Aug. 13, 1957 T. H. NIFONG 2,802,529

LABEL ROLL CUTTING AND CONTROL-FEED MECHANISM FOR PACKAGING MACHINES

Filed June 26, 1953 5 Sheets-Sheet 1

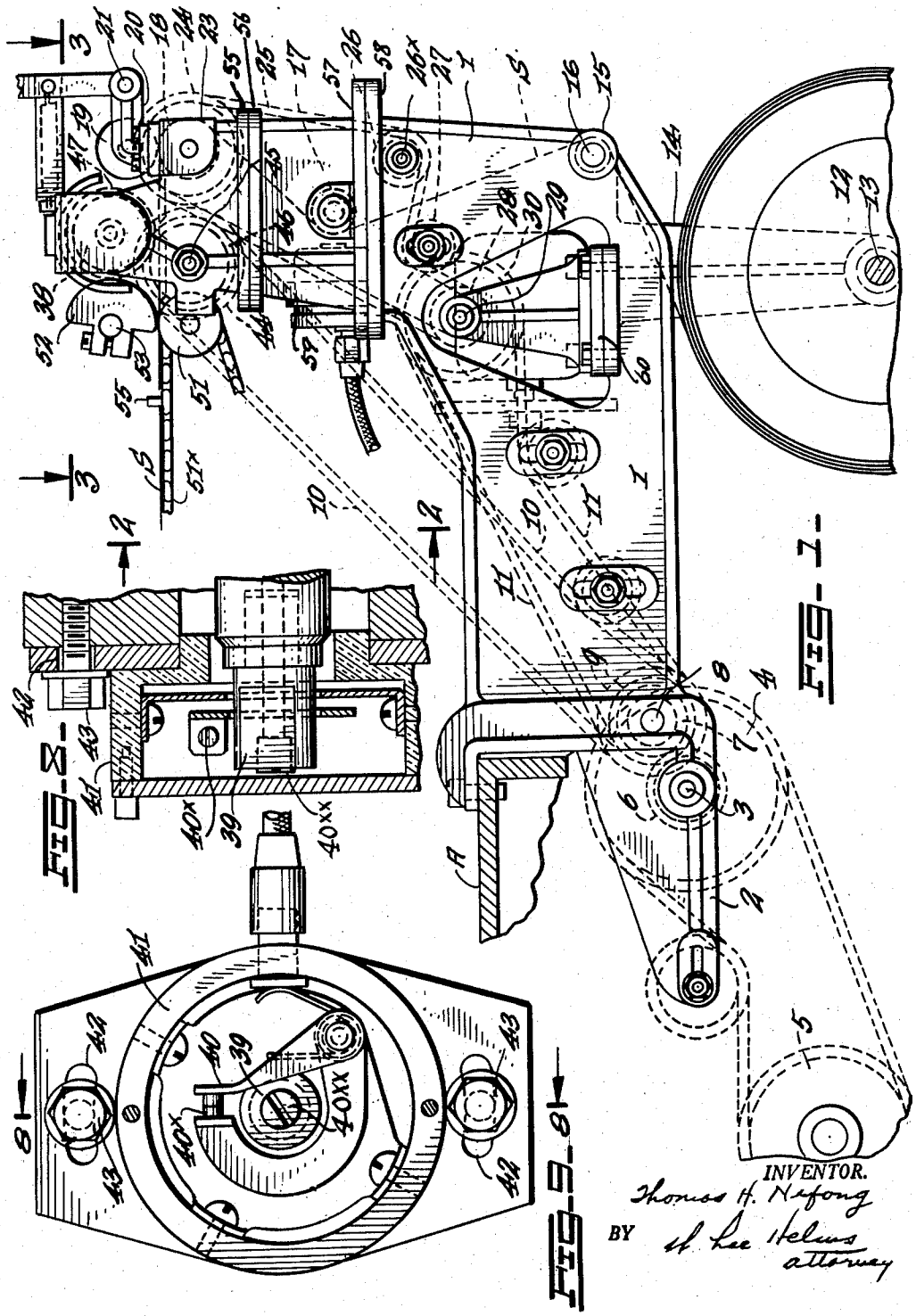


FIG. 7

FIG. 8

FIG. 9

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Filed June 26, 1953 5 Sheets-Sheet 2

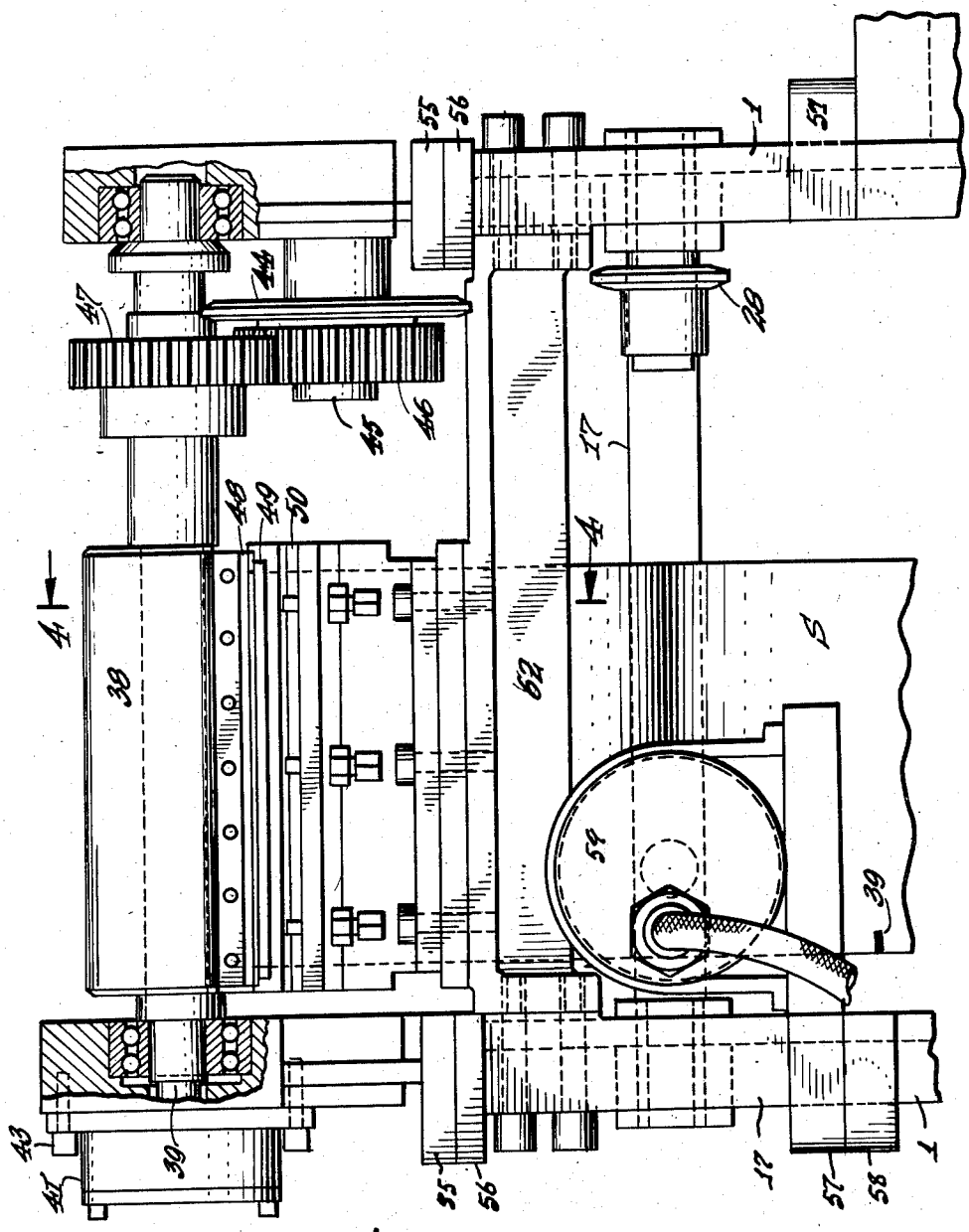


FIG. 2.

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Filed June 26, 1953 5 Sheets-Sheet 3

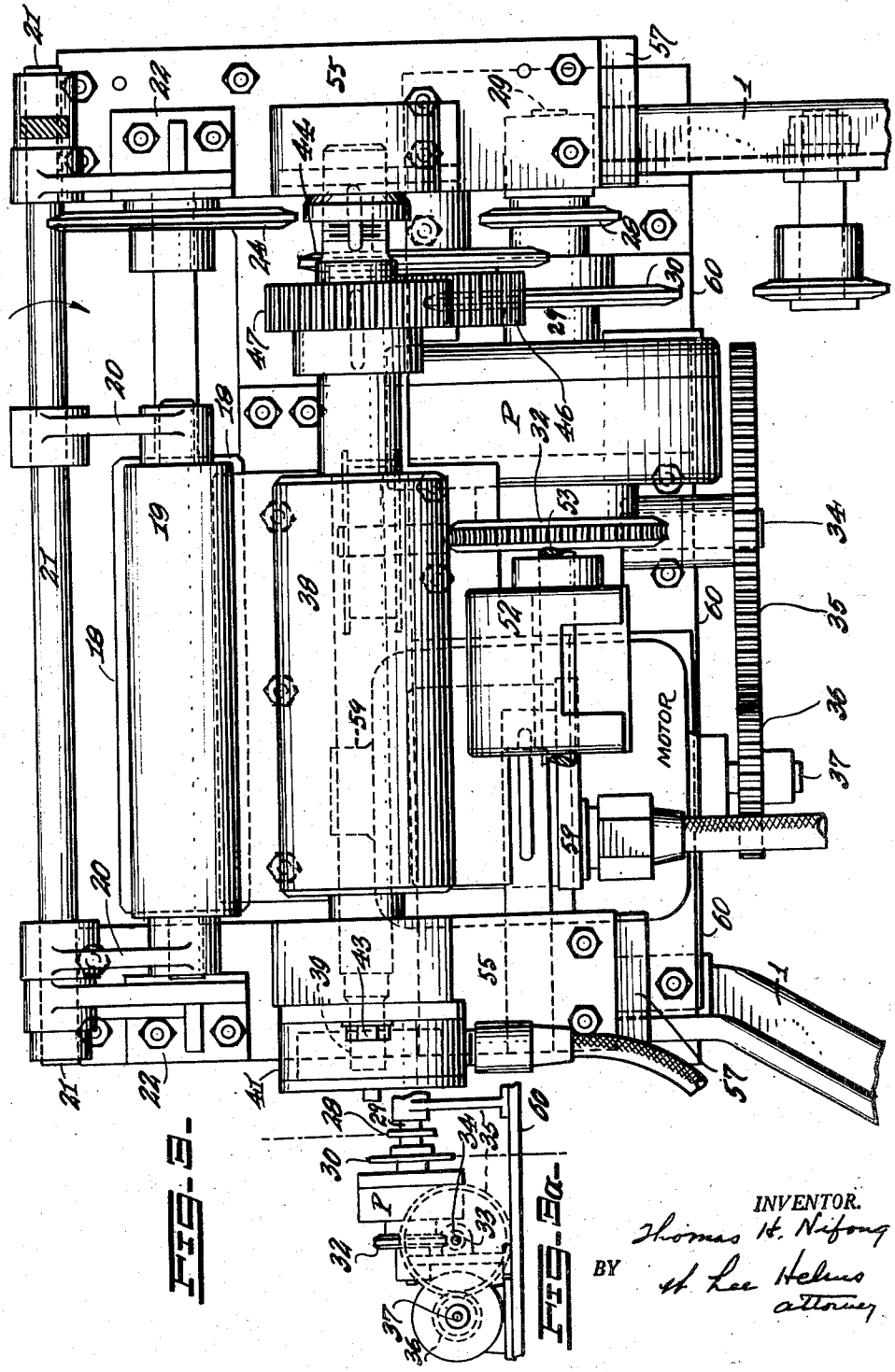


FIG. 5.

FIG. 5a.

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Filed June 26, 1953 5 Sheets-Sheet 4

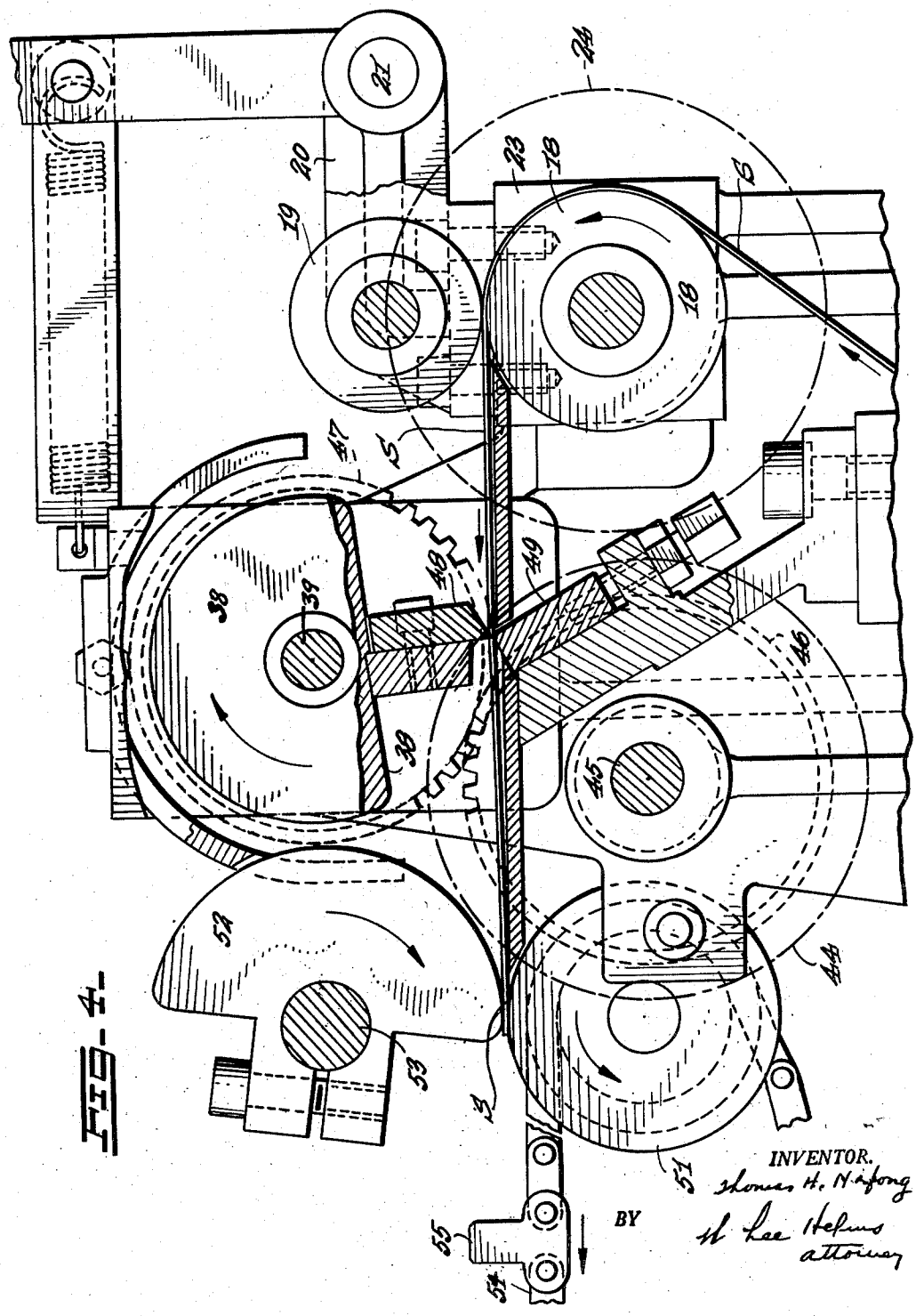


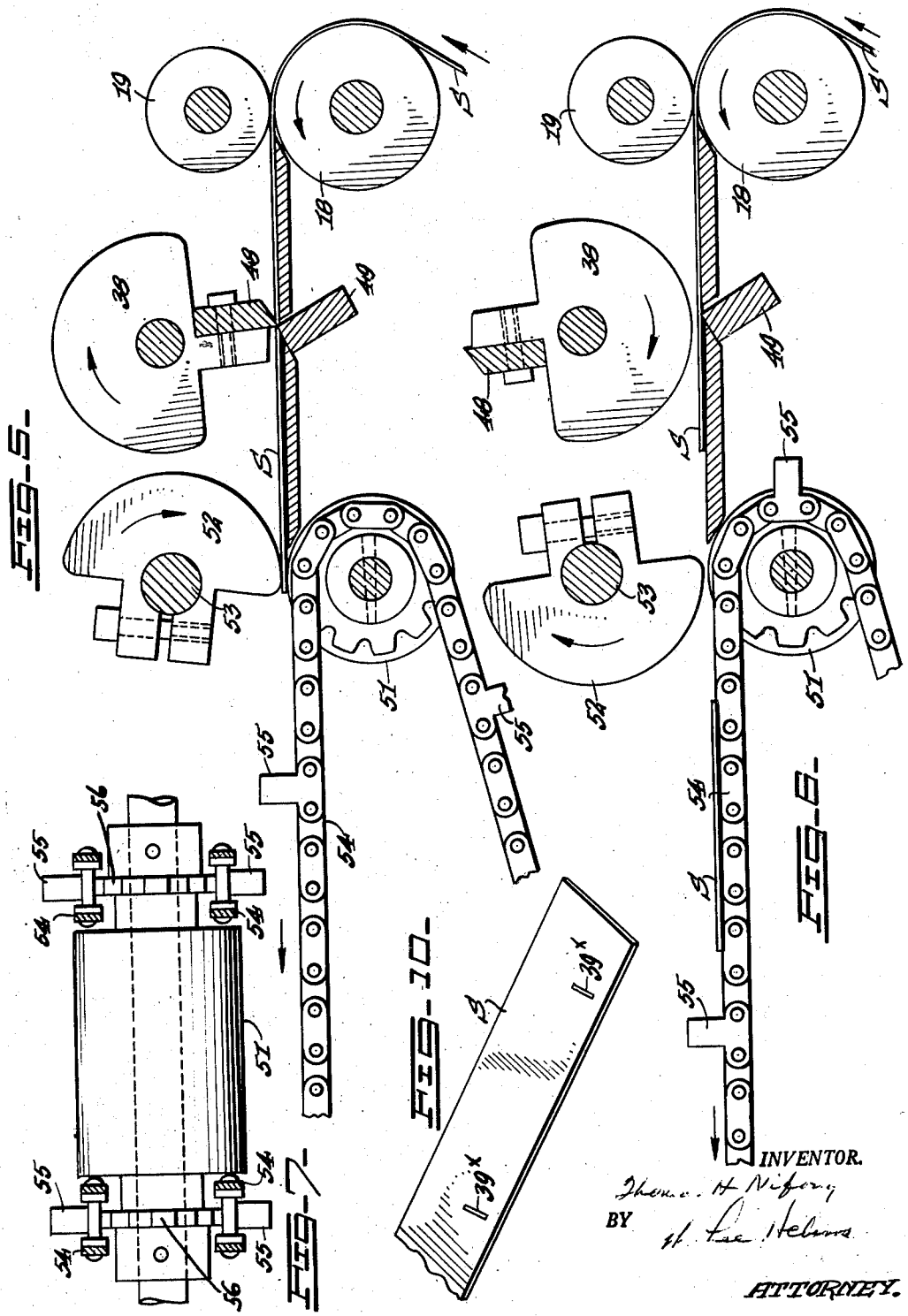
FIG. 4.

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LABEL ROLL CUTTING AND CONTROL-FEED MECHANISM FOR PACKAGING MACHINES

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2,802,529

LABEL ROLL CUTTING AND CONTROL-FEED MECHANISM FOR PACKAGING MACHINES

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Application June 26, 1953, Serial No. 364,329

1 Claim. (Cl. 164—68)

It has been common in cigarette packaging machines to successively feed labels from the base of a stack of cut labels, the feeding mechanism gripping and turning each label 180° and depositing it upon a carrier chain, the latter continuously moving to the label folding and wrapping devices for the cigarette packages. Periodic machine stoppages are encountered because of misses in the label feed, plural label feed, and jamming of the mechanism. It has been desired in the past to continuously feed a roll of labels with simultaneous cut-off and registration label deposit upon the chain, but unforeseen difficulties have caused various attempts to fail.

By means of the present invention, mechanism of demonstrated cure of the difficulties is provided.

The mechanism is characterized in part by mechanism arranged and separated into novel coacting groups, enabling easy and convenient separate adjustment, assembly and detachment, the said mechanism continuously feeding a strip from a roll, on which strip the labels will be printed in line. The mechanism cuts and deposits upon a feed or carrier chain, the labels in a special manner—wherein at the instant of complete cut, the severed label is rapidly carried away from the forwardly moving strip and in parallel with and upon the feed or carrier chain, the latter carrying the cut labels (in spaced relationship) to the folding and wrapping devices of the cigarette machine.

Other characteristics of the invention will appear from the following specification, with reference to the drawings. In the drawings:

Fig. 1 is a side elevation showing the general assembly of elements;

Fig. 2 is an enlarged partial front elevation looking from the rear in the direction of the line 2—2, Fig. 1;

Fig. 3 is a horizontal section on the line 3—3, Fig. 1, looking from the rear toward the front of the assembly;

Fig. 3*a* is a detail view in elevation showing the outlines of the planetary correction-drive assembly;

Fig. 4 is an enlarged vertical section on the line 4—4, Fig. 2;

Fig. 5 is an enlarged fragmentary side elevation showing the upper web feed and label cutter elements in association with the rapid label feed;

Fig. 6 is a view similar to Fig. 5 showing the elements in an advanced position;

Fig. 7 is a vertical section through the structure of Fig. 5;

Fig. 8 is a view in vertical section of the selector switch assembly and the associated end of the cutter shaft, the section being taken on the line 8—8, Fig. 9;

Fig. 9 is a front elevation of the selector switch assembly, the cover plate therefor being removed; and

Fig. 10 is a schematic view of a section of a suitable web or strip upon which label matter (not shown) will be printed in succession, the strip showing spaced electric eye responsive markings.

At A is shown a front angle frame member forming part of the cigarette packing machine (not shown).

Bolted to angle frame member A at spaced horizontal areas are two similar main brackets 1, one of which is shown in Fig. 1. In bearings provided by the main brackets and an auxiliary bracket 2 is a power takeoff shaft 3 carrying a sprocket 4 chain driven by a sprocket 5 on the cigarette packing, or other label applying, machine.

On shaft 3 is a gear 6 connected to a gear 7 on shaft 8. The latter shaft carries a double sprocket 9 which transfers, by chain 10, rotation to a cutter head, and, by chain 11, rotation to a planetary control therefor, later to be mentioned herein. Sprocket 9 is given one rotation for each rotation of power takeoff shaft 3.

The roll of strip on which the labels are successively printed is mounted on a reel 12 carried by a shaft 13 held by a depending bracket 14. The label strip is led over a sleeve-roller 15 on a shaft 16, held by the primary brackets 1, and thence over an idler sleeve 17 to a driven feed roller 18. As the label strip runs over feed roller 18, it is pressed down by a spring-loaded rubber faced roller 19 which has turned down stub ends rotating in the bearing ends of arms 20 on shaft 21, which in turn is journaled in brackets 22.

Feed roller 18 is turned down at its ends to provide stub shafts journaled in bearing boxes 23, Fig. 4. Facing the front of the assembly, th right-hand stub shaft on feed roller 18 carries a sprocket 24 driven by chain 25 (Fig. 1) led under an idler 26 on shaft 26*x*, thence over adjustable chain tightener sprocket 27, and to counterclockwise rotating sprocket 28 on the planetary gear shaft 29 (Fig. 3).

The planetary gear operation may be in principle the same as that shown in patent to Shoults et al., No. 2,151,570.

From one drive sprocket 9 (24 teeth) is led drive chain 11 to sprocket 30 on said shaft 29 in the planetary casing. In normal operation, shaft 29 is driven in the same speed ratio as the drive gear 9 for chain 11. Shaft 29 transmits rotation to its sprocket 28, over which chain 25 is led to the feed roller sprocket 24.

The planetary gear housing which is mounted for rotation carries a worm wheel 32 having 40 teeth in mesh with worm 33 on a shaft 34 (Fig. 3) which carries gear 35 driven by gear 36 on motor shaft 37. Worm 33 (Fig. 3*a*) normally holds the planetary gear housing P from rotation.

On one stub shaft of the cutter head 38 (Fig. 9) is a cam 39 which holds circuit breaker switch arm 40 of the selector switch assembly open for all but a brief period of revolution of the cutter head. The closing is timed to take place when a registration mark 39*x* (Fig. 10) on the label strip S reaches a predetermined point. Cam 39 is held in adjusted position on the cutter head shaft by a set screw 40*xx*. To give fine and exact adjustment, the switch casing 41 is flanged and the flange at top and bottom is formed with an arcuate slot 42. Two screw studs 43 pass through the slots into one of the two bracket arms for the cutter head shaft. By loosening the screws, the switch casing, with its switch arm 40 and contact 40*x* may be moved relatively to the cam, and hence finely adjusted to change timing.

From double sprocket 9 leads a chain 10 which drives sprocket 44 carried by stub shaft 45 (Fig. 2) on which is a gear 46 in mesh with a second gear 47 carried by the end of rotary cutter head 38.

On the cutter head 38 is an adjustable knife 48 which coacts with a blade 49 (Fig. 5) carried by an adjustable bracket 50 (Fig. 2).

Forwardly of the cutter head is a rubber faced label feed roll 51, above which is the label feed member 52 having an arcuate active surface extending 180°. This primary label feed member 52 may be on a shaft 53

driven from the cigarette packer by means not shown. However in the embodiment shown, it may be considered that feed roll **51** is an idler roller on feed chain assembly shaft and is rotated by contact with feed member **52**, and the cut label feed is at a speed much higher than that of the web and preferably 3⅓ times the web feed.

Forwardly of the label feed members **51** and **52** is the said chain label feed assembly consisting of two parallel chain members **54** carrying opposite and spaced feed lugs **55**. The spacing of the pairs of feed lugs is greater than the length of the label. Rearwardly, the chain members are mounted on sprockets **56**, Fig. 7, carried at opposite ends of the rubber faced feed roller **51**. Forwardly, the chain members extend into the cigarette packing machine and over idler sprockets or positively driven sprockets, not shown since they are outside the invention herein claimed.

The label strip when led into position relatively to the cutter preferably is so positioned that the photo-cell registration mark on the strip is set for label severance by the cutter at the exact predetermined line of cut. In the present embodiment, the feed roller **18** has a circumference twice that of the label length, and to maintain the predetermined position of label cut, the feed roller has such normal peripheral speed as to feed in each half revolution slightly less than a label length, preferably less 0.0015". In fine work the degree of accuracy as to the line of cut severing the printed label from its strip should be within 0.005". By means of the present invention, the control enables even less variance. The selector switch planetary gear motor and photocell scanning head may be connected together in a circuit by means well known in the art. The selector switch will be connected to a starting switch for the motor, and the photocell scanning head will be connected to a switch which will stop the motor.

With each half revolution of the feed roller, a label length of the strip, less .0015", is fed forwardly to the cutter. Inasmuch as there is an accepted tolerance of 0.005" at the line of cut, in the continued feed of the strip, after initial setting, three labels will be cut and then the tolerance will be exhausted. This means that the appropriate registration mark on the strip will be short of registration with the beam from the photo-cell scanning head at the instant the normally open selector switch arm is in circuit closing position. Therefore circuit is closed through the planetary motor and the planetary housing instantly is rotated to advance the strip to the minute but important degree that the registration mark is brought up to the beam and the planetary motor circuit instantly is opened. The internal planetary gear arrangement is standard and therefore is not illustrated.

As customary, the planetary motor is high speed, and each revolution of the worm is preferably made equivalent to 0.002" advance of the strip over and above the normal feed action of the feed roller. Thus, approximately two revolutions of the worm (six revolutions of the motor with a 3×1 ratio) will correct the registration. With a prepared planetary motor speed of 1,080 R. P. M., the correction is made in ⅓ second with a normal feed roller peripheral speed of approximately 444" per minute.

The superimposed unit assemblies and their drive are unique. All of the control feed and cutter elements are first removable from the top of the frame assembly as a unit, and the scanning head assembly may then be removed as a unit to expose the entire planetary assembly. Or the feed and scanning head assemblies may be removed

as one unit. The power is led to a single power takeoff shaft **8** which carries two sprockets, one for a chain-drive leading directly to sprocket **44** on a stub shaft **45** which gear-drives the cutter assembly **38, 39** and one for a second chain-drive leading to a sprocket **30** carried by planetary shaft **29** which, through sprocket **28**, drives chain **25** leading to the pull-off roll **18**. The relation of the planetary drive to both the cutter assembly **38, 39** and the pull off roll **18** has special utility in control and simplicity.

Summarizing the operation of the machine, the label web is drawn from its roll and guided to the roll **18** which may be characterized as a pull off roll. Coacting therewith is pressure roll **19** and pull off feed of the said rolls is joined with the action of a rotary cutter assembly with the member **38** which is partly cut away to leave an arcuate face and which, opposite said face, carries a cutter blade **48**. The label severed from the web by the cutter is quickly drawn away from the continuously moving web by means of the high speed intermittently acting feed assembly including member **52**, which is a roll cut partly away forming an arcuate feed surface extending approximately 180°. Perfect control is assured inasmuch as feed member **52** is driven in coaction with feed roll **51** so that it bites into the leading edge of the cut label at the instant of cutting (or slightly thereafter) for feeding to the chain. If the label size is varied the feed segment may bite into other than the leading edge. The instant of bite is the instant of cutting. If a feed roll instead of a feed segment were used, there would be no means by which the feed of the label could be synchronized with the cutting operation. If the label were picked up too late, it would be engaged by the leading edge of the web and if too early, it would cause serious tension since the label speed is 3⅓ times the web speed.

Having described my invention, what I claim and desire to secure by Letters Patent is:

In a web feeding and label cutting mechanism comprising web feed-in means, label cutting means and cut label feed-out means, the improvement which consists in a rotary cutter-carrier, a cutter blade carried thereby, means for rotating said cutter-carrier at the peripheral speed of the web feed-in means, and in combination therewith a coacting speed synchronized label feed-out means adapted to engage each cut label at the instant of cutting, a motor operated planetary gear adapted to increase the speed of the web feed to the cutter, a switch controlled by said cutter and adapted to start said motor, and a scanning beam device forward of said cutter and adapted to stop said motor.

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