(No Model.) 3 Sheets—Sheet 1.

B. A. DOBSON & W. I. BROMILEY.

TRAVELING FLAT CARDING ENGINE.

No. 452,993. Patented May 26, 1891.

FIG. 2.

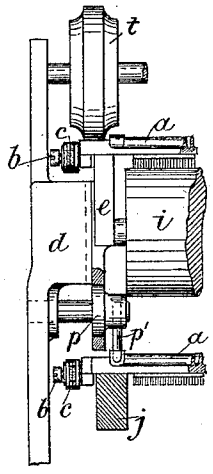


FIG. 1.

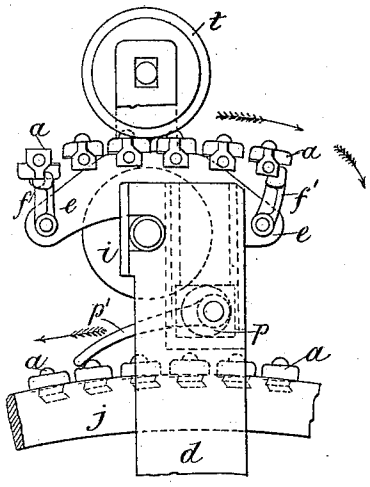


FIG. 6.

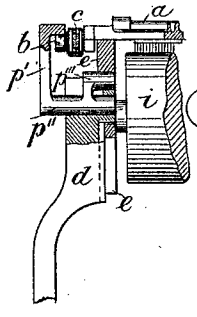


FIG. 5.

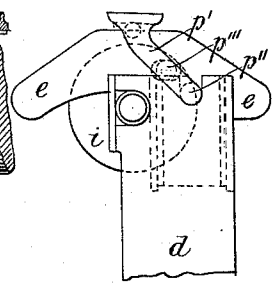


FIG. 4.

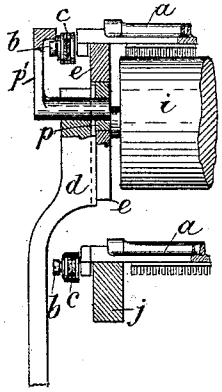
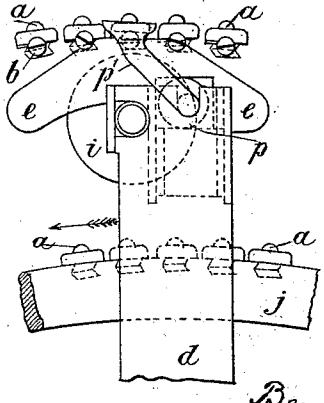


FIG. 3.



Witnesses:
A. Champion.
A. P. Sherman

Inventors:
Benjamin Alfred Dobson,
William Sherwood Bromiley
By Richards & Co.
Attorneys.

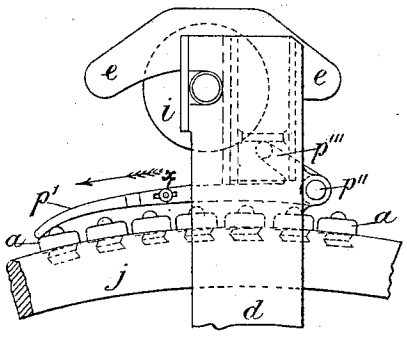
(No Model.) 3 Sheets—Sheet 2.

B. A. DOBSON & W. I. BROMILEY.

TRAVELING FLAT CARDING ENGINE.

No. 452,993. Patented May 26, 1891.

FIG. 7.



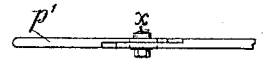


FIG. 7A.

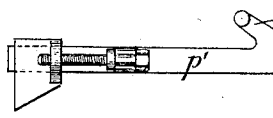


FIG. 7B.

Fig. 8a.

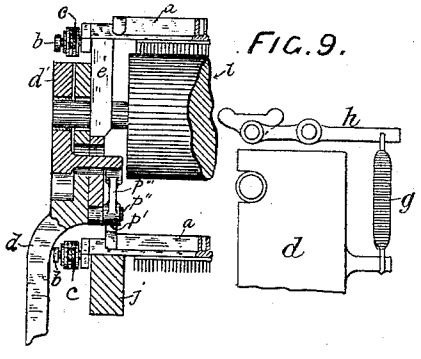


FIG. 9.

FIG. 8.

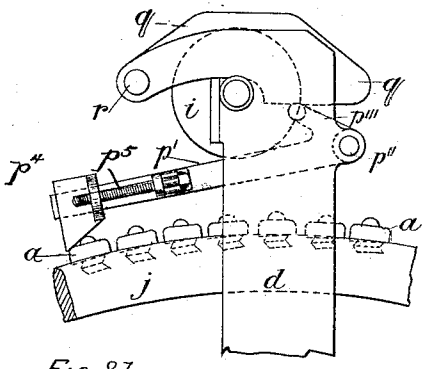


Fig. 8b.

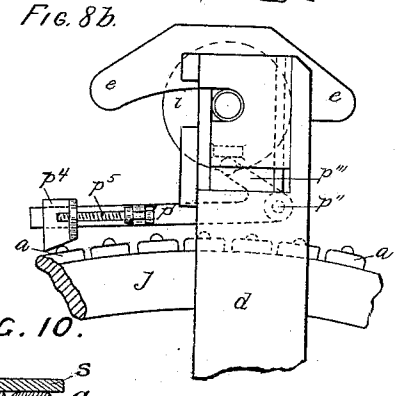
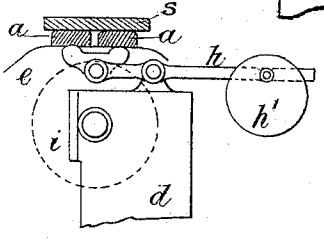


FIG. 10.



Witnesses:
C. C. Champion.
A. P. Thurman.

Inventors:
Benjamin Alfred Dobson.
William Isherwood Bromiley.
By Pierce & Co.
Attorneys.

(No Model.) 3 Sheets—Sheet 3.

B. A. DOBSON & W. I. BROMILEY.

TRAVELING FLAT CARDING ENGINE.

No. 452,993. Patented May 26, 1891.

FIG. 11.

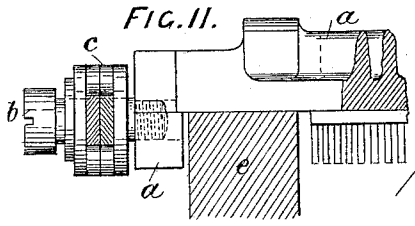


FIG. 12.

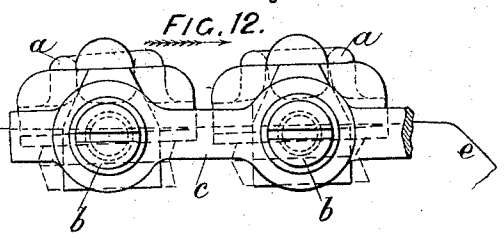


FIG. 13.

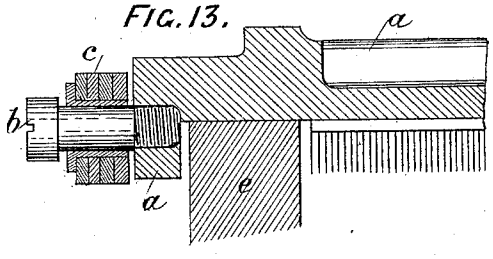


FIG. 14.

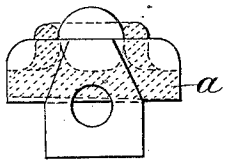


FIG. 15.

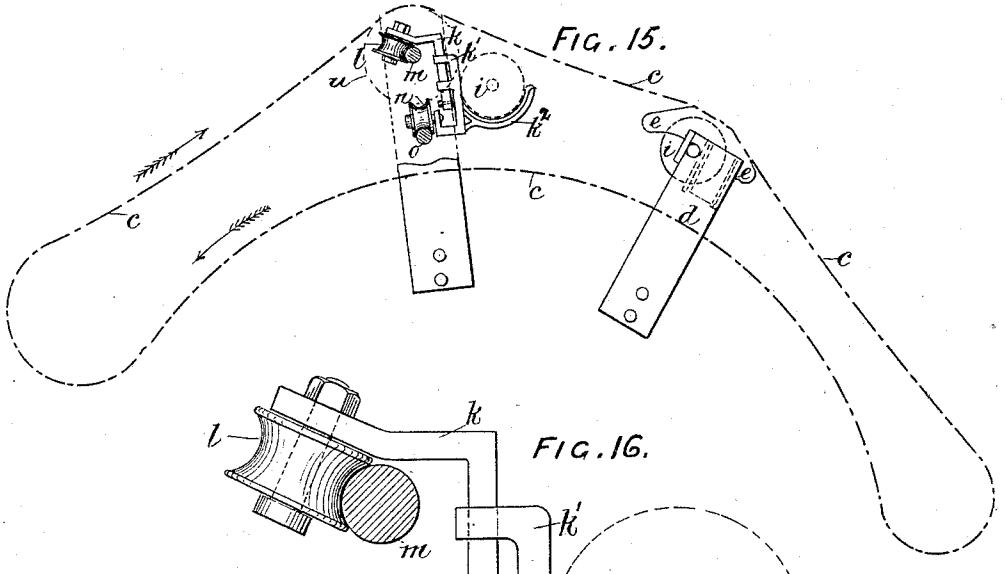
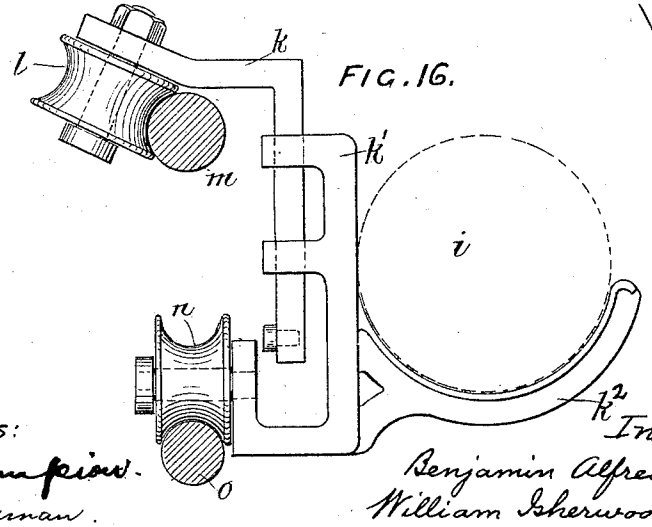


FIG. 16.



Witnesses:
A. P. Sherman.

Inventors:
Benjamin Alfred Dobson
William Isherwood Bromiley
By Richards & R.
Attorneys.

UNITED STATES PATENT OFFICE.

BENJAMIN ALFRED DOBSON AND WILLIAM ISHERWOOD BROMILEY, OF BOLTON, ENGLAND, ASSIGNORS TO DOBSON & BARLOW, OF SAME PLACE.

TRAVELING-FLAT CARDING-ENGINE.

SPECIFICATION forming part of Letters Patent No. 452,993, dated May 26, 1891.

Application filed October 23, 1890. Serial No. 369,139. (No model.) Patented in England December 5, 1889, No. 19,519.

To all whom it may concern:

Be it known that we, BENJAMIN ALFRED DOBSON and WILLIAM ISHERWOOD BROMILEY, subjects of the Queen of Great Britain, residing at Bolton, in the county of Lancaster, England, have invented certain new and useful Improvements in Traveling-Flat Carding-Engines, (for which we have obtained Letters Patent in Great Britain, No. 19,519, and bearing date December 5, 1889,) of which the following is a specification.

Our invention relates to improvements in grinding the wire-clothing of those flats of carding-engines which are known as "revolving" or "traveling" flats, and has for its object to grind the flats efficiently when relatively in the same position as that which they occupy when performing their work upon the cylinder—*i. e.*, wire downward—and thereby to avoid the irregularity or inexactness due to the deflection of the flats, which sometimes results when the flats are ground with the wire upward. We are aware that this has previously been done, but not in the same manner as that in which we now perform it.

In order that our invention may be fully understood and readily carried into effect, we will describe the accompanying three sheets of drawings, reference being had to the letters marked thereon.

Figure 1 is a side elevation of part of the chain of traveling flats of a carding-engine, illustrating the application of our improvements in means for grinding the same. Fig. 2 is an end view of the devices shown in Fig. 1. Figs. 3, 5, 7, and 8 are side elevations of alternative arrangements for regulating the position of the slide upon which the reversed flats are supported while being ground. Figs. 4 and 6 are end views of the devices shown in Figs. 3 and 5, respectively. Figs. 7^a and 7^b are two detail views of part of the devices shown in Figs. 7 and 8, respectively. Figs. 8^a and 8^b are respectively a side elevation and an end view, partly in section, of an arrangement of parts whereby the grinding-roller is moved toward and from the flats being ground. Figs. 9 and 10 are views of two arrangements for pressing the flats upward while being ground. Figs. 11, 12, 13, and 14 are detail views, on an enlarged scale, illustrating the section of the flat and the manner of mounting the same according to our invention. Fig. 15 is a view showing the application of the carriage for supporting the grinding-roller, and Fig. 16 is a view of the carriage on a larger scale.

The drawings show one side only of the carding-engine; but it will of course be understood that certain of the parts which necessarily go to make up a complete operative machine will be duplicated upon the side not shown in the drawings.

Similar letters refer to similar parts throughout the several views.

In carrying out our improvements we alter the section of the flat *a* in such a way—that is, by making it with two shallow ribs in place of one deep one, as is usual, as shown best in Figs. 13 and 14—that while retaining the necessary strength to resist deflection it can be arranged to pivot or turn over on the studs *b*, by which it is attached to the chain-links *c*, connecting the flats *a* together, and by means of which they are driven in the ordinary manner, each flat being able to turn over on its studs *b*, as described, without touching either of the flats adjoining it.

Secured to the engine-bend is a flat grinding-bracket *d*, in slideways in which is fitted a slide *e*, the upper surface of which is made straight to receive each flat *a* after it has been automatically reversed by means of a catch *f* or an equivalent thereof coming against lugs on the flats, as shown in Fig. 1. As the reversed flats are carried along the straight portion of the slide *e* on their working-surface we pass them over a grinding apparatus designed for the purpose of grinding flats from the "working-surface"—*i. e.*, that part upon which the flat is supported on the flexible bend when carding, or by means of pivoted levers *h*, Fig. 9, acted upon by the springs *g* or weights *h'*, Fig. 10, we may press each flat *a* upward (see Fig. 10) against the grinding-surface *s*, which is reversed in position, and grind in the ordinary manner with the flat reversed.

In the ordinary mode of grinding, the back of the flat *a* would rest upon the upper side

of the plate or grinding-surface *s*, and the grinding-roller *i*, placed above the plate *s*, would act upon the teeth of the flat, whereas when we use the ordinary grinding-surface or plate *s* the back of the flat, wire downward, is pressed against the under side of said plate and the grinding-roller *i* is placed below. The grinding-roller *i* therefore works between the flats *a*, which are supported on the flexible bend or equivalent *j* and working on the cylinder and those above returning from work, and it is these flats returning from work that we turn over, as shown in Fig. 1, and grind after they have been stripped and, if necessary, brushed.

We desire to point out that according to our invention the center of gravity of each reversed flat is such that it will, when liberated, return to its normal position with the wire upward without the help of the catch *f'* and lugs or other means, which are, however, provided in order to prevent any accident. This is effected by causing the studs *b* to enter the flats lower down than usual, so that, the weight of the flat above *b* being greater than the weight below, the flats will, if left to themselves, always turn upon the studs *b* into the position described with the wire upward, and consequently when the flats come onto the flexible bend *j* they will be in their proper working positions with the wire downward.

With regard to the grinding arrangement shown in Figs. 1 to 10, the grinding-roller *i* is simply mounted in bearings in the grinding-roller bracket *d* and has nothing particular about it or anything in its nature of operation differing from that of an ordinary grinding-roller for the purpose of grinding flats.

t, Figs. 1 and 2, is a roller so mounted in its supports as to have a certain amount of vertical play or movement and serving as a weight to bear down on and hold the flats upon the straight portion of the slide *e*. The grinding-roller is supported in brackets or bearings in substantially the usual manner; but as the flats are reversed before being ground this roller must necessarily work between instead of above the chain of flats, and consequently the roller must be placed in position or removed from the side of the machine rather than from above.

For the purpose of passing the grinding-roller *i* from one side of the carding-engine to the other between the chain of flats without any risk of damage to either the ordinary tightening-rollers, (indicated at *u* in dotted lines, Fig. 15,) which are mounted upon the shaft *m* and are used to take up the slack in the chain of flats or to the flats themselves, we provide a carriage, Figs. 15 and 16, which consists, preferably, of two parts *k k'*, connected together by a slide. The part *k* is provided with a bowl *l* to run on the top of the cross-shaft *m*, connecting the tightening-bowls *u* for the flat-chain *c*, and the other part *k'*, which is formed with a cradle k^2 to carry one end of the grinding-roller *i*, runs with flanged bowls *n* upon a shaft *o*, which we place across the card from one tightening-fixing to the other, and which also acts as a stay. It will be readily understood that this carriage is removable, only requiring to be lifted off the shafts *m* and *o*.

As all traveling-flat carding-engines have the tightening-rollers and the shaft *m*, on which they are mounted adjustably, it is thought that it is not necessary to show the means for making such adjustment. It is this adjustability of the shaft *m* which necessitates the carriage being made in the two parts *k* and *k'*, as has been described.

In using this carriage it is moved to one side of the carding-engine, and the workman rests one end of the roller *i* upon the cradle k^2 and then pushes the roller and carriage across the machine, when two workmen, one at each end of the roller, can easily lift it into its bearings.

It will be understood that the arrangement just described is not an alternative arrangement from that shown for grinding the flats, but that the carriage *k k'* is a simple device for passing the grinding-roller *i* from the side of the carding-engine between the two sections or parts of the chain of flats across and into its position—that is, into its bearings in the brackets *d*. The reason for making the carriage *k k'* in two parts is to permit the two rollers *l* and *u*, which are carried, respectively, by the said parts, to always run upon the shafts *m* and *o* whether they be close together or farther apart.

In order to utilize the apparatus for grinding from the working-surface of the flats at present in use, we should require to travel the flats in the reverse direction to that now customary, so that the cleaned flats would enter to work on the cylinder at the doffer instead of at the licker-in end; but this method of traveling flats is generally considered objectionable, and in order to grind from the working-surface with the flat in the reversed position while traveling in the ordinary direction we have devised means by which this can be done.

Referring first to Figs. 3 and 4, in the movable slide *e* (on each side of the carding-engine) is a slot in which is closely fitted an eccentric *p*, from which there is a projecting finger or bracket *p'*. The action is such that as the flats travel forward after having been reversed in position the screwed studs *b*, upon which the links of the flat chain *c* work, and each of which is prolonged to form a head by which the stud may be screwed up, come into contact with the finger or bracket *p'*, attached to the eccentric *p*. This finger or bracket *p'* should be so shaped as to project over the path of the head of the stud *b*, whereby the finger or bracket *p'* is lifted and turns the eccentric *p* and raises the slide *e*, and after it passes from engagement therewith allows it to fall by its own weight and those of the flats bearing upon it during the passage of a

reversed flat over the grinding-roller *i* in such a manner that the surface of the wire of the flat immediately over the center line of the grinding-roller is always maintained at the same distance from the surface of the grinding-roller. In other words, this movement of the eccentric *p* and slide *e* will counteract or compensate the inclination given to the flat and generally known as "heel" or "bevel." The bevel on the flat is the incline always cut on that surface of each flat which travels on the flexible bend, and it is necessary to employ a device such as the eccentric *p* and finger *p'* and slide *e* to compensate for this inclination and keep the wire on the flat in its proper position relatively to the grinding-roller.

In Figs. 1 and 2 the end of the eccentric finger *p'* is shown resting upon the lower flats working upon the flexible bend or equivalent *j*. In Fig. 7 the eccentric *p* is dispensed with and the finger *p'* is made in two pieces adjustably connected by a nut and bolt *x*, passing through the two parts of the finger, one of which is slotted, (see Fig. 7ª,) so that the length of the finger can be varied, if required. Instead of the eccentric *p*, the finger *p'* is pivoted at *p''*, and an extension-arm *p'''* is employed to raise and lower the slide *e*.

In Figs. 5 and 6 an alternative arrangement is also shown, the finger *p'* being pivoted at *p''* to the bracket *d*, and the arm *p'''* actuating the slide *e*. In this construction, as well as those shown in Figs. 7 and 8, the finger *p'* is actuated by the chain of flats passing under it, and the arm *p'''* engages with and raises the slide *e* as the arm *p'* is rocked. The contact part p^4, Fig. 8, which lies on the back of the flats, can be adjusted by means of a screw p^5, so as to compensate for any stretching or wear in the links of the flat-chain.

In Fig. 8 the flats slide upon a rocking frame *q*, pivoted at *r*. This frame replaces the slide *e* and is lifted and lowered at one end by an eccentric or the arm *p'''*.

Either of the arrangements herein shown and described might be employed to raise and lower the grinding-roller *i* (see Figs. 8ª and 8ᵇ) while the reversed flats were passing over a fixed guide in place of the slide *e*. The grinding-roller in this case is mounted in bearings *d'*, arranged to slide vertically in the bracket *d*.

What we claim is—

1. In a carding-engine, the combination of a chain of traveling flats and a grinding-roller arranged between the upper and lower flats of the chain to grind said flats when reversed, substantially as described.

2. A chain of flats for carding-engines, consisting of the links *c* and independently-reversible flats journaled at their ends to the said links by studs, substantially as described.

3. In combination, in a carding-engine, a grinding-roller supported in brackets above the engine-bend and a traveling chain of flats inclosing the roller and consisting of links *c* and independently-reversible flats connected at their ends to the links by studs, whereby each flat may be reversed independently to present its wires to the roller as it passes above the same, substantially as described.

4. In a carding-engine, the combination of a grinding-roller supported above the engine-bend, and a chain of traveling flats, each flat being pivotally supported by the links of the chain, whereby it is free to be reversed, and the said pivots being arranged eccentrically of the flat, whereby when free the said flat will automatically turn to its normal or working position, substantially as set forth.

5. The combination, in a carding-engine, of a chain of traveling flats, a grinding-roller supported within the chain, a slide or frame to guide the flats, a finger adapted to be moved by the traverse of the flats, and an eccentric projection connected with the said finger and operatively connected, substantially as described, to regulate the position of the roller and frame with relation to each other for the purpose of compensating for the heel or bevel in a flat being ground in a reversed position, substantially as described.

6. In combination with a flat-grinding mechanism for carding-engines, a carriage adapted to support the grinding-roller as it is being moved to or from its place on its supporting-bearings, the said carriage being mounted upon supports upon which it is free to be moved from side to side of the card, substantially as set forth.

7. In a carding-engine, the combination of a chain of traveling flats and a grinding-roller supported below the upper flats of the chain, substantially as described.

8. In a carding-engine, the combination of a chain of traveling flats, a grinding-roller supported below the upper flats of the chain, and a slide or frame to present the reversed flats in proper relation to the grinding-roller, substantially as described.

9. In a carding-engine, the combination of a chain of traveling flats, a grinding-roller supported below the upper flats of the chain, a slide or frame to present the reversed flats in proper relation to the roller, and means for regulating the relative positions of the guiding-surface of the slide and the surface of the roller, substantially as described.

10. In a carding-engine, the combination of a chain of traveling flats, a grinding-roller supported below the upper flats of the chain, and a movable slide or frame to present the reversed flats in proper relation to the roller, substantially as described.

11. In a carding-engine, the combination of a chain of traveling flats, a grinding-roller supported below the upper flats of the chain, a slide or frame to present the reversed flats in proper relation to the roller, and mechanism for automatically regulating the relative

positions of the guiding-surface of the slide and the surface of the roller, substantially as described.

12. In a carding-engine, the combination of a chain of traveling flats, a grinding-roller supported below the upper flats of the chain, a slide or frame to present the reversed flats to the roller at an angle, and a lever automatically regulating the relative positions of the slide or frame and the surface of the roller, substantially as described.

13. In a carding-engine, the combination of a chain of traveling flats, a grinding-roller supported below the upper flats of the chain, a slide or frame to present the flats to the roller at an angle, and a lever operated by the traveling flats to determine the position of the slide and roller with relation to each other, substantially as described.

14. In a carding-engine, the combination of a chain of traveling flats, a flat grinding mechanism consisting of brackets secured to the engine-bend, a grinding-roll journaled in said brackets between the flats of the chain, a slide or frame to guide the flats to the roller, and a lever having an arm which is engaged by the traveling flats, whereby it is operated automatically to regulate the distance between the guiding-surface of the slide and the surface of the roller, substantially as described.

15. In an apparatus for grinding the flats of a traveling chain for carding-engines, the combination of the brackets secured to the engine-bend, a grinding-roller journaled therein, the sliding frames *e*, carried by the brackets above the roller, and the levers fulcrumed on the brackets and engaging with the said sliding frames to regulate the distance between the surface of the roller and the supporting-faces of the frames *e*, substantially as set forth.

16. In a carding-engine, the combination of a chain of traveling reversible flats, a grinding mechanism consisting of a roller mounted between the upper and lower flats of the chain, a slide adjustable in guides of the roller-supporting bracket, a catch, as *f*, to reverse the flats as they reach the slide, and a lever pivoted on the bracket and actuated by the traveling flats to adjust the position of the slide with relation to the roller, substantially as described.

In witness whereof we have hereunto set our hands in presence of two witnesses.

BENJAMIN ALFRED DOBSON.
WILLIAM ISHERWOOD BROMILEY.

Witnesses:
SAMUEL BROMLEY,
165 *Clarence St., Bolton.*
PERCY EDWARD HASLAM,
200 *Blackburn Road, Bolton.*