A. B. EVANS, F. MARCAURELE & F. R. LANGLOIS.

COMBING MACHINE.

APPLICATION FILED DEC. 9, 1908.

979,389.

Patented Dec. 20, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

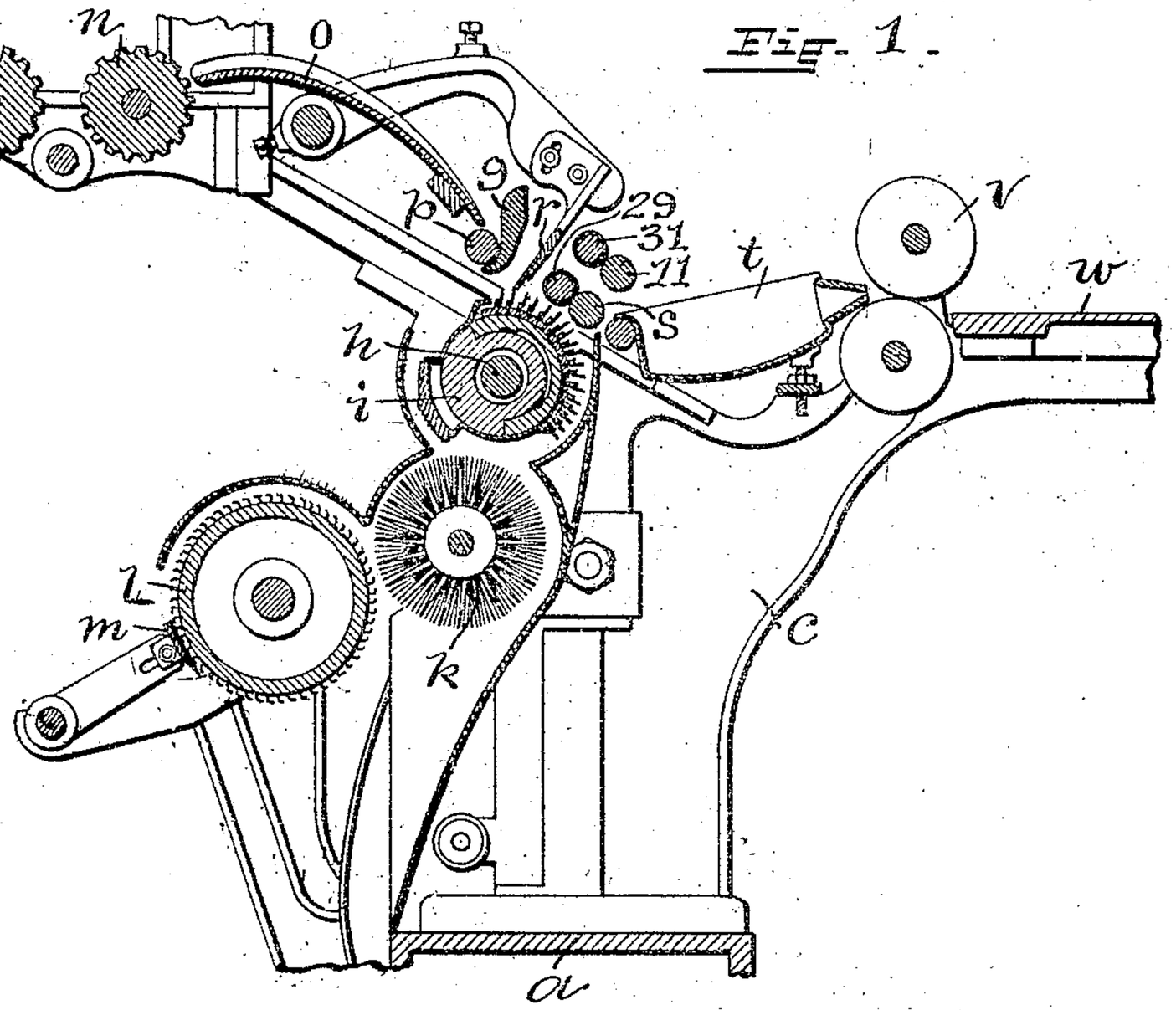


Fig. 2.

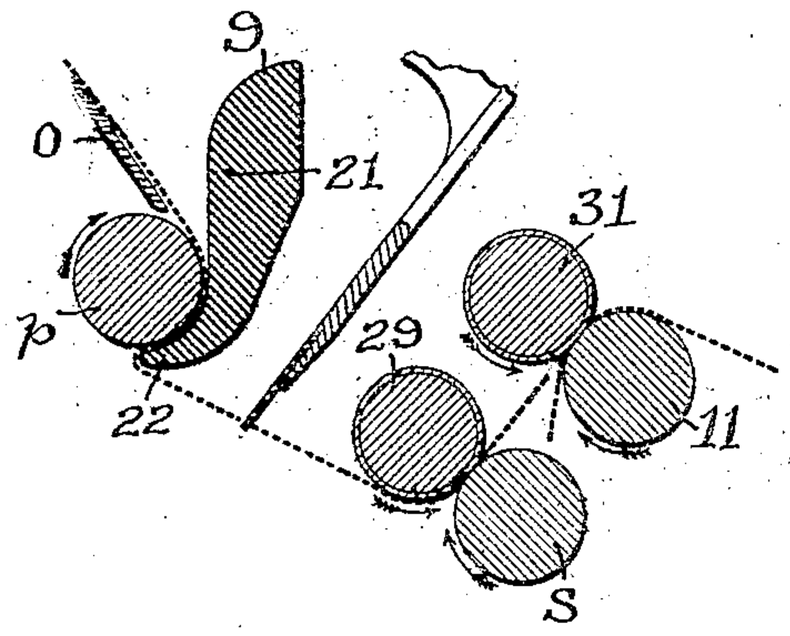
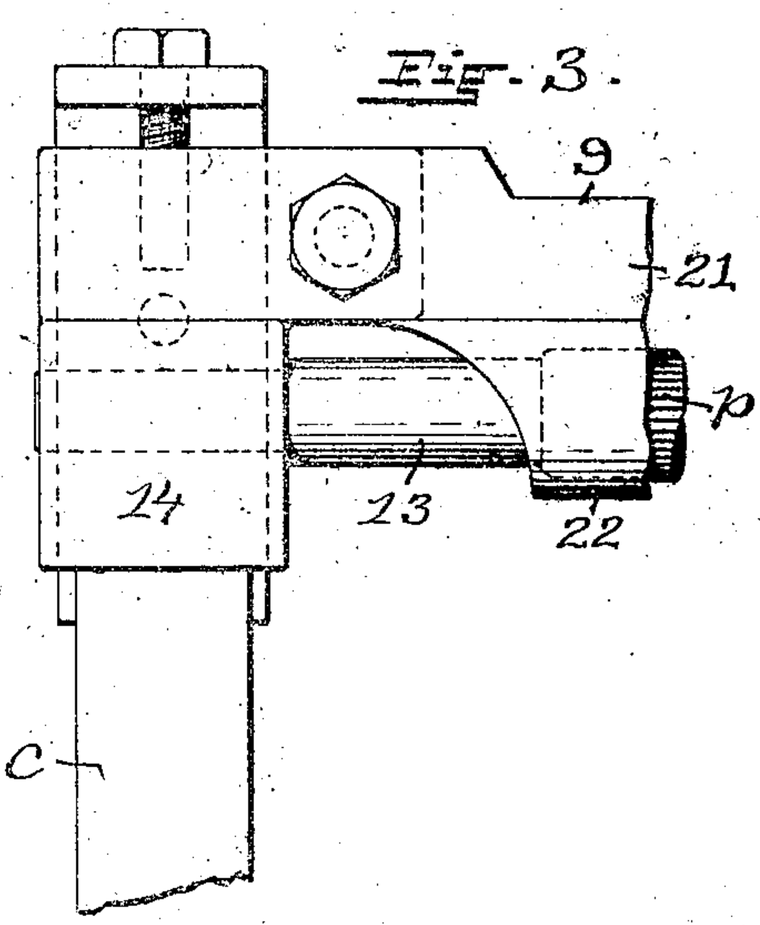


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

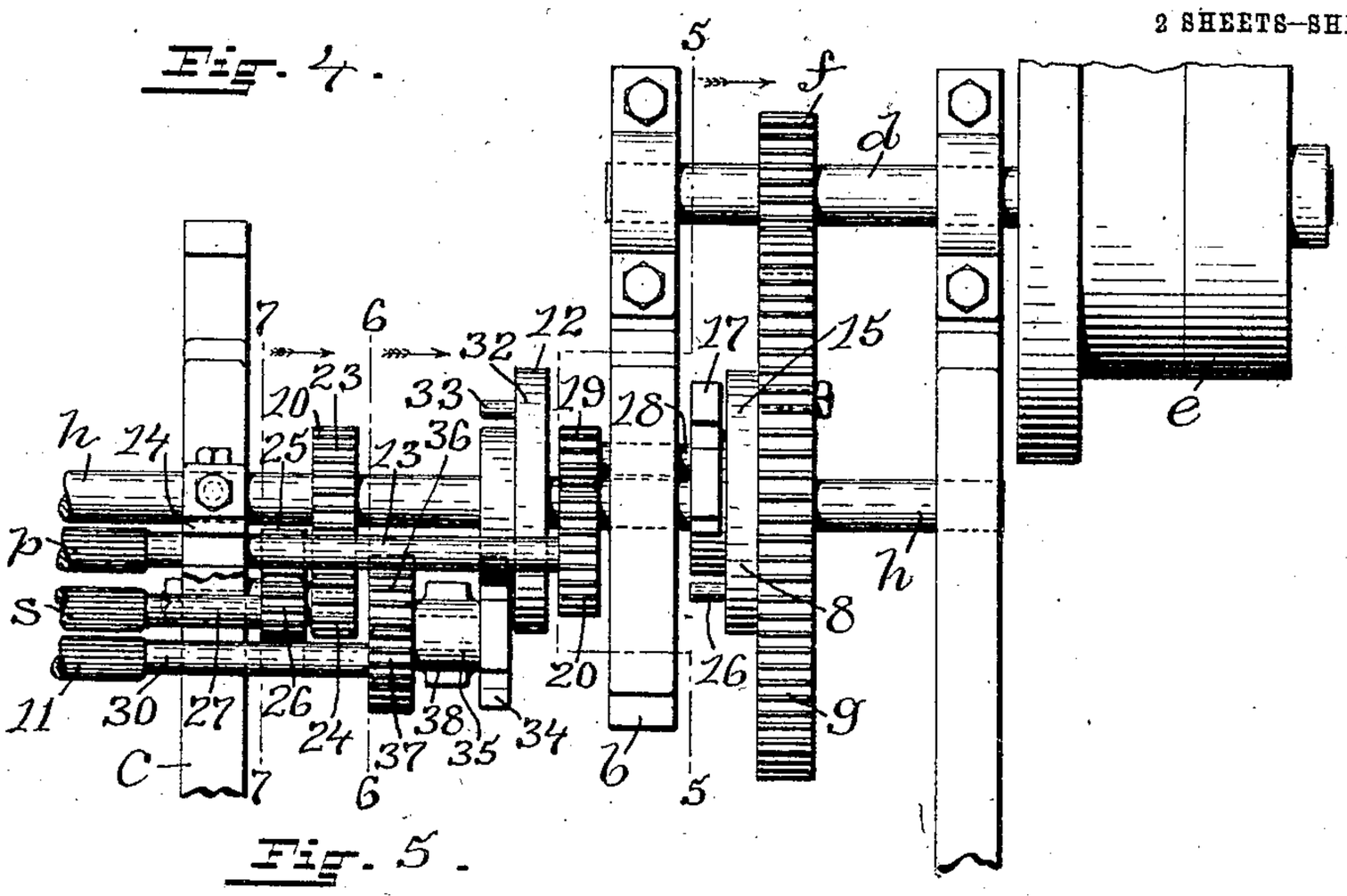


Fig. 5.

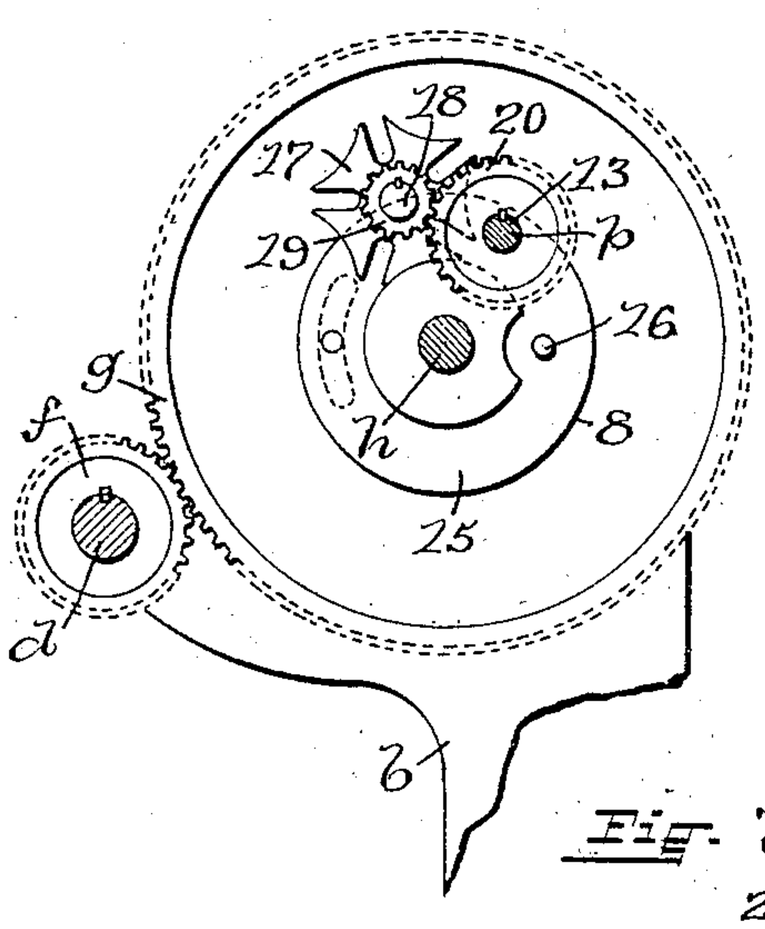


Fig. 6.

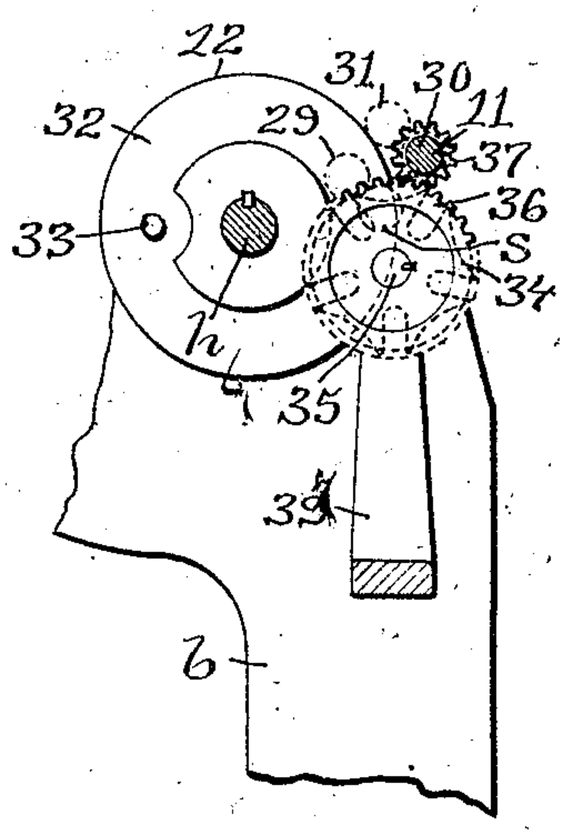
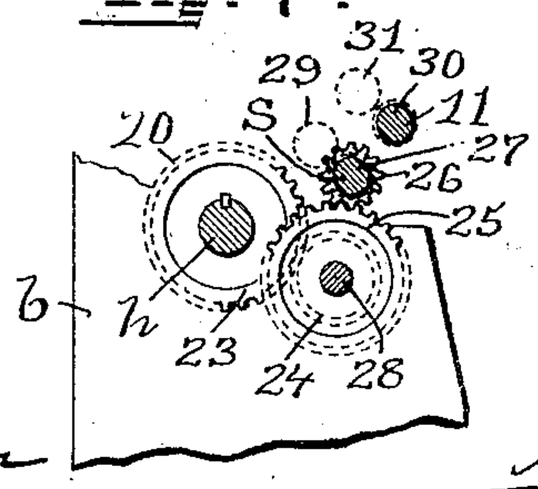


Fig. 7.



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UNITED STATES PATENT OFFICE.

ALFRED B. EVANS AND FRANK MARCAURELE, OF NEW BEDFORD, MASSACHUSETTS, AND FRANK R. LANGLOIS, OF WOONSOCKET, RHODE ISLAND.

COMBING-MACHINE.

979,389. Specification of Letters Patent. Patented Dec. 20, 1910.

Application filed December 9, 1908. Serial No. 466,615.

To all whom it may concern:

Be it known that we, ALFRED B. EVANS and FRANK MARCAURELE, citizens of the United States, and residing at New Bedford, in the county of Bristol and State of Massachusetts, and FRANK R. LANGLOIS, a citizen of the United States, residing at Woonsocket, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Combing-Machines, of which the following is a specification.

This invention has reference to an improvement in combing machines and more particularly to an improvement in that form of combing machines known as the Heilmann comber for combing cotton and similar fibrous material.

Combing machines as heretofore constructed and operated on the principle of the well-known Heilmann comber usually have the following motions and complicated mechanisms which are discarded in our invention: the upper lap feed roller and its spring tension connections, the nipper frame, the nipper knife and its cam operated mechanism, and the intermittent backward rotation of the drawing off or detaching roller and its operating mechanism, all of which materially limit the speed and production of the machine.

The object of our invention is to improve the construction of a combing machine, whereby a large number of the parts and their operative mechanisms heretofore used are eliminated, thereby increasing the speed and the production of the machine and reducing the cost of combing the material.

A further object of our invention is to simplify the construction of a Heilmann form of combing machine, thereby reducing the cost of manufacturing the machine.

Figure 1 is a vertical transverse sectional view taken centrally through one of the combing heads of a combing machine embodying our invention. Fig. 2 is an enlarged detail sectional view similar to Fig. 1 of the rolls, feed plate and top comb, illustrating our improved method of overlapping or piecing the combed staple, which is indicated in dotted lines. Fig. 3 is an enlarged detail view of the top portion of a gearing stand and showing the means for rigidly securing the ends of the lap feed plate to the bearings of the lap feed roller. Fig. 4 is a top plan view of the driving mechanism for the combing cylinder and detaching rolls and the intermittent motion mechanisms for the lap feed roll and the intermittent piecing rolls. Fig. 5 is a vertical sectional view taken on line 5 5 of Fig. 4, showing the intermittent motion mechanism for the lap feed roller, with the gear stand removed. Fig. 6 is a vertical sectional view taken on line 6 6 of Fig. 4, showing the intermittent motion mechanism for the intermittent piecing roller, and Fig. 7 is a vertical sectional view, showing the mechanism for constantly driving the detaching roller.

In the drawings, *a* indicates the main horizontal girder forming a part of the frame and extending the length of the machine for the common support of the several combing heads and gearing stand *b* and supports *c* mounted on the girder and forming supports for the several operating parts, *d* the driving shaft having the pulleys *e* and pinion *f* meshing with the gear *g* on the shaft *h* of the combing cylinder *i*, *k* the cleaning brush, *l* the doffing cylinder, *m* the doffer comb, *n* the lap rolls, *o* the apron, *p* the lap feed roller, *r* the top comb, *s* the detaching roller, *t* the sliver can, *v* the calendering rolls, and *w* the sliver apron of a combing machine embodying our invention, which consists of a lap feed intermittent motion mechanism 8 for the lap feed rolls *p*, a lap feed plate 9, a constant driving motion mechanism 10 for the detaching roller *s*, an intermittent piecing roller 11 and an intermittent piecing motion mechanism 12 for the piecing roller 11.

All of the lettered parts of the machine, as shown in the drawings, are constructed in the usual way and all of the lettered operating parts except the lap feed roller *p* and the detaching roller *s* are operated on the well-known principle of the Heilman comber.

The lap feed roller *p* has the shaft 13 rotatably supported in the bearings 14 which are adjustably secured to the top of the supports *c* in the usual way, as shown in Figs. 3 and 4. The feed roller *p* may be held so as to revolve in a fixed position relative to the lap feed plate 9 or held under a yielding downward pressure by any well known means.

The lap feed intermittent motion mechanism 8 consists of a disk 15 supported concentrically on the shaft *h* of the combing cylinder *i* and preferably adjustably se-

cured to the gear g, an off-center stud 16 on the disk 15, a star wheel 17 on the outer end of a shaft 18, supported in bearings in the gear stand b in a position for the stud 16 to engage with the star wheel 17 and revolve the star wheel one-fifth of a revolution to one revolution of the shaft h of the combing cylinder, a pinion 19 on the inner end of the shaft 18 and meshing with a gear 20 on the end of the shaft 13 of the lap feed roller p, as shown in Figs. 4 and 5. The construction of the disk 15, stud 16 and star wheel 17 is similar to and operates on the principle of the well-known Geneva stop motion.

The lap feed plate 9 extends the length of the combing head and is constructed in the form of a bar having the flat vertical portion 21 and the backwardly-curved lower lip 22 forming the segment of a circle, the center of which coincides with the center of the lap feed roller p. This plate is rigidly secured, as shown in Fig. 3, at each end to the bearings 14 for the lap feed roller p in a position for the curved lip 22 to extend backwardly under the lap feed roll p to approximately a line drawn vertically through the center of the roll and to form a thin concentric space (when the roller p is held in a fixed position relative to the plate 9) between the lap feed roller p and the lap feed plate 9 for the lap, which enters the V-shaped space between the lap feed roller p and the lap feed plate 9, as shown in dotted lines in Fig. 2.

The constant driving motion mechanism 10 for the detaching roller s consists of a gear 23 secured to the shaft h of the combing cylinder i and meshing with a pinion 24 formed integral with a gear 25 which meshes with a pinion 26 on the shaft 27 of the detaching roller s. The pinion 24 and gear 25 are rotatably supported on a stud 28 secured to the support c in a position for the pinion 24 to mesh with the gear 23, and for the gear 25 to mesh with the pinion 26, as shown in Figs. 4 and 7. A roller 29 is held under pressure in frictional contact with the detaching roll s, as shown in Fig. 1, by any of the well known means.

The intermittent piecing roller 11 has a shaft 30 rotatably supported in suitable bearings (not shown) on the supports c in a position to bring the roller above and toward the sliver can t, and a roller 31 is held under pressure in frictional contact with the piecing roller 11, as shown in Fig. 1, in any suitable manner.

The intermittent piecing motion mechanism 12 consists of a disk 32 secured to the shaft h of the combing cylinder i, an off-center stud 33 on the disk 32, a star wheel 34 secured to one end of a shaft 35, on the opposite end of which is a gear 36 meshing with a pinion 37 on the end of the shaft 30 of the piecing roller 11. The shaft 35 is rotatably supported in a bearing 38 on the upper end of a bracket 39 secured to the support c in a position for the stud 33 to engage with the star wheel 34 and for the gear 36 to mesh with the pinion 37, as shown in Figs. 4 and 6. The construction and operation of the disk 32, stud 33, and star wheel 34 are the same as that shown in the lap feed intermittent motion mechanism 8.

In the operation of our improved combing machine the lap feed roller p has an intermittent forward rotation, as indicated by the arrow in Fig. 2, (the duration of each intermittent rotation corresponding to the length of the staple) through the lap feed intermittent motion mechanism 8. The lap feed plate 9 is rigidly secured in its operative position. The detaching roller s revolves constantly in the direction of the arrow, as indicated in Fig. 2, through the constant driving motion mechanism 10 and the intermittent piecing roller 11 has an intermittent forward rotation through the intermittent piecing motion mechanism 12, the duration of each intermittent motion corresponding to the length of the staple. The roll of lap is carried on the rolls n and the layer of lap unwinding therefrom passes down the apron o into the V-shaped space or opening between the lap feed roller p and the lap feed plate 9. The lap is now squeezed between the lap feed roller p and the lap feed plate 9 and forced through between the same by the intermittent rotation of the lap feed roller p into the path of rotation of the combing cylinder i. The ends of the staple which project downward from the lower edge of the lap feed plate 9 are combed by the teeth or needles on the combing cylinder i in the usual manner and are then engaged by the detaching half-lap or segment on the combing cylinder which cooperates with the detaching roller s in the usual way, to separate the staple from the lap which is now held by the nip or bite of the lap feed roller p and the lap feed plate 9, at the same time dragging the staple through the teeth of the stationary top comb r, which is adjusted to be just clear of the path of the segment. The staple now passes between the detaching roller s and the nipper roller 29 to the intermittent piecing roller 11 which with the top roller 31 intermittently advances the staple and then holds the tail ends of the staple until the next advancing staple overlaps the same, as indicated in dotted lines in Fig. 2. The detaching roller s and piecing roller 11 then advance both the staples simultaneously, thereby piecing the same. The pieced staple emerges from the rolls in the form of a continuous sheet and passes through the calendering rolls v onto the sliver apron w upon which it is fed along to the drawhead in the usual manner. The combings or

noils are removed from the combing cylinder *i* by the rotary cleaning brush *k* by which they are delivered to the doffing cylinder *l* and removed from the latter by the oscillating doffer comb *m* all operating in the usual manner.

It is evident that the rolls may be placed in any position desired relative to each other and that the construction of the mechanisms for operating the rolls may be varied within wide limits without materially affecting the spirit of our invention.

Having thus described our invention, we claim as new and desire to secure by Letters Patent;—

1. In a combing machine, the combination with lap feeding means, and a combing cylinder and comb associated therewith for separating the staple from the lap; of a pair of frictionally-engaged detaching rollers located adjacent said comb and cylinder; a pair of frictionally-engaged piecing rollers located adjacent said detaching rollers, means for continuously rotating said detaching rollers, to feed the combed staple to the piecing rollers; and means for intermittently rotating said piecing rollers, whereby the ends of the lengths of staples fed thereto are overlapped and pieced together and subsequently advanced.

2. In a combing machine, the combination of a lap feed roller, a rigidly mounted feed plate arranged in close proximity to said feed roller and having a portion thereof curved rearwardly beneath the same; means for intermittently rotating said feed roller; a combing cylinder and an associated comb at one side of which said plate and feed roller are arranged, for separating the staple from the lap; a pair of frictionally-engaged detaching rollers located at the opposite side of the cylinder, for receiving the lengths of staple fed thereto by said cylinder; a pair of frictionally-engaged piecing rollers located adjacent said detaching rollers, means for continuously rotating said detaching rollers, to feed the combed staple to the piecing rollers; and means for intermittently rotating said piecing rollers, whereby the ends of the lengths of staples fed thereto are overlapped and pieced together and subsequently advanced.

In testimony whereof we have signed our names to this specification in the presence of the subscribing witnesses.

ALFRED B. EVANS.
FRANK MARCAURELE.
FRANK R. LANGLOIS.

Witnesses to signature of Alfred B. Evans:

ADA E. HAGERTY,
J. A. MILLER,

Witnesses to signature of Frank Marcaurele:

ADELARD CARDEN,
EUGENE RUSHLOW.

Witnesses to signature of Frank R. Langlois:

J. L. SIFFORD,
J. E. CLINE.