and a sliver delivery head at the forward end of said combing train.

15. In a combing machine, a feed board terminating in a curved or elbow chute, an inverted train of pins adapted to receive a fiber lap from said chute and a combing pin train below said train and chute, separated therefrom by an unobstructed combing space.

16. In a combing machine, an inverted feeding train and means for supplying a fiber-lap thereto with the forward ends of the individual fiber-bunches on the under side of said lap, in combination with a train of upright combing pins coöperating with the fiber-holding stretch of said inverted train and disposed to move in the same direction therewith and at a converging angle thereto.

17. In a combing machine, a forwardly moving combing pin train, and means for holding and feeding the fiber thereto comprising a forwardly moving feeding train mounted above and having its rear portion disposed at an angle to said combing pin train and its forward portion at a less angle or parallel to said train, in combination with means for feeding the fiber to said feeding train and a sliver delivery head for said combing pin train.

In testimony whereof, I have signed this specification in the presence of two witnesses.

JOHN GOOD.

Witnesses:

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