

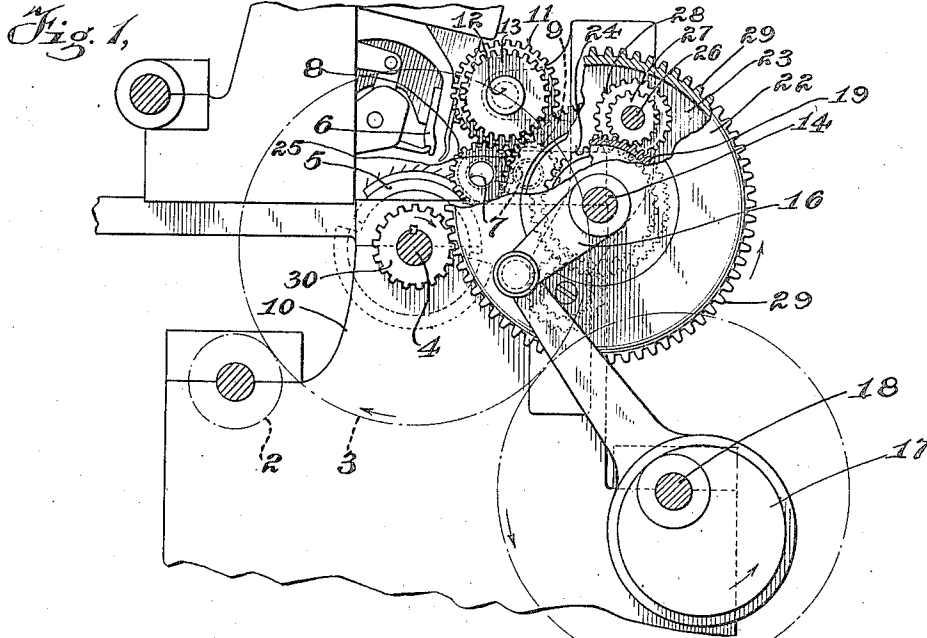
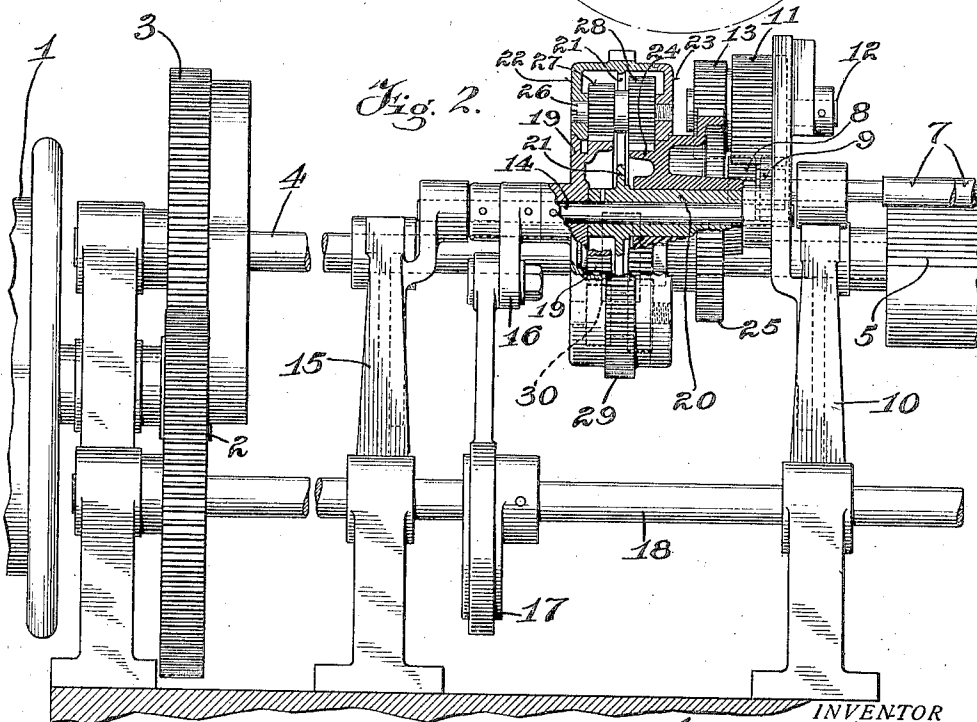
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DETACHING MOTION FOR COMBING MACHINES

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DETACHING MOTION FOR COMBING MACHINES.

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To all whom it may concern:

Be it known that I, SIGURD H. HELLAND, a citizen of the United States, residing in Whitinsville, Massachusetts, have invented the following described Improvements in Detaching Motions for Combing Machines.

The invention consists in the relative arrangement and general organization of the gearing of the detaching mechanism of Heilman type combers, as hereinafter more fully disclosed, adapting such mechanism for construction in compact, durable and efficient form so as to be applicable to existing combers within the space available in these compact machines and adapted also to produce various kinds of piecing roll movement according to the ratios of the gears employed.

In the accompanying drawings: Figure 1 is a transverse section of part of the drive head of an ordinary cotton comber using this invention, with parts broken out and shown in section, and Figure 2 is a side elevation.

These figures will be sufficient to illustrate the principles of the invention and their relation to other usual parts of cotton combers, not shown in the drawing. It will be understood that the drive pulley 1, through the pinion 2 and gear 3 drives the main or comb cylinder shaft 4 and that a number of comb cylinders 5 are ordinarily mounted on such shaft, one for each combing head; also that the lap to be combed is appropriately fed to and through the nipper mechanism and held by the latter so that its forward end is combed by the comb cylinder and thereafter presented to or grasped by the detaching rolls 7 (Fig. 2) by which the combed end of the lap is detached from the lap, as a tuft, and drawn through the top comb, and then pieced in over-lapping relation to the previously detached tuft to form the combed sliver. The particular detail of the combing cycle however, is of no consequence to this invention because the principles of the latter are applicable to the drive of detaching and piecing rolls of various types of combers as above stated and as will hereafter become apparent. In the machine taken for illustration, there are two detaching and piecing-roll shafts 7 which,

in multiple head combers will be understood to extend through the machine so as to serve all the heads thereof. These shafts are provided with two equal sized gears 8 and 9, situated close together in offset positions within the drive head compartment, and close to the frame upright 10, which separates the drive head space from the next adjacent combing head. These gears are connected by a superposed wide faced idler 11 journaled on a stud 12 carried by the said frame upright so that both roll shafts are thus connected to rotate in like direction and at like angular speed. The wide faced idler 11 is formed in one piece or compounded with the gear 13 which is the gear by which both detaching rolls are driven in this particular machine. This arrangement is well known and it will also be understood that where the combing machine employs but a single detaching roll shaft the idler 11 is omitted and the pinion on the end of said shaft then serves the same function as gear 13. Such a pinion or gear 13, as the case may be is driven from the drive-pinion 2 by the organization of parts embodying and representing this invention and such organization includes a short lay shaft 14 journaled at one end in the aforesaid frame upright 10 and at its other end in a bracket 15. This shaft is equipped with a crank 16 oscillated by the connecting rod of an eccentric 17 carried on the main cam shaft 18 of the comber, which latter shaft commonly extends through the length of the comber, as will be understood. Any other shaft available in the comber might be employed for oscillating the crank 16, but the existing cam shaft 18 is utilized for this purpose, in the present case, because it makes one revolution for each nip and because it is desirable for the purpose of the invention that the said crank be oscillated by a crank rather than a cam motion.

The lay shaft 14 also carries, fixed upon it, one of the side gears 19 of a differential or epicyclic gear set and carries, rotatable upon it, the sleeve 20 of the spider member of that set. This spider member comprises the said sleeve 20 and an apertured web 21 and is provided with lateral side walls or shrouds 22 and 23 which, with the other

members of the set, form an enclosure for the planetary pinions and all the intermeshing gear teeth of the set. The opposite side gear 24, which is the driven member of the epicyclic gear set, is formed on a sleeve hub rotatably journaled on the sleeve 20 of the spider member and also formed in one piece with, or connected to a larger gear 25 which meshes with and drives the gear 13 above referred to.

The shrouds 22 and 23 of the spider member carry the journal pins 26 of the planetary pinions, which are also compound gears, each consisting of gear members 27 and 28. For convenience of manufacture one of the shrouds 23, is a separate ring appropriately secured to the rim of the spider member, but obviously both shrouds can be integral with the spider member if desired. Their inner margins are fitted concentrically to the offset webs of the two concentric side gears 19 and 24, and preferably by means of a rebate or staggered joint as shown in the drawings. The webs of both gears are imperforate so that the enclosure formed by the spider member and the gears is adapted to be filled with and to retain lubricant. The gears may thus run in a mass of oil. The side shrouds and the gear webs preferably occupy the same planes which are close together as apparent from the drawing. The box form spider carries an external circumferential set of gear teeth 29 and its diameter and the shaft 14 are so proportioned and placed with relation to the comb shaft and detaching rolls, that these teeth may mesh directly with a drive pinion 30 secured to the comb cylinder shaft 4. By this connection the box form spider is driven continuously in the direction of the arrow in Fig. 1. During this continuous and constant speed rotary movement the eccentric 17 imparts one complete oscillation to the crank 16 and side gear 19 for each revolution of the comb cylinder shaft, the result being that the compound side gear 24—25 receives a progressing oscillation of greater extent in one direction than in the other, and this motion is transmitted to the detaching rolls, through the gearing 13 already described, causing them to rotate forwardly a certain amount and then backwardly a less amount, on each nip and as required for machines of the Heilman type. It will be seen that the extent, as well as the angular velocity of the detaching roll movement is controlled by the relative size of the gears and that in particular the velocity of the movement is controlled by the proportions of the gears of the epicyclic set and the length of the oscillating crank 16. These relations will be generally apparent from the drawings and as shown are suitable to give a proper piecing motion when operated by an eccentric or crank motion, as distinguished from cam actuation,

and may give a substantially constant velocity to the detaching rolls when rotating forwardly, and this velocity may be so nearly constant as to adapt one of the detaching rolls to nip the cotton against a detaching half lap on the cylinder, when the invention is applied to combers of that class. The oscillated driving gear 19 is preferably larger than the driven gear 24 and each successive couple in the gear set multiplies the velocity and this relation is combined with a crank radius which is longer than either side gear thereby adapting the mechanism to run quietly and smoothly with the least deterioration and development of lost motion as the result of wear.

I claim:—

1. In a comber, the combination with the comb cylinder shaft having a pinion and a detaching roll shaft having a pinion, of an epicyclic gear set comprising a spider member having circumferential teeth meshing with said comb shaft pinion and concentric side gears, one of the latter being connected with said roll shaft pinion and the other side gear being connected with an oscillating member.
2. In a comber, the combination with the comb cylinder shaft having a pinion, a detaching roll shaft having a pinion, of an epicyclic gear set comprising a spider member having circumferential teeth meshing with said comb shaft pinion, a concentric side gear constituting the driven member of said set connected with said roll shaft pinion, another side gear constituting the driving member of the set and a revolving eccentric or crank member for oscillating the latter side gear.
3. In a comber, the combination with the comb cylinder shaft having a pinion and a detaching roll shaft having a pinion, of a lay shaft, an epicyclic gear set supported thereon and comprising a spider member rotatively journaled on said shaft and having circumferential teeth directly driven by said comb shaft pinion, a side gear concentrically mounted with respect to said shaft and connected with said roll shaft pinion, a side gear fixed on said shaft and a connecting rod for oscillating said shaft and last mentioned side gear.
4. In a comber, the combination with the comb cylinder shaft having a pinion and a detaching roll shaft pinion, of an epicyclic gear set comprising a box-form spider member having circumferential teeth driven by said comb shaft pinion and concentric side gears having teeth within the enclosure of said member, one of said side gears being connected with said roll shaft pinion and the other with an oscillating member.
5. In a comber, the combination with the comb cylinder shaft having a pinion and a detaching roll shaft having a pinion, of an

epicyclic gear set comprising a spider member having annular side shrouds and circumferential teeth driven by said comb shaft pinion, planetary pinions carried by said shrouds and concentric side gears closing the centers of said shrouds, one of said gears being connected with said roll shaft pinion and the other with an oscillating member.

6. In a comber, the combination with the comb cylinder shaft and a detaching roll shaft, of an epicyclic gear set comprising a spider member having a central perforate web and annular side shrouds and formed with circumferential teeth driven from said comb shaft, a planetary pinion carried by said member and concentric side gears meshing with said pinion, one of said gears being connected with said detaching roll shaft and the other with an oscillating member, and the webs of said side gears forming joints with said shrouds adapted for confining lubricant within said spider member.

7. In a comber, the combination with the comb cylinder shaft and a detaching roll shaft, of an epicyclic gear set comprising a spider member having circumferential teeth driven from said comb shaft, compound planetary pinions carried by said member, concentric side gears meshing with said pinions, one of said gears being connected with said detaching roll shaft and the other to an oscillating member and each successive couple of said gear set having a speed multiplying ratio.

8. In a comber, the combination with the comb cylinder shaft having a pinion and a detaching roll shaft having a pinion, of an epicyclic gear set comprising a spider member having circumferential teeth meshing with said comb shaft pinion and concentric side gears, one of the latter being connected with said roll shaft pinion, a shaft common to several heads of the comber, and an eccentric or crank member on said shaft connected to the other side gear and adapted to oscillate the same.

9. In a comber, the combination with the comb cylinder and detaching roll shafts both connected to pinions, of an epicyclic gear

set connected between said pinions comprising a spider member having circumferential teeth meshing with the comb shaft pinion, a concentric, compound side gear constituting the driven member of said set connected with said roll shaft pinion, another side gear constituting the driving member of the set and means for oscillating the latter side gear.

10. In a comber, the combination with the comb cylinder and detaching roll shafts, of a short lay shaft, an epicyclic gear set mounted thereon and comprising a spider member having a long hub rotatably journaled on said shaft and having circumferential teeth driven from said comb shaft, a side gear having a sleeve hub journaled on said long hub and connected with said detaching roll shaft, a side gear fixed on said shaft and means for oscillating said shaft and last mentioned side gear.

11. In a comber, the combination with the comb cylinder shaft, of an epicyclic gear set comprising a spider member having circumferential teeth driven from said comb shaft, and side shrouds enclosing the planetaries of said set, and concentric side gears having teeth within the planes of said shrouds, the web of said side gears meeting the edges of said shrouds to form a lubricant enclosure therewith, one of said side gears being connected with the detaching roll shaft and the other with an oscillating member.

12. In a comber, the combination with the comb cylinder shaft having a pinion and a detaching roll shaft having a pinion, of an epicyclic gear set comprising a spider member having annular side shrouds and circumferential teeth driven by said comb shaft pinion, planetary pinions carried between said shrouds and concentric side gears having webs in the same planes as and closing the centers of said shrouds, one of said gears being connected with said roll shaft pinion and the other with an oscillating member.

In testimony whereof, I have signed this specification.

SIGURD H. HELLAND.