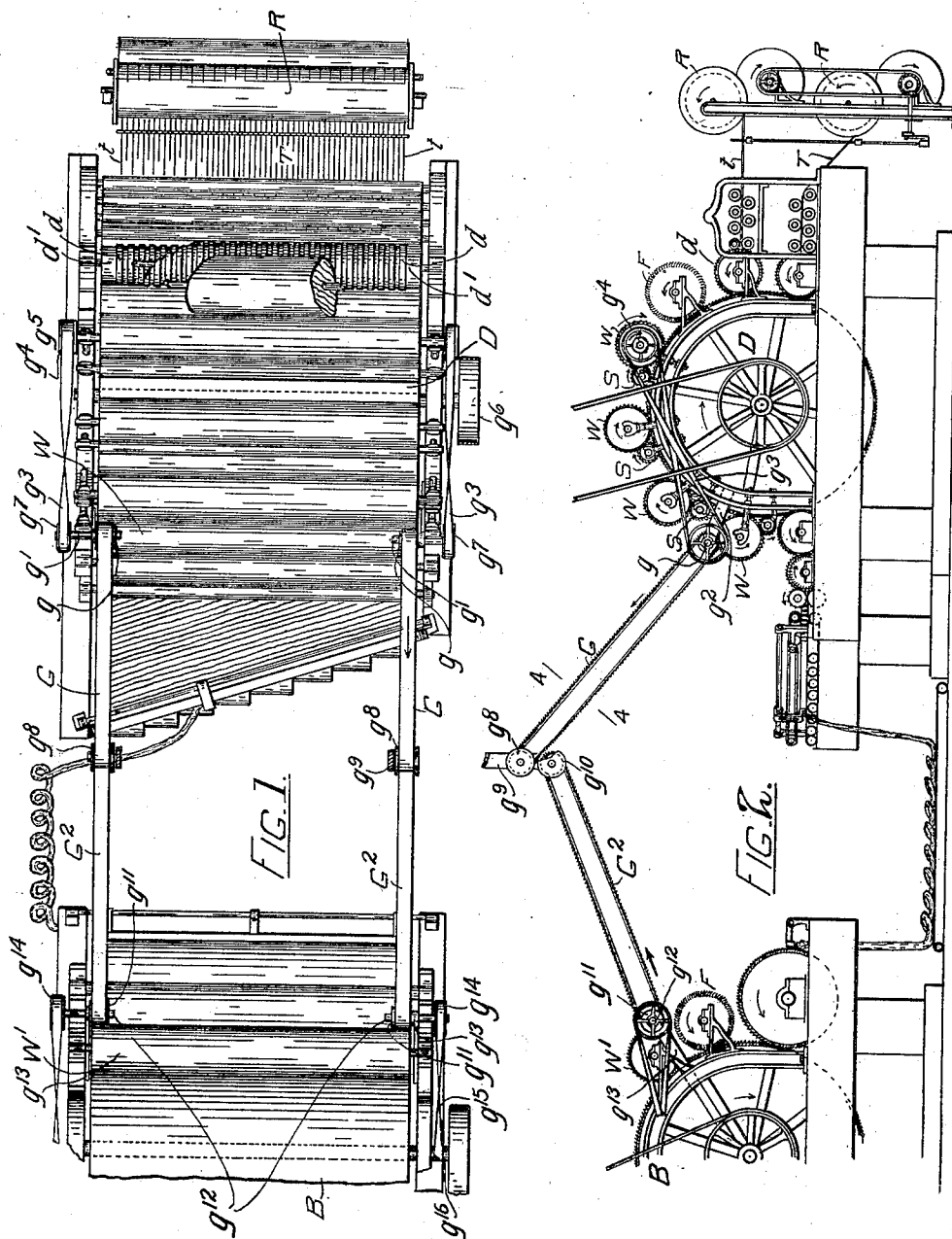


J. R. HINCHLIFFE & J. HALL.
CARDING ENGINE.

(Application filed July 1, 1901.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES
W. E. Cooney
E. A. Allen

INVENTORS
JOHN RICHARD HINCHLIFFE, JAMES HALL
BY THEIR ATTORNEY
Edw. S. Beach

No. 696,437.

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2 Sheets—Sheet 2.

Fig. 3.

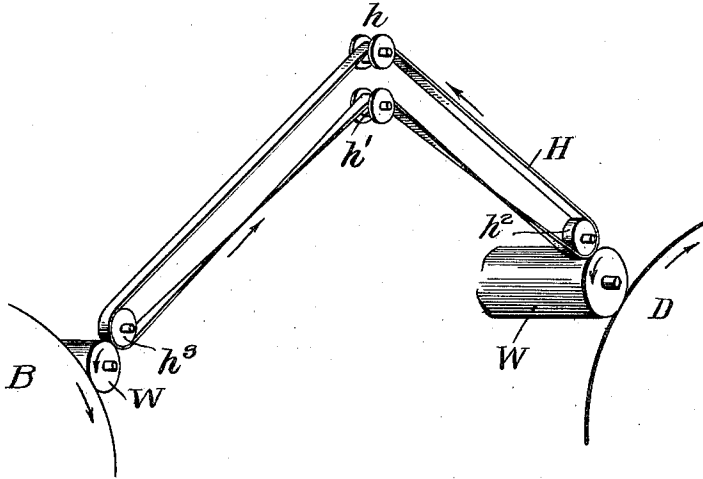


Fig. 4.



Witnesses
Geo. A. Byrne
Clarence A. Bateman.

By

Inventors
John Richard Hinchliffe,
and James Hall.
McKisim & Dick.
Attorneys

UNITED STATES PATENT OFFICE.

JOHN RICHARD HINCHLIFFE AND JAMES HALL, OF MAYNARD,
MASSACHUSETTS.

CARDING-ENGINE.

SPECIFICATION forming part of Letters Patent No. 696,437, dated April 1, 1902.

Application filed July 1, 1901. Serial No. 66,631. (No model.)

To all whom it may concern:

Be it known that we, JOHN RICHARD HINCHLIFFE and JAMES HALL, subjects of the King of England, residing at Maynard, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Carding-Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a top plan view of a portion of a series of carding-machines embodying our invention. Fig. 2 is a side elevation of what is shown in Fig. 1. Fig. 3 shows a modified form of the invention; and Fig. 4 is a detail sectional view, the section being taken on the line 4 4, Fig. 2.

Our invention will be best understood from a brief consideration of the prior art.

Many forms of series of carding-machines as heretofore made for use in woolen manufacture comprise in operative combination a "first breaker," a "second breaker," and a "finisher." From the finisher the carded wool is delivered in the form of a considerable number of slivers, and with the exception of the "waste ends" these slivers are taken up on a plurality of long spools or reels R R. "Waste ends" is a name commonly applied to the two outside slivers of a series of slivers coming from the finisher. Heretofore each waste-end sliver has been taken up on a separate short spool, there being one spool at each end of the upper roll R. At frequent intervals during the operation of such a series of carding-machines an attendant has been generally required to remove the waste-end slivers from each spool and to carry the waste ends from the finisher end of the carding-machine to the feeding-reservoir A' therefor at the far or back end of the carding-machine.

We are aware of United States Letters Patent to R. W. Lewis, No. 61,219, dated January 15, 1867, in which there is set forth the combination of an endless card-clothing belt with doffer-rings and the main cylinder of the second breaker, so as to receive what Lewis calls the "waste roving" directly from the main cylinder and transfer it to the second breaker; but we are not aware that the "self-feed for

wool-cards" set forth in the Lewis patent has ever been in use, and our invention differs substantially from that set forth in the Lewis patent in particulars set forth hereinafter.

Our invention may be applied to any old carding-machine in which waste ends are now formed, and it is also applicable to carding-machines constructed without provision for formation of waste ends. In accordance with the principle of our invention whatever the form of its embodiment may be the formation of so-called "waste ends" is prevented. Heretofore the waste ends have frequently broken, and in that event the slivers or wool which forms the slivers, called "waste ends," have frequently run into the adjacent slivers, going to the spools on which the good slivers have been taken up, making some of the same uneven or irregular in size. This condition is very objectionable, as is well known to all skilled in the art, because all the slivers which are taken up from the finisher on the spools should be of uniform diameter and weight. The so-called "waste ends" or "waste-end slivers" have been heretofore formed from portions of the wool which in the series of carding-machines have been at the opposite ends of the carding-cylinder of the finisher. In accordance with our invention the wool, which has heretofore been at the ends of the carding-cylinder and run thence into waste-end slivers, is automatically removed from the ends of the carding-cylinder and automatically carried back to a proper place in the machine, whence it is redelivered to the finisher without extra carding and with even distribution over the carding-cylinder. When there has been manual transfer of the waste ends to the wool-reservoir, the operators have naturally thrown the waste ends into the reservoir, so that the waste ends would fall at almost any part of the reservoir, and the consequence has been that there has been some uneven distribution of wool on the card in the first breaker as the wool has been fed thereon; but the more important objection has been that the wool, which rapidly appeared at the finisher end of the series of carding-machines, has been recarded, and this recarding of different portions of the wool has

been a constant recurrence during the carding operation, and thereby many portions of the wool have been unduly strained, and so more or less injured, during the operation of the series of carding-machines. The occasional and rather frequent breaking of the waste ends has been objectionable. In prior practice the unevenness or lumpy condition of the side slivers running to the main spools R R, in consequence of broken waste-end slivers running into the said side slivers, and the cost of labor required to transfer the waste ends to the staple-feed reservoir have been serious objections, as is well known to all skilled in the art.

In the drawings illustrating the principle of our invention and the best mode now known to us of applying that principle, B is the second breaker; D, the finisher; R R, the spools or reels, upon which the main slivers T are taken up as they come from the finisher, *t'* being what are known as the "end slivers" of the entire series of slivers going to a spool R.

In applying our invention to a series of carding-machines now in use we omit the usual waste-end rings, as shown at *d' d'*, heretofore found at the ends of the ring-doffer *d* of the finisher, and combine with one of the workers W (preferably with the first worker of the finisher) an automatic mechanism, which picks and takes up the wool from each end of said worker and feeds it back and automatically transfers it to one of the workers, preferably the last worker W' of the second breaker B. Consequently the wool taken from the ends of the finisher-cylinder card is not recarded, and thereby strained and impaired in strength, because the carding operation proper takes place between the first and second breakers. The preferred form of automatic transferring mechanism referred to consists of four belts arranged in pairs, each belt being made of card-clothing. The first pair of belts G G are each mounted upon suitable pulleys *g*, mounted on journals *g'*, carried on brackets *g²*, attached to the side frames of the machine, and driven by belts *g³* from pulleys *g⁴* on shaft *g⁵*. The shaft *g⁵* is preferably that of the last worker in the finisher. Each belt *g³* runs from a driving-pulley *g⁴* to a pulley *g⁷* on a journal *g'*. Each belt G extends to an end portion of the worker W and picks up and carries off the wool thereon, each belt traveling in the direction of the arrow shown in Fig. 2. The wool thus removed from the ends of worker W has heretofore gone into waste ends. The belts G are each extended rearwardly toward the second breaker B, and each runs over a pulley *g⁸*, suitably mounted on brackets *g⁹*, which, for example, may depend from the ceiling of the room in which the carding-machine is set up. In this preferred construction the belts G deliver the wool taken up by them to a corresponding pair of carding-clothing belts G², which each extend from a pulley *g¹⁰* on a bracket *g⁹* to a pulley *g¹¹*, mounted on a shaft *g¹²*, mounted in bracket

g¹², secured in any suitable manner to the side portions of the second breaker or otherwise, as may be mechanically desirable. Each shaft *g¹²* is provided with a driven pulley *g¹⁴*, belted, preferably, to the shaft of the second worker of the second breaker, that shaft not being shown because readily understood by all skilled in the art. Any other suitable mode of driving the belts may be employed. The second belts G² take the wool from the first set of belts and carry it to a suitable worker W', preferably the last worker of the second breaker, whence the wool is again delivered, as will be readily understood by those skilled in the art, to the finisher. The belts G² travel in the direction of the arrow shown below a belt G² in Fig. 2, and the belts G and G² are so located with reference to their own card-clothing surfaces and with reference to the similar surfaces of the workers W and W' that there is a constant movement of wool back from worker W of the finisher to the worker W' of the second breaker. It will be thus seen that no waste-end slivers are produced in a series of carding-machines embodying the principle of our invention and that all the objections heretofore found to waste ends in a series of carding-machines are obviated.

In embodying our invention in a series of carding-machines as now made the end portions or end rings of the doffer in the finisher are removed. The end rings or end portions of the doffer in the finisher are removed, because, if not removed, more or less wool will be removed thereby from the corresponding end portions of the finisher card-cylinder and produce waste, that will fall on the floor or fly about the front end of the carding-engine, and this would be objectionable, not only as involving a waste of wool, but also because of its fouling the apparatus. The return of these old waste ends, forming portions of wool to the second breaker in the manner described results in an increase of probably not less than ten per cent. in production from the same carding-surface of the engine and improves the initial feeding at the first breaker, because there is no soft waste to be returned to that feeder, as heretofore.

In Fig. 3, showing a modification of our invention, a single card-clothing belt H, instead of a pair of belts, is employed for effecting the said transfer from each end of the finisher-cylinder to the worker on the second breaker. In this construction for each belt H between the second breaker and finisher are a pair of pulleys or rolls *h h'*, each end portion of the belt H running over a pulley *h²* and *h³*, pulley *h²* being mounted at the finisher and pulley *h³* being mounted at the second breaker. The finisher is provided, as usual, with a plurality of workers W and attendant-strippers S, fancy F, and doffer. The second breaker is likewise provided with a plurality of workers W' and with other parts too well known to those skilled in the art

to require specific mention. The returned waste-end slivers are fed in mat-like form to the last worker of the second breaker and then carried on to the doffer of the second breaker, together with the wool already on the workers before the waste-end sliver was deposited thereon. It is then stripped from the doffer by the comb and made a part of the sliver which is fed on to the feed of the finisher. The advantage of delivering back from the first worker of the finisher to the last worker of the second breaker is that the fibers are not subject to any extra carding, which would impair the strength of the fibers.

15 In the series of carding-engines embodying our invention we catch the fibers which have heretofore formed waste ends from the worker side before the sliver reaches the finisher-doffer and convey it back to a worker of the second breaker without the wool having been carded by the finisher.

What we claim is—

1. The combination of a breaker and finisher, each provided with a series of workers, and means arranged to carry back the end slivers from the edges of any finishing-worker

to the edges of any breaker-worker, substantially as described.

2. The combination of a breaker and a finisher, each provided with a series of workers, and means arranged to carry back the end slivers from the edges of the first worker of the finisher to the edges of the last worker of the breaker, substantially as described.

3. The combination of a breaker and a finisher, each provided with a series of workers and means for carrying back the end slivers from the edges of any finishing-worker to the edges of any breaker-worker, said means including belts arranged in pairs and running from pulleys located at a considerable height above the breaker and finisher to said breaker and finisher, respectively, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

JOHN RICHARD HINCHLIFFE.
JAMES HALL.

Witnesses:

ROBERT J. C. WRIGHT,
FRED. ALFRED BALLON.