Sept. 29, 1931. H. WILKINSON 1,825,167

CONTROLLING MECHANISM FOR MACHINES FOR CLEANING AND OPENING COTTON AND FORMING THE SAME INTO LAPS

Filed Nov. 26, 1929 6 Sheets-Sheet 1.

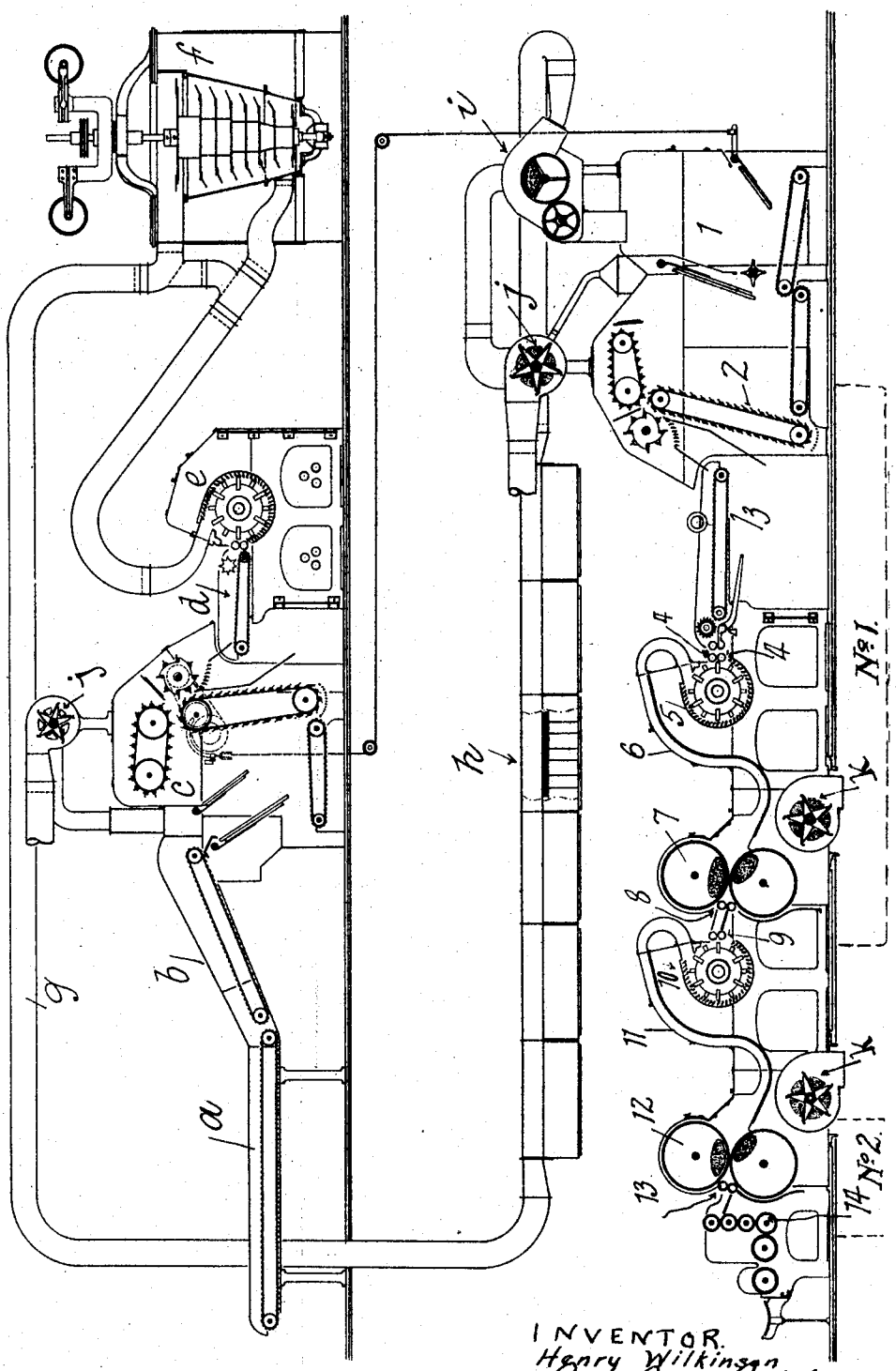


FIG. 1.

INVENTOR.
Henry Wilkinson
BY: Rugg, Boyett & Bakeless
ATTORNEYS.

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CONTROLLING MECHANISM FOR MACHINES FOR CLEANING AND OPENING COTTON AND FORMING THE SAME INTO LAPS

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FIG. 2.

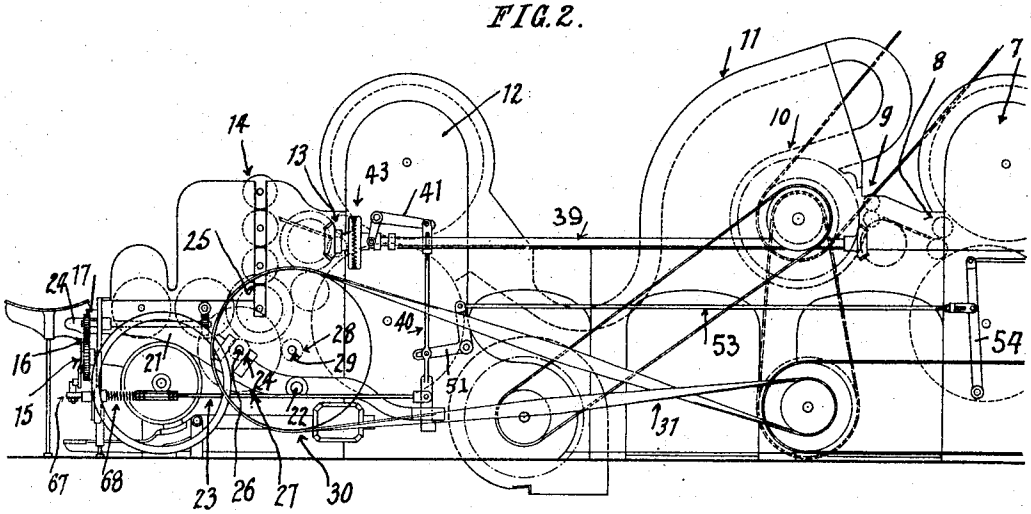
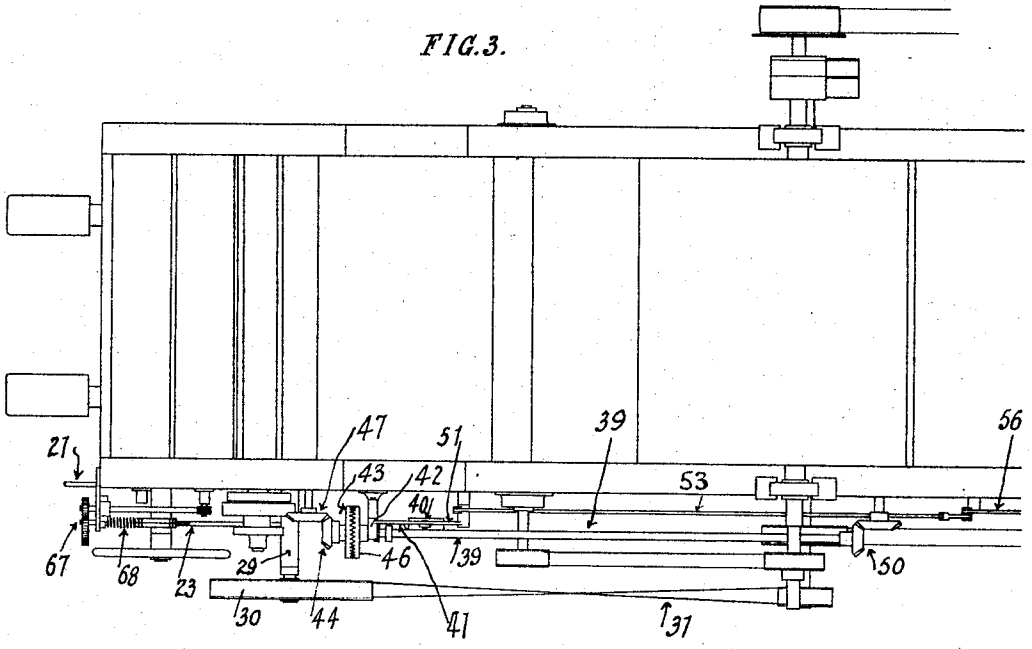


FIG. 3.



INVENTOR:
Henry Wilkinson
BY: Kerr, Boyce & Bakewell
ATTORNEYS

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CONTROLLING MECHANISM FOR MACHINES FOR CLEANING AND OPENING COTTON AND FORMING THE SAME INTO LAPS

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FIG. 2a

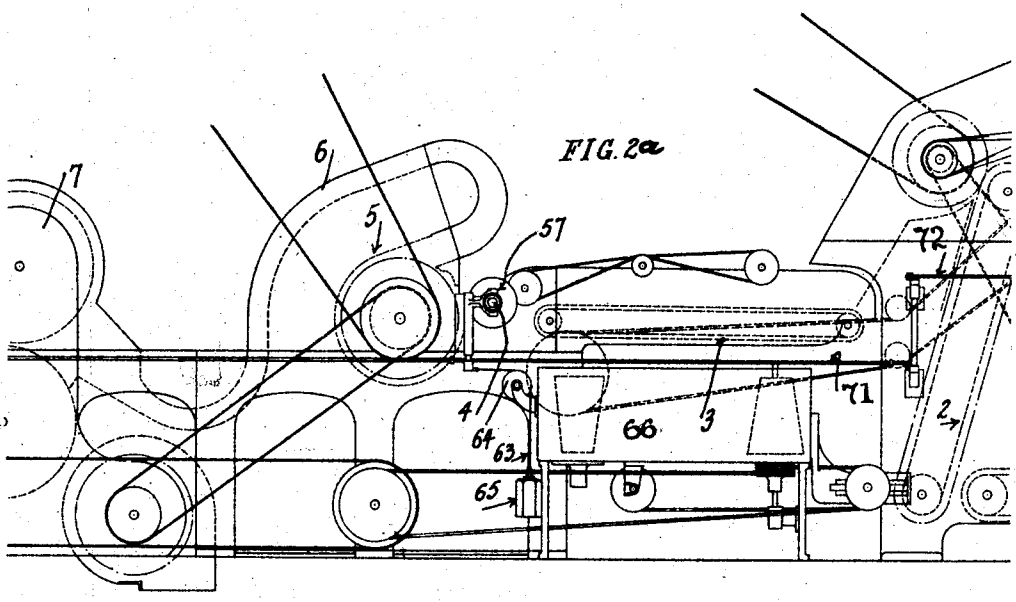
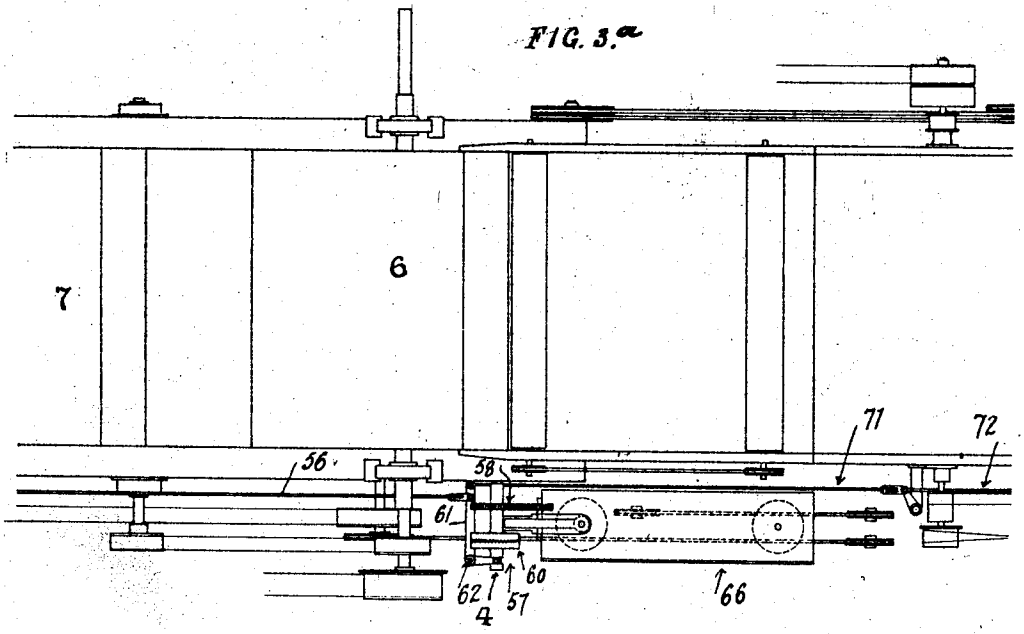


FIG. 3a



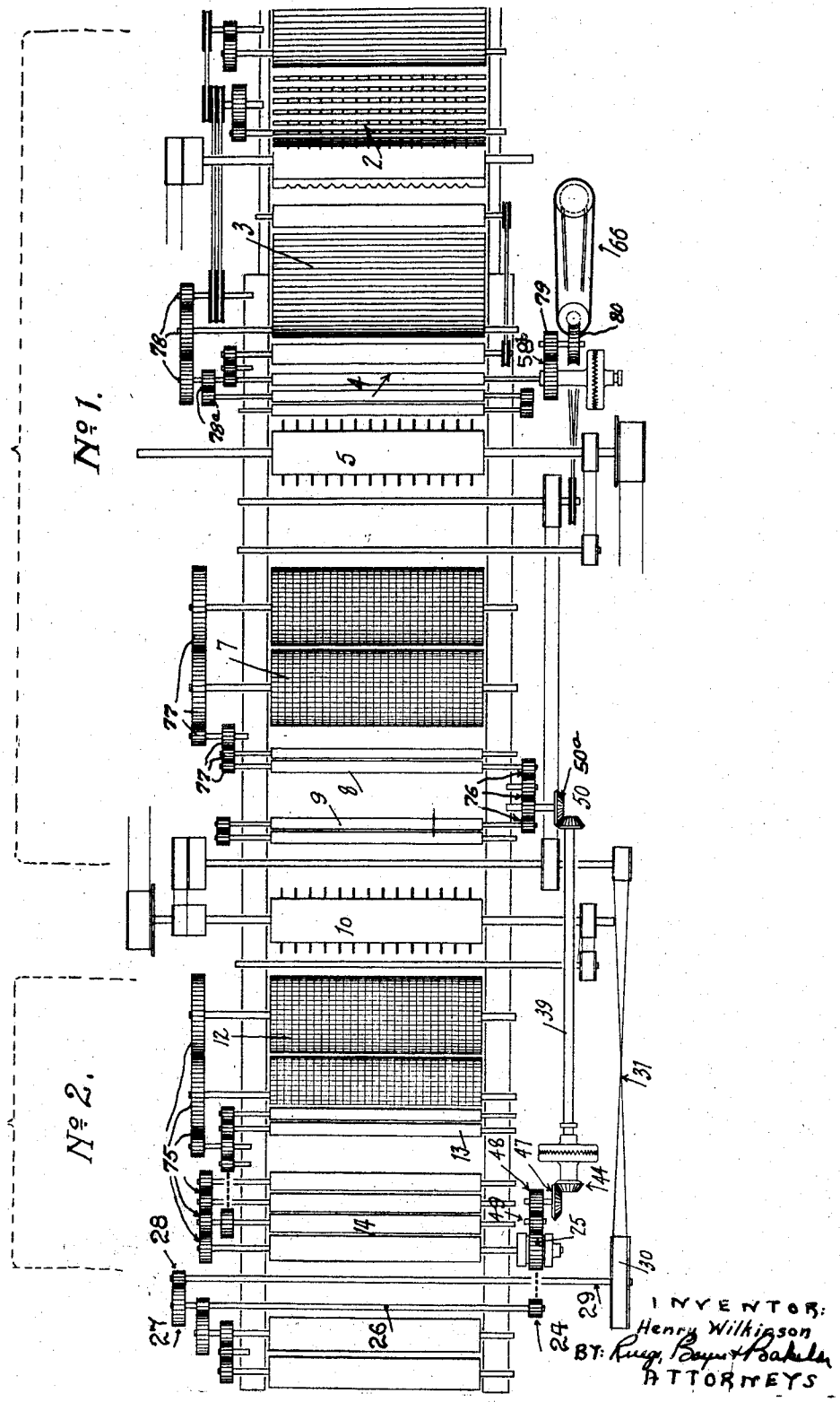
INVENTOR:
Henry Wilkinson
BY: Rugg, Boyer & Bakelar
ATTORNEYS

Sept. 29, 1931. H. WILKINSON 1,825,167

CONTROLLING MECHANISM FOR MACHINES FOR CLEANING AND OPENING COTTON AND FORMING THE SAME INTO LAPS

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FIG. 4.



INVENTOR:
Henry Wilkinson
BY: Kerr, Boyce & Rankin
ATTORNEYS

Sept. 29, 1931. H. WILKINSON 1,825,167

CONTROLLING MECHANISM FOR MACHINES FOR CLEANING AND OPENING COTTON AND FORMING THE SAME INTO LAPS

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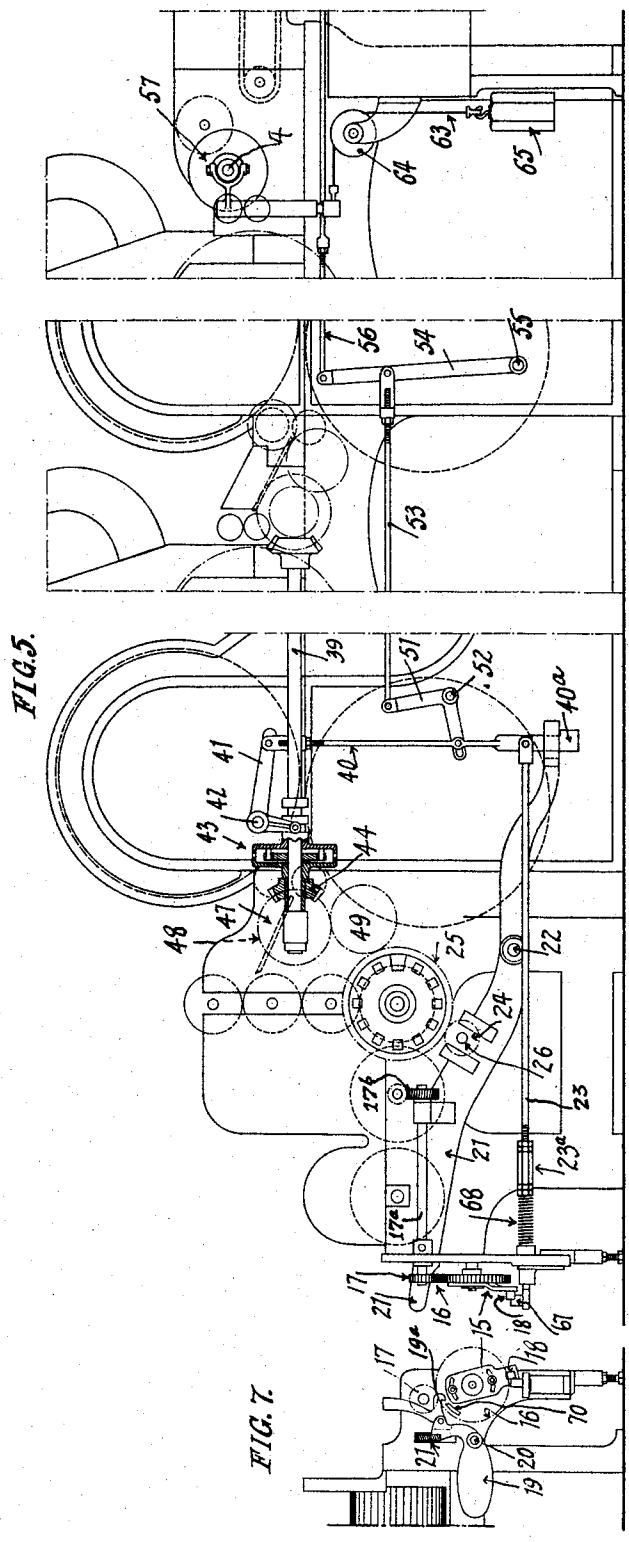


FIG. 5.

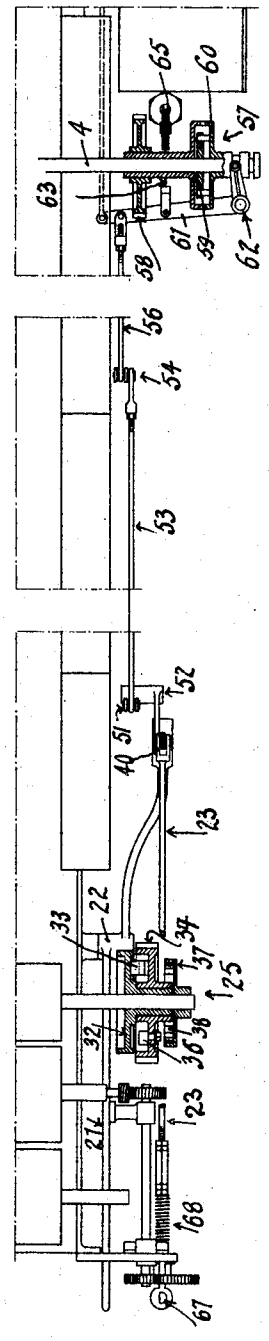


FIG. 6.

FIG. 7.

INVENTOR:
Henry Wilkinson
BY: Kruger, Boyce & Bakeless
ATTORNEYS

Sept. 29, 1931. H. WILKINSON 1,825,167

CONTROLLING MECHANISM FOR MACHINES FOR CLEANING AND OPENING COTTON AND FORMING THE SAME INTO LAPS

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FIG. 8.

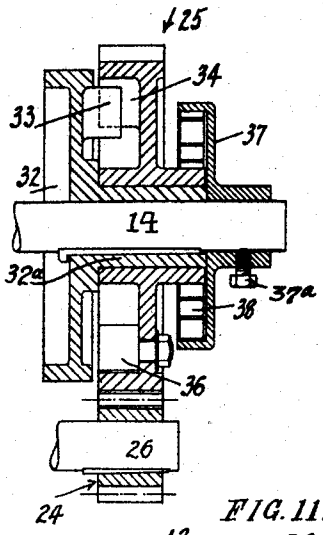


FIG. 9.

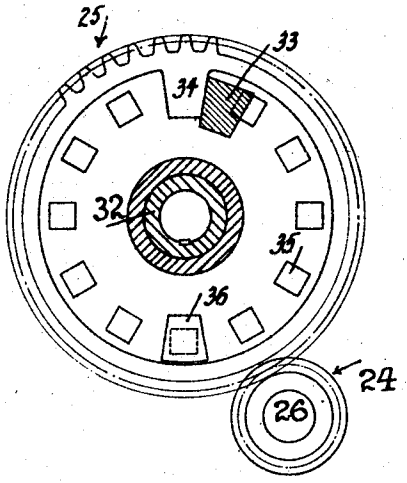


FIG. 10.

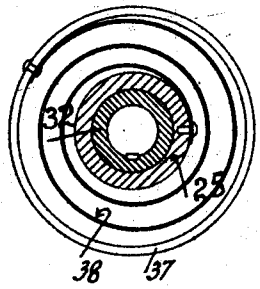


FIG. 11.

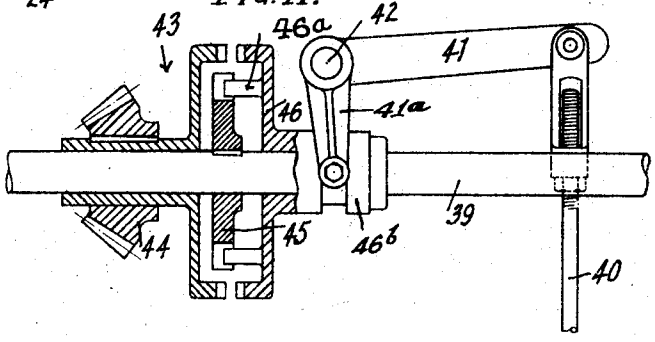


FIG. 12.

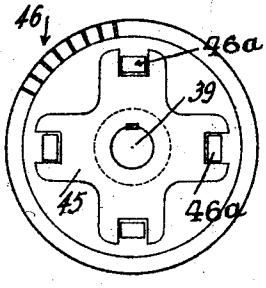


FIG. 13.

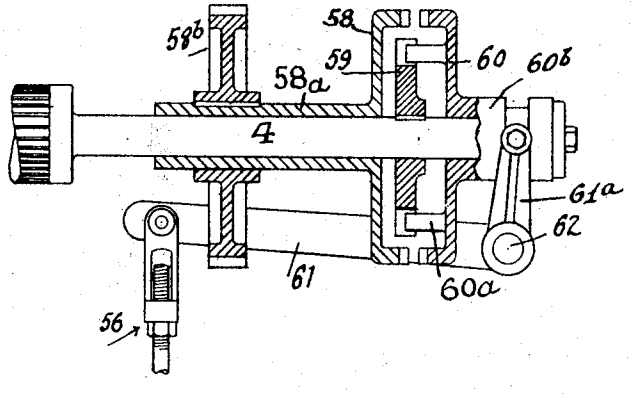
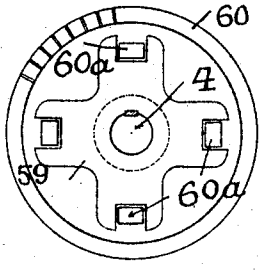


FIG. 14.



INVENTOR:
Henry Wilkinson
BY: Rugg, Boyd & Babcock
ATTORNEYS

Patented Sept. 29, 1931 1,825,167

UNITED STATES PATENT OFFICE

HENRY WILKINSON, OF OLDHAM, ENGLAND, ASSIGNOR OF ONE-HALF TO PLATT BROTHERS AND COMPANY, LIMITED, OF OLDHAM, ENGLAND

CONTROLLING MECHANISM FOR MACHINES FOR CLEANING AND OPENING COTTON AND FORMING THE SAME INTO LAPS

Application filed November 26, 1929, Serial No. 409,812, and in Great Britain February 16, 1929.

This invention concerns cotton cleaning, opening and lap forming apparatus wherein the fibre is in part mechanically and in part pneumatically conveyed while being dealt with or acted on in grouped machines, and there are two groups of cleaning and opening machines, one a preliminary group, and the other a further or refining group, the refining group finishing with lap forming mechanism, there being pneumatic or other conveyance between the preliminary group and the refining group and through the refining group which concludes with the lap forming mechanism.

As regards the preliminary group, this may be any suitable combination of conveying and opening apparatus and may embrace a creeper lattice, filling motion, hopper opener, hopper feeder, cylinder opener, Crighton opener, or any preliminary group of an effective nature, the material dealt with thereby being pneumatically conveyed if necessary over grid dust trunk but the cotton may be otherwise conveyed to the second or refining group with which my improvements are particularly concerned.

In this second or refining group, pneumatic conveyance is made use of, along with dust cages and also two cylinder openers together with other devices such as a hopper feeder fed by cotton pneumatically or otherwise conveyed and delivering to a lattice, together with all necessary feed rollers, etc.; but the exact combination is capable of considerable variation.

In the more modern type of cylinder or other opener from which the opened cotton is conveyed by an air pipe to succeeding cages, there is a vastly greater distance for the cotton to travel from the opener to the dust cages, it may be, say some 13 feet as against 4 feet for example. As a consequence, when a machine is stopped on completion of a lap, the fibre in transit between opener and dust cages is much more considerable, and such volume of fibre tends to bank-up at the dust cages with the result that uneven laps would be formed.

If the reader will refer to prior U. S. A. Patents 1,452,133 and 1,485,240 he will see there a type of cylinder opener which involves a long air trunk passage way to any combined cages, but it must be understood that my improvements are in no way confined to cylinder openers of the character mentioned, but apply to any combination of opener and cages the one if need be situated compartively remote from the other as will be understood. The improvements are applicable to two sets each consisting of a cylinder or like opener and cages with interconnecting pneumatic tubes or trunks. I shall herein deal with a two set cylinder opener and cages each set with pneumatic interconnecting tube, the second set followed by a lap forming arrangement of more or less well known type.

The conception at the root of the invention is this: I arrange to periodically and automatically arrest the mechanism feeding the first cylinder opener, the dust cages, the cage rollers, etc., (group marked No. 1 herein) before I arrest the second set of dust cages, its cage rollers, etc., (group marked No. 2 herein). The cylinder openers in each group revolve constantly. As a consequence, the considerable quantity of fibre between first cylinder opener and first set of cages banks-up at the first set of cages, but does not pass forward to the second cylinder opener, so that, the fibre between second cylinder opener and second cages can be substantially cleared-up on the second pair of cages. In effect I create an interregnum between the periodic cessation of the described first group and the periodic cessation of the second described group. Inversely, having automatically stopped both groups at one stage, I restart the first group a fraction of time before restarting the second group. If this be considered, it fol-

lows that the desired even laps will result, because, the considerable quantity of fibre remains banked-up having reached an impasse, while substantially what is forward of that goes onto the lap, and by thereafter first starting the first described group, before the second, the banked-up fibre behind the first cages catches up to the second cages and links up ere these re-start.

Such is the system upon which I propose to work and the various operations and controls can be well effected by mechanism which is to some considerable extent known on various textile machines, but which I have adopted, modified and combined for the purposes of carrying out my purpose.

The accompanying drawings sufficiently illustrate the means I propose to employ. In the drawings:

Fig. 1 is a general elevation showing a combination of grouped apparatuses which can operate in the manner and for the purposes set forth, and deal with the fibrous material from a creeper lattice until a lap is formed, without any manual intervention as to handling of the fibre being dealt with.

Figs. 2 and 2^a together comprise an enlarged side elevation of the greater part of the succeeding or refining and grouped apparatuses seen in the lower half of Fig. 1.

Figs. 3 and 3^a together comprise a plan view of the apparatus shown in Figs. 2 and 2^a.

Fig. 4, while not a true plan view, is a developed diagrammatic plan introduced to enable the gearing for refining group of apparatuses (lower part of Fig. 1 and Figs. 2 and 3) to be easily followed.

Fig. 5 is a side elevation in side widths or sections which shows more clearly the mechanism, for the cylinder openers, the cages, cage rollers, lap forming mechanism, and connections therefrom.

Fig. 6 shows a plan view of Fig. 5.

Fig. 7 is a broken front view of part of the lap forming mechanism.

Fig. 8 shows a section of the "spring wheel" device.

Fig. 9 is a face view thereof.

Fig. 10 is a view showing the volute spring device which returns or re-sets the "spring wheel" when the driving pinion or small gear on the lap drop lever is disengaged.

Fig. 11 shows the catch box structure, etc., on the side shaft of the refining group of apparatus.

Fig. 12 is an end elevation of one half of the catch box.

Fig. 13 shows the catch box structure, etc., for the feed rollers of the first cylinder opener and feed lattice in the refining group of apparatus.

Fig. 14 is an end elevation of one half of the catch box Fig. 13.

I may use any appropriate preliminary group of apparatus as for example such a group as is indicated in the upper part of Fig. 1. Shown there, is a creeper lattice *a*, filling motion *b*, hopper opener *c*, lattice feeder *d*, cylinder opener *e*, Crighton opener *f*, a suction pipe *g* conveying the cotton over grid dust trunk *h* to a condenser *i* which delivers into a hopper feeder 1 with spiked lifting lattice 2, etc., and pivoted control board or boards, or the like, and any mechanism delivering onto a horizontal or other lattice 3 with known feed rollers 4 delivering to a cylinder opener 5 similar to U. S. A. Patent 1,485,420 (or otherwise) said opener communicating with a pneumatic tube 6 leading to cages 7 with cage rollers 8, etc., and then come feed rollers 9. This is the first group or section. The feed rollers 9 deliver the cotton to the second cylinder opener 10, which communicates with a pneumatic tube 11 leading to the second set of cages 12, cage rollers 13, calender rolls 14, and lap forming mechanisms of more or less ordinary type. this being the second group. A suitable fan or fans, such as *j* is or are provided in the preliminary group to draw the cotton—say from the Crighton opener *f*, so that the condenser *i* can supply the hopper feeder 1, the same fan *j* serving to exhaust the air from the dust cage in condenser *i*. This fan provision can be considerably varied. Fans *k* properly driven and connected up are provided in association with the cages in the apparatuses of the second or refining group.

Referring now particularly to Figs. 5, 6 and 7, the controlling lever 21, known in the art as the lap drop lever, is pivotally mounted at 22 on the frame of the machine, the free outer end of which lever is adapted to be engaged and retained in set position by the usual goose-neck lever 19 pivoted at 20 on the machine frame at the lap end thereof.

When the lap drop lever 21 is lifted or engaged by hand in the known manner, it carries a small gear wheel 24 into engagement with a spur gear 25 forming part of a "spring wheel" assembly of a more or less known type and which will be described in detail hereinafter. This small gear wheel 24 is mounted on a shaft 26 which is a jointed or "floating" shaft, as known, and which shaft carries at its opposite end a large gear wheel 27 which is driven by a spur pinion 28 secured on one end of a shaft 29, said shaft carrying at its opposite end a pulley 30 which is actuated by a crossed belt 31 from any suitable source of power. When the outer end of the lever 21 is released by the goose-neck lever above described, that end of the lever 21 will drop by gravity, thus carrying the small gear wheel 24 out of mesh with the spur gear 25. The so-called spring wheel assembly is mounted on one end of the shaft of the lowermost calendar roll 14, all of the calendar

rolls being geared together and to the cage rollers 13 and cages 12 by a train of gearing 75 disposed at the side of the machine opposite from said spur gear 25, as shown in Fig. 6, whereby when the pinion 24 is in mesh with the spur gear 25 motion will be imparted by means of the spring wheel assembly to the calendar rolls 14, as well as the cage rollers 13 and cages 12. The construction of the spring wheel assembly, however, is such that the spur gear 25 must rotate a portion of a revolution before imparting motion to the calendar rolls. This construction is well illustrated in Figs. 8, 9 and 10, wherein is shown a flanged disk 32 having an integral sleeve 32ª by which it is keyed on the shaft 14 of the lowermost calendar roll. The spur gear 25 is mounted for free rotation on said sleeve and is provided with an internal projection 34 forming a fixed stop member, and with a plurality of openings 35 each adapted to receive a movable stop member 36. The disk 32 is provided with an integral lug 33 that extends into the path of the spur wheel stop members 34 and 36, so that the spur wheel may rotate independently of the disk in both directions only until one of its stop members encounters the lug 33 of the disk. A second flanged disk 37 is secured by means of a set screw 37ª to the shaft 14 in abutting relation to the end of the sleeve 32ª of the disk 32 and the hub of the spur gear 25. A volute spring 38 is secured at one end to the flange of said disk 37 and at its opposite end to the hub of the spur wheel 25, whereby upon rotation of the spur wheel in one direction the spring is placed under tension.

In Fig. 4 it will be observed that the spur wheel 25 is in mesh with an idler pinion 49, which in turn is in mesh with a pinion 48, on the shaft of which is secured a bevel gear 47 in mesh with a bevel gear 44. Referring now to Fig. 11, the bevel gear 44 is keyed on a sleeve formed integral with a flanged clutch member or disk 43 mounted for free rotation on a countershaft 39, on which shaft is also mounted for free rotation a second flanged clutch disk 46, said clutch members having cooperating teeth formed in the opposing edges of their respective flanges, means being provided, as hereinafter described, for moving the clutch disk 46 axially of the shaft thereby to control the operation of the clutch members. Between the clutch disks 43 and 46, a member 45, preferably of cruciform in face view, as shown in Fig. 12, is keyed to the shaft 39, said member being provided in the end of each of its arms with openings in which are slidably positioned projections or lugs 46ª formed integral with clutch disk 46. For operating the clutch disk 46 toward and from the clutch disk 43, a yoke 41ª engages a peripheral groove in a sleeve 46ᵇ formed integral with the clutch disk 46, said yoke forming one arm of a bell-crank lever 41 pivoted at 42 on a fixed portion of the machine frame. To the free end of the bell-crank lever 41 is pivotally connected the upper end of a depending rod 40, the lower end of which passes through an elongated slot in the lap drop lever 21 hereinbefore described (see Fig. 5) said depending rod being provided at its extreme lower end with a shouldered foot or boot 40ª whereby when the parts are in the position shown in Fig. 5 said foot engages beneath the end wall of the lever and is thus retained depressed until operated in the manner to be later described. A spring rod 23 is pivoted at one end thereof to the depending rod 40 at some distance above the lower end of said depending rod, the outer end of said spring rod passing through the end frame of the machine and slidable therein. A coil spring 68 encircles the rod 23 and is confined between the machine end frame and a sleeve 23ª threaded on the rod, whereby said rod is retained in the position shown in Fig. 5 under tension of said spring. Means are provided for periodically causing the rod 23 to slide outward through the machine frame, said means comprising a cam lug 67 secured on the outer end of the rod 23 in position to be engaged by a cooperating lug 18 (see Figs. 5 and 7) carried on the usual radius plate 15 which is secured to a gear 16 mounted for rotation on the end frame of the machine in mesh with a pinion 17 secured on a shaft 17ª, which receives rotary motion by means of a worm gear 17ᵇ from any suitable source of power. The gear 16 also carries a lug 70 near its periphery, said lug being adapted to engage a hook-shaped member 19ª carried by the goose-neck lever 19 thereby periodically to swing said lever on its pivot and release the lap drop lever 21, as hereinafter described.

In the operation of the machine so far described, constant rotary motion is imparted to the shaft 29. Consequently, when the outer end of the lap drop lever 21 is raised to the position shown in Fig. 5, two results immediately follow, namely: The pinion 24 is carried into engagement with the spur wheel 25, and the depending rod 40 is pulled downward by reason of the engagement of its foot 40ª with the underside of the lever 21. The effect of the engagement of pinion 24 with spur wheel 25 is to cause said spur wheel to rotate, thus immediately transmitting motion through 49, 48, 47 and 44 to clutch member 43, while the effect of the downward pull on the rod 40 is to swing the bell-crank 41 on its pivot thereby carrying the clutch member 46 into engagement with clutch member 43, so that motion is imparted through the member 45 to the shaft 39 and thence through bevel gears 50, 50ª and train of gears 76 to the cage rollers 8 and feed rollers 9, and by means of the train of gearing 77 motion is imparted to the first set of cages 7.

Because of the spring wheel assembly disposed between the spur wheel 25 and the shaft of the roller 14 on which said spur wheel is mounted, the said shaft does not begin to rotate immediately, for the reason that, under the action of the spring 38 after each period of rotation the spur wheel comes to rest with its adjustable stop lug 36 in abutting relation to one side of the lug 33 of the disk 32, so that when motion is again imparted to the spur wheel it rotates freely until its fixed stop lug 34 abuts against the opposite side of the disk lug 33, whereupon the disk 32 and the shaft to which it is keyed will be carried along as a unit with the spur wheel, the spring 38 having been retensioned during the free rotation of the spur wheel. It will thus be clear that all of the mechanism to which motion is imparted by the shaft 39, namely the feed rolls 9 to the second cylinder opener 10, the cage rollers 8, and the first cages 7, begin to rotate in advance of the rollers 14, cage rollers 13 and second cages 12, so that fibre is fed to the second cylinder opener 10 and thence to the second set of cages before the latter begin to rotate, the length of time between the beginning of the rotation of cages 7 and that of cages 12 being determined by the position to which the stop lug 36 has been set on the spur wheel.

Means are provided whereby the downward pull on the rod 40, in addition to bringing the clutch members 46 and 43 into operative engagement as above described, is also effective simultaneously to cause rotation of the feeding mechanism for the first cylinder opener 5. As shown in Fig. 4, the lattice 3 is geared by means of a train of gearing 78 to the shaft of one of the feed rolls 4 for the first cylinder opener. On the end of said shaft opposite from said gearing is disposed a clutch mechanism similar to that already described and comprising a pair of cooperating flanged disks 58 and 60 (see Figs. 13 and 14) mounted for free rotation on the shaft 4 both of said clutch disks having interengaging teeth, as indicated at 57, the clutch disk 60 being slidable toward and from the companion clutch disk and having lugs 60^a projecting through openings in the arms of a cruciform member 59 keyed on the shaft 4. The clutch disk 58 is provided with an elongated sleeve 58^a on which is keyed a spur wheel 58^b which is constantly in mesh with a pinion 79 operated by means of worm gearing 80 from the well known regulating motion 66 (see Fig. 4). The clutch disk 60 is operated toward and from its companion clutch member by means of a yoke 61^a in engagement with a peripheral groove in a hub portion or sleeve 60^b formed integral with the disk 60, said yoke constituting the short arm of a bell-crank lever 61 pivoted at 62 on a fixed portion of the machine frame. The free end of the bell-crank 61 is pivotally connected to one end of an adjustable connecting rod 56, the opposite end of which is pivoted to the free end of a lever 54 pivoted at 55 on the machine frame. A second adjustable connecting rod 53 is pivotally connected at one end to the lever 54 and at its opposite end to one arm of a bell-crank lever 51 pivoted at 52 on a fixed part of the machine frame. The other arm of the bell-crank lever 51 is provided with an elongated opening through which it is pivoted to the depending rod 40 hereinbefore described.

From the foregoing it will readily be seen that when the rod 40 is pulled downward for causing engagement of the clutch members 43 and 46 as hereinbefore described, it will simultaneously swing bell-crank lever 51 on its pivot, thus pulling connecting rod 53 toward the left as shown in Fig. 5, thereby swinging lever 54 and pulling connecting rod 56, thus swinging bell-crank 61 on its pivot and carrying clutch member 60 into operative engagement with clutch member 58, whereupon rotary motion is imparted by means of the gearing 80, 79, 58^b and the clutch members 60, 58 to the shaft 4 and thence through the gearing 78 to the lattice 3 and through the gearing 78^a to the feed rollers for the first opener 5, so that these mechanisms are started simultaneously with the starting of the first pair of cages 7, cage rollers 8 and cylinder 9.

For automatically disengaging the clutch members 58 and 60 when the pull on the connecting rods 53, 56 is released, a flexible member 63 such as a cable or chain is secured at one end to the side of the bell-crank 61 opposite from the rod 56, said cable passing over a pulley 64 mounted in a bracket carried by the machine frame, a weight 65 being suspended from the opposite end of the cable, whereby when the pull on the connecting rods is released the bell-crank 61 will be swung in the opposite direction under the pull of the cable, thus disconnecting the clutch members.

When the second cylinder opener 10 has begun to supply the second cages 12, that is, after a fraction of time, the "spring wheel" assembly 25 begins to drive the gear wheels 75 and carriers for the second cages 12, the cage rollers 13, and lap rolls 14, as hereinbefore described, whereupon the lap forming delivery begins again, the fibre having so to speak "caught-up" so as to constantly and uniformly feed the second cages 12.

At this period, the lap is being wound-on the lap rod, in the ordinary and well known fashion, and this condition continues until the lap is nearly fully wound. When this stage is reached, the lug 18 acts on the projection 67 on the spring rod 23 and moves the latter against the action of the spring 68. The result is, the pendent bar 40 has its foot 40*a* disengaged from the slotted end of the lap drop lever 21, the slot being of

sufficient length to permit the foot to pass upward therethrough when the rod 40 is pulled to the rear end of the slot. The pendent bar 40 being thus disengaged or "unlocked", is free to rise. The action of the weight 65 is at this time exerted on the bell-crank 61 and is transmitted by rods 56 and 53 to bell-crank 51, causing the latter to swing on its pivot, thereby moving the pendent bar 40 upward and swinging the bell-crank 41 to disengage the clutch members 46 and 43 simultaneously with the disengagement of clutch members 58 and 60. As a consequence, the lattice 3, its rollers 4, etc. the first pair of cages 7, and cage rollers 8, and cylinder rollers 9, are arrested, and any fibre between the first cylinder opener 5 and the first pair of cages 7 banks-up on the latter. The second pair of cages 12, however, go on rotating along with the cage rollers 13 and lap rolls 14 until the fibre available is almost exhausted, whereupon the goose-neck lever 19, is disengaged by the lug 70 on the large gear wheel 16 and so the lap drop lever 21 is released and falls in known manner. The release of the lap drop lever 21 carries the small gear wheel 24 out of mesh with the spring wheel gear 25, so that the rotation of the latter ceases. The "spring wheel" 25, being no longer driven, the second pair of cages 12, the cage rollers 13 and lap rolls 14, etc. stop. This is the period of arrestation for removal of the lap. The volute spring 38 in the "spring wheel" combination, Figs. 8, 9 and 10, in the meantime returns the abutment 34 to starting position, that is, until the stud 36 encounters the cast-on projection 33. The cylinder openers 5 and 10 in groups No. 1 and No. 2 are intended to revolve constantly.

This particular means which I shall now briefly refer to, is not material, and could be greatly varied, but there is preferably provided an extending connecting rod or rods 71, 72, with one or more L levers or other connections to the hopper feeder if such is combined in the refining group, to arrest the conveying devices therein, by shifting a belt or otherwise, and there is preferably connecting mechanism to the preliminary group of machines (such as shown in the upper part of Fig. 1) whether in another room, or elsewhere to stop the conveyance of cotton via the pneumatic tube or otherwise to the initial hopper feeder in the refining group or apparatuses with which the invention is concerned, and during such time as the lap is being removed and up to the period of restarting.

The "spring wheel" spoken of is broadly known and is of such a construction as clearly set forth herein that the time when the driving of the second cages, cage rollers, lap rolls etc. (following setting of the lap drop lever) shall occur, can be regulated by adjusting the known settable stud 36 combined in the spring wheel.

By means of the present invention, I am able to better clean and open the fibre and to produce entirely uniform laps, and the material is never manually handled from the creeper lattice *a* until in lap form.

I declare that what I claim is:

1. In a cotton-cleaning and lap-forming apparatus, the combination of two distinct groups of similar mechanisms, a shaft mounted for rotation, gearing at one end of said shaft for transmitting motion to one of said groups, a gear mounted for free rotation on said shaft, means shiftable into and out of engagement with said gear for imparting motion thereto, gearing in mesh with said gear for imparting motion to the other group of mechanism and cooperating means carried by said shaft and gear for imparting rotation to the shaft after the gear has been rotated through a predetermined angle whereby motion is imparted first to one of said groups in advance of the other group and then to both groups.

2. In a cotton-cleaning and lap-forming apparatus, the combination of two distinct groups of similar mechanisms, a shaft mounted for rotation, gearing at one end of said shaft for transmitting motion to one of said groups, a gear mounted for free rotation on said shaft, means shiftable into and out of engagement with said gear for imparting motion thereto, gearing in mesh with said gear for imparting motion to the other group of mechanisms, cooperating means carried by said shaft and gear for imparting rotation to the shaft after the gear has been rotated through a predetermined angle whereby motion is imparted first to one of said groups in advance of the other group and then to both groups, and means automatically operative after the actuation of both groups to discontinue the actuation of the first group in advance of the other group.

3. In a cotton-cleaning and lap-forming apparatus, the combination of two distinct groups of similar mechanisms, a shaft mounted for rotation, gearing at one end of said shaft for transmitting motion to one of said groups, a gear mounted for free rotation on said shaft, means shiftable into and out of engagement with said gear for imparting motion thereto, gearing in mesh with said gear for imparting motion to the other group of mechanisms, said last gearing including shiftable clutch members normally out of operative relation, means operative on the shifting of said motion-imparting means into engagement with said gear for shifting the clutch members into operative relation thereby to impart motion to the gear-actuated group at the beginning of the rotation of said gear, and cooperating means between said shaft and gear

for imparting motion to the shaft after the gear has been rotated through a predetermined angle thereby to impart motion to the shaft-actuated group.

4. In a cotton-cleaning and lap-forming apparatus, the combination of two distinct groups of similar mechanisms, a shaft mounted for rotation, gearing at one end of said shaft for transmitting motion to one of said groups, a gear mounted for free rotation on said shaft, means shiftable into and out of engagement with said gear for imparting motion thereto, gearing in mesh with said gear for imparting motion to the other group of mechanisms, said last gearing including shiftable clutch members normally out of operative relation, means operative on the shifting of said motion-imparting means into engagement with said gear for shifting the clutch members into operative relation thereby to impart motion to the gear-actuated group at the beginning of the rotation of said gear, cooperating means between said shaft and gear for imparting motion to the shaft after the gear has been rotated through a predetermined angle thereby to impart motion to the shaft-actuated group, and means automatically operative during the actuation of both groups to return said clutch members to inoperative position thereby to discontinue the actuation of said gear-actuated group in advance of the discontinuance of the shaft-actuated group.

5. In a cotton-cleaning and lap-forming apparatus, the combination of two distinct groups of similar mechanisms, a shaft mounted for rotation, gearing at one end of said shaft for transmitting motion to one of said groups, a gear mounted for free rotation on said shaft, means shiftable into and out of engagement with said gear for imparting motion thereto, gearing in mesh with said gear for imparting motion to the other group of mechanisms, said last gearing including shiftable clutch members normally out of operative relation, means operative on the shifting of said motion-imparting means into engagement with said gear for shifting the clutch members into operative relation thereby to impart motion to the gear-actuated group at the beginning of the rotation of said gear, cooperating means between said shaft and gear for imparting motion to the shaft after the gear has been rotated through a predetermined angle thereby to impart motion to the shaft-actuated group, means automatically operative during the actuation of both groups to return said clutch members to inoperative position thereby to discontinue the actuation of said gear-actuated group, and means automatically operative to shift the motion-imparting means out of engagement with said gear thereby to discontinue actuation of the gear-actuated group.

6. In a cotton-cleaning and lap-forming apparatus, the combination of two distinct groups of similar mechanisms, a shaft mounted for rotation, gearing at one end of said shaft for transmitting motion to one of said groups, a gear mounted for free rotation on said shaft, means shiftable into and out of engagement with said gear for imparting motion thereto, gearing in mesh with said gear for imparting motion to the other group of mechanisms, said last gearing including shiftable clutch members normally out of operative relation, means operative on the shifting of said motion-imparting means into engagement with said gear for shifting the clutch members into operative relation thereby to impart motion to the gear-actuated group at the beginning of the rotation of said gear, cooperating means between said shaft and gear for imparting motion to the shaft after the gear has been rotated through a predetermined angle thereby to impart motion to the shaft-actuated group, means automatically operative during the actuation of both groups to return said clutch members to inoperative position thereby to discontinue the actuation of said gear-actuated group, means automatically operative to shift the motion-imparting means out of engagement with said gear thereby to discontinue actuation of the gear-actuated group, and means automatically operative to return said gear to its shaft-free position.

7. In a cotton-cleaning and lap-forming apparatus, a shaft mounted for rotation, a gear mounted for free rotation on said shaft, means shiftable into and out of engagement with said gear for imparting motion thereto independently of the shaft and cooperating means carried by said shaft and gear for imparting rotation to the shaft at a predetermined period during the rotation of the gear.

8. In a cotton-cleaning and lap-forming apparatus, a shaft mounted for rotation, a gear mounted for free rotation on said shaft, means shiftable into and out of engagement with said gear for imparting motion thereto independently of the shaft, cooperating means carried by said shaft and gear for imparting rotation to the shaft at a predetermined period during the rotation of the gear, and flexible means operative when said motion-imparting means is out of engagement with said gear for returning the latter to its shaft-free position.

9. In a cotton-cleaning and lap-forming apparatus, a shaft mounted for rotation, a gear mounted for free rotation on said shaft, means shiftable into and out of engagement with said gear for imparting motion thereto independent of the shaft, a stop disk secured on said shaft for rotation therewith, cooperating means carried by said disk and gear for engagement after the gear has ro-

tated through a predetermined angle thereby to rotate the shaft, and flexible means secured to said shaft and gear and adapted to be placed under tension during the shaft-free movement of the gear and operative when said motion imparting means is out of engagement with the gear to return the latter to its shaft-free position.

In testimony whereof I have signed my name to this specification.

HENRY WILKINSON.