Aug. 11, 1964 W. LIMBERGER 3,143,947

ACCESSORY APPARATUS FOR COPYING DEVICES AND A COPYING DEVICE THEREFOR

Filed Nov. 6, 1961 2 Sheets-Sheet 1

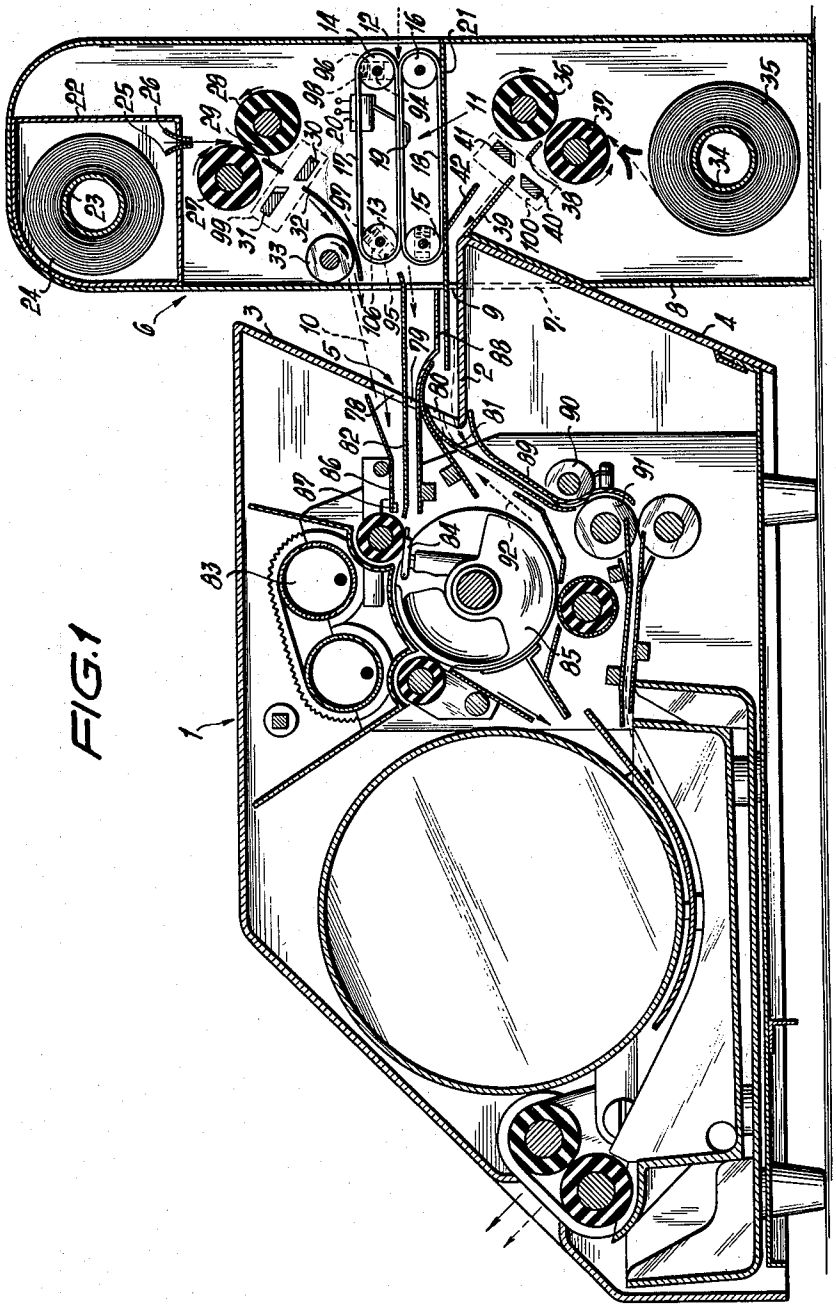


FIG. 1

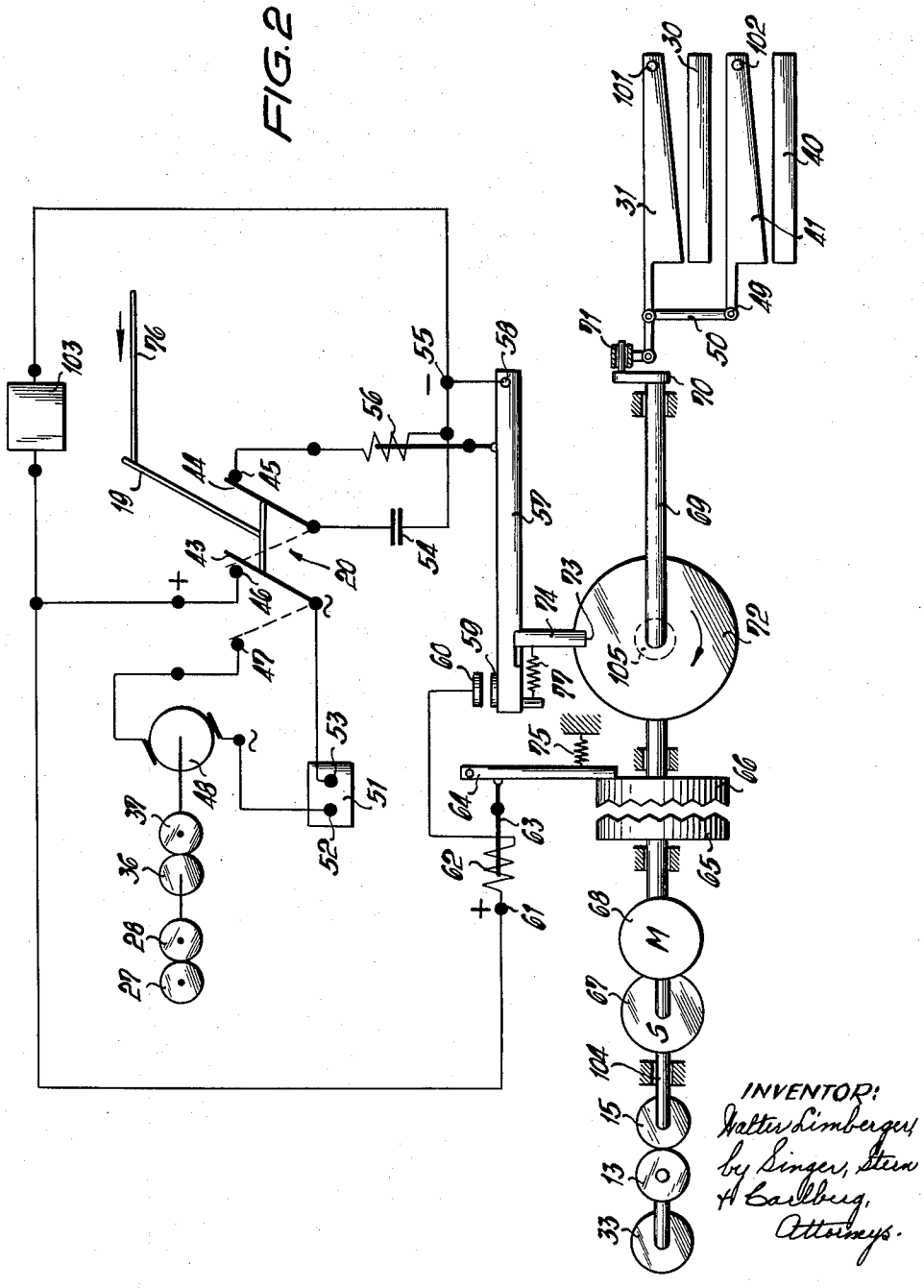
INVENTOR:
Walter Limberger,
by Singer, Stern & Carlberg,
Attorneys

Aug. 11, 1964 W. LIMBERGER 3,143,947

ACCESSORY APPARATUS FOR COPYING DEVICES AND A COPYING DEVICE THEREFOR

Filed Nov. 6, 1961 2 Sheets-Sheet 2

FIG. 2



United States Patent Office 3,143,947
Patented Aug. 11, 1964

3,143,947

ACCESSORY APPARATUS FOR COPYING DEVICES AND A COPYING DEVICE THEREFOR

Walter Limberger, Hamburg-Poppenbuttel, Germany, assignor to Lumoprint Zindler KG., Hamburg, Germany

Filed Nov. 6, 1961, Ser. No. 150,411
Claims priority, application Germany Nov. 18, 1960
12 Claims. (Cl. 95—75)

This invention relates to an accessory apparatus, or an attachment unit, for copying devices processing sheet material comprising at least one layer carrier and one original.

Prior art copying devices for sheet material require that the original and at least one layer carrier be introduced simultaneously. In many cases the layer carrier is light sensitive and must, prior to processing, be removed out of a package or container which is substantially light proof. This layer carrier must then be introduced into the device as quickly as possible to avoid exposure to light. In this procedure the simultaneous introduction of the original and the layer carrier requires a substantial degree of skill, particularly when the original and the negative layer carrier must be introduced through two separate slots. The difficulties increase when at the same time an additional layer carrier, a so called positive layer carrier, must be introduced which for example is required when copies are made by using the diffusion method.

In establishments where mass production of copies is not required it is often satisfactory to introduce precut layer carriers with the original. However, in cases where a large number of copies are to be produced in swift succession it becomes desirable to provide means whereby introduction of the originals automatically causes the required number and sizes of layer carriers to be introduced in proper sequence. Machines of this kind are expensive, and in establishments using a large number of copying machines the cost would be prohibitive in every case where the manual procedure is normally satisfactory and the increased capacity is required only occassionally.

It is particularly in establishments of the last mentioned type—which are very common—that the advantages of the present invention become of especially great and pronounced importance, in that the establishment can be equipped with a large number of relatively simple and inexpensive copying machines excellently serving the normal needs, while a single attachment unit according to the invention can be used in order to swiftly and conveniently convert any one of said simple machines into an instrument for more or less pronounced mass production of copies. Experience has shown that the savings in cost, including the rationalizing through time saving, are remarkable.

Accordingly, a primary object of the invention is to provide an attachment unit of the kind set forth which eliminates the abovementioned disadvantages attendant to prior art installations for similar purposes.

Another object of the invention is to provide an attachment unit of the kind indicated in which all operations are accomplished automatically by merely introducing the originals therethrough.

Other objects and advantages of the invention will be evident from the following description of an embodiment thereof shown in the accompanying drawings, in which:

FIG. 1 is a diagrammatic side view of the accessory apparatus according to the invention and a sectional view of an associated copying device, and

FIG. 2 is a diagram showing various control circuits and coupling devices for the accessory apparatus.

The copying device 1 shown in FIG. 1 comprises a

front wall consisting of a horizontal table 2, an upwardly and forwardly inclined wall section 3, and a downwardly and rearwardly inclined wall section 4. Above the table 2 slots 5 for introducing the sheets are arranged.

The copying device 1 shown in the drawing for illustrative purposes only is of the diffusion type but this is not to be taken as a limitation upon the utility of the inventive unit which may be used with equal advantage in combination with copying devices operating on different principles.

The accessory apparatus 6 of the illustrated advantageous embodiment is arranged in such a way that the table 2 and the projection of the device formed thereby extend into an aperture, or recess 7 of a housing 8 of the accessory apparatus 6.

This arrangement makes it easy to find the correct relative position of the copying device and attachment unit and at the same time offers the possibility of arranging suitable latching means for releasably connecting the housing 6 to the device 1. The projection formed by the projecting wall section 3 of the housing of the device 1 at the same time screens the table 2 and associated parts against light from above.

The invention may include a guide surface 10 extending from the upper edge of the outlet opening 9 in the housing 8 to or into the upper edge of slot 5.

A transport path 11 extends from the inlet opening 12 to the outlet opening 9 through the housing 8 in a plane corresponding substantially to that of the slot arrangement 5 of the copying device 1. In the illustrated embodiment this transport path is formed by an upper and a lower guide element, preferably comprising endless belts guided over rolls 13, 14 and 15, 16, respectively.

One roll of each pair of rolls 13, 14 or 15, 16, respectively, may be supported displaceably, and may be subjected to the action of a spring. The runs of the endless belts 17, 18 which are facing each other are in contact with each other, thereby providing for a defined guidance of the original.

According to FIG. 1 for example, the rolls 13, 14 are journalled in bearing blocks 106, 94. In the side walls, or intermediate walls, of the housing 8, which are not illustrated, slots 95, 96 are provided for displaceably receiving said bearing blocks. Springs 97, 98 are provided in to these slots which are acting upon the bearing blocks in such a way that the belts are tensioned, and that the rolls 13, 14, or 15, 16 respectively, are yieldingly urged against each other as well. In order to simultaneously urge the roll 13 against the roll 15 and to tension the belt 17 the guide slot 95 for the bearing block 106 is arranged in an inclined position.

In the zone of the transport path a release element is provided in form of an actuating member 19 of a micro switch which actuating member 19 extends across the transport paths of the original defined by the runs of the belts which are in contact with each other. By means of this arrangement it is also possible to process extremely thin originals without risking any failure in actuating the actuating member 19.

Below the lower guide element formed by the rolls 15 and 16 and the belt 18 a guide member 21 is arranged in such a way that the run of the belt 18 moving towards the inlet opening 12 glides on this surface. By means of this a transporting device for returning the original is obtained.

Above the transport path, for example, a spool box 22 is arranged in the upper part of the housing 8. Within this spool box 22 a supply spool with a web of negative layer carrier 24 wound thereon is journalled preferably under slight braking action, for example by sliding engagement of a brake shoe on the shaft of the spool. The web is moved out of the spool box through an outlet slot. This

outlet slot, for example, is provided with resilient sealing strips 25, 26, thereby sealing the spool box in a light proof manner.

Somewhat below the outlet slot of the spool box 22 a pair of transport rollers 27, 28 are arranged, between which the layer carrier web is guided. At least one of these rollers is driven and the direction of rotation of each roller is shown by an arrow.

The transport rollers 27, 28 are journalled in bearings arranged in the side walls, or intermediate walls, of the housing 8. The drive means may be arranged in a known manner behind an intermediate wall extending in a plane parallel to the plane of the drawing, the drive shafts extending through the intermediate wall. The function and the assignment of the drive means are illustrated in FIG. 2. The transport rollers 27, 28 are provided with an elastic surface.

A guide member 29 is mounted adjacent to these rollers 27, 28 and is inclined downwardly towards the outlet opening 9. At the lower end of the guide member 29 a cutting device is provided formed, for example, out of a fixed knife 30 and a movable knife 31 adapted to sever the layer carrier web upon actuation. Below the cutting device a second guide member 32 starts, which terminates slightly below the upper edge of and within the outlet opening 9.

The cutting device with the knives 30, 31 comprises a frame 99 in which the required, not illustrated lever members and bearing means for effecting the cutting movement are disposed. The frame is mounted within the housing 8. The arrangement of the knives is diagrammatically illustrated in FIG. 2.

In order to screen the space portion of the housing 8, within which the light sensitive negative layer carrier is arranged, against light through the outlet opening 9 a roller 33, driven in the direction indicated by the arrow, may be arranged above the guide member 32 and in close proximity thereof, thereby providing a transporting action, and at the same time screening the gap in the outlet opening 9 above the guide member 32. In the illustrated, particularly advantageous embodiment a supply spool 34 with a web of positive layer carrier 35 wound thereon is arranged in the lower part of the housing 8. This spool 34 is rotatably journalled against a slight brake action caused, for example, by a brake shoe sliding on the shaft of the spool. Between the spool 34 and the outlet opening 9 substantially similar elements are arranged having the same function as those arranged between the outlet opening 9 and the spool 23. These parts include a pair of transport rollers 36, 37 corresponding to the pair of transport rollers 27, 28, guide members 38, 39, the fixed knife 40 and the movable knife 41, which are arranged in the structure 100 and are provided with the bearing, guide and drive means necessary for their functioning.

In addition a further guide member 42 may be provided for guiding the positive layer carrier to the lower side of the guide member 21.

All movable parts are journalled in side wall sections of the housing 8. The required drive means are mounted on these side walls and, for example, are arranged within a lateral chamber. Furthermore the side walls may be provided with openings for introducing supply spools, or the spool box 22 may be removable as a whole.

In FIG. 2 are illustrated: The actuating member 19 of the micro switch 20 which comprises, as may be seen, two switching arms 43 and 44, two contacts 45, 46 being assigned to the switching arm 44, and only one contact 47 being assigned to the switching arm 43; the pairs of rollers 27, 28 and 36, 37 which are coupled with the drive motor 48 in a schematically illustrated manner; the fixed and the movable knives 30, 31 and 40, 41 respectively, the movable knives being pivotally connected at 101 and 102 to the structures 99 and 100. A source of electric power is indicated at 51 and has one pole 52 directly connected to the motor 48, while the other pole 53 is connectible to the motor via the contact arm 43 and the contact 47. The other contact arm 44 is connected with the condenser 54 which on the other hand is connected with the negative pole 55 of a D.C. source not illustrated. Between the D.C. source and the contact 45 the coil of a solenoid 56 is connected, the armature of which is connected with a pivotal switch lever 57. The switch lever 57, for example, is pivotally supported at 58 and made out of conductive material and connected with the negative terminal 55. The switch lever carries at its free end a contact plate 59 to which a counter contact 60 is assigned which is engaged by the plate 59, when the switch lever 57 is pivoted. Between the counter contact 60 and the positive terminal 61 of the D.C. source 103 the coil of another solenoid 62 is arranged. The armature 63 of this solenoid is connected with a pivotal actuating lever 64, which serves to actuate a clutch 65, 66. After the appartaus has been switched on the driving part 65 of this clutch is constantly driven by a motor 68 which either has a great working load, or is provided with a flywheel 67. The driven part 66 of the clutch is connected with a shaft 69, at the end of which a crank 70 is mounted for actuating the movable knives 31, 41 by means of the rods 49, 50. The crank pin of the crank 70, for example, is guided within a coulisse having a transverse slot 71 corresponding to the double eccentricity of the crank.

Advantageously a slotted disc 72 is fixedly arranged on the shaft 69 and has a peripheral notch 73 engaged by a projection 74 mounted on the switch lever 57.

The clutch 65, 66 is designed in such a way that it is normally disengaged. For this purpose a spring 75 is provided acting upon the actuating lever 64.

In the illustrated normal position the condenser 54 is short circuited via the coil 56. The motor 68 rotates in such a direction that the disc 72 after the clutch has been engaged is driven in a sense illustrated by the arrow.

It is to be understood that, when the motor 68 is started, the drive elements of the transport path 11 are also started. This is schematically disclosed in FIG. 2 by coupling, for example, the shaft 104 of the motor 68 with the rolls 13 and 15, and also with the roll 33. If an original 76, which is introduced in a direction indicated by the arrow, pivots the actuating member 19 the motor 48 is started by being connected to the source of energy 51, whereby the corresponding layer carrier webs are pulled off from the supply spools by the roller pairs 27, 28, 36, 37 and transported into the inlet slot arrangement 5.

The flipping of the switch also causes the switch arm 44 to engage the contact 46 which communicates with the positive terminal of the not illustrated D.C. source. Thereby the discharge circuit of the condenser 54 is opened, so that the condenser is charged by the D.C. source 55, 93.

When the trailing edge of the original releases the actuating member 19, the switch 20 returns to the illustrated initial position. By stopping the motor the roller pairs 27, 28, 36, 37 are stopped. The discharge circuit for the condenser 54 is closed, whereby the solenoid 56 pivots the switch lever 57. Thereby the projection 74 is removed from the notch 73 and the solenoid 62 is energized over contacts 59, 60 causing the actuating lever 64 to pivot, thereby engaging the clutch 65, 66, whereby, due to the rotation of the shaft 69 and the crank 70, the knives 31, 41 are actuated. The discharge current of the condenser 54 is of very short duration, so that the projection 74 will rest upon the circumference of the disc 72, before the slot 73 returns to its initial position the projection 74 engages the notch 73 again and arrests the shaft 69. Due to the earlier deenergization of the solenoid 62, after the deenergization of the solenoid 56, the clutch 65, 66 is already released. Due to the flywheel 67 the impulse transmitted to the shaft is sufficient to perform the cutting operation.

In view of the short duration of the discharge current

of the condenser means are provided to prevent latching of the disc **72** prior to its start. For example, the projection **74** is displaceably guided in parallel direction to the axis of the switch lever **57**, and is subjected to the action of a spring **77** pulling the projection, after its release, towards the left opposite to the rotating direction of the disc. The same purpose may be achieved, if the disc **72** is mounted in such a way that it may rotate a small amount in the direction of the arrow, and is subjected to a corresponding spring action, since in this case the release of the projection **74** will immediately cause a forward movement of the notch **73** out of alignment with the projection **74**. A bearing provided for this purpose is shown in dashed lines at **105**. The bearing **105** consists of two parts, one being fastened to the disc **72**, while the other is fastened on the shaft **69**, the parts being rotatable relative to each other a limited amount and having a spring provided between them to urge the parts to one end position of the limited relative movement path.

The spring **77**, or a corresponding spring in the bearing **105** at the same time dampens the shock caused by the engagement of the projection **74**. This arrangement is characterized by safety in operation and small expenditure.

Now FIG. 1 is referred to again. It will be noted that the arrangement of the introduction slots **5** practically comprises four slots, namely the introduction slot **78** for the negative layer carrier, the introduction slot **79** for the original, the introduction slot **80** for the positive layer carrier, and the outlet slot for the original arranged between the slots **79** and **80**, said outlet slot being closed by a pivotal guide plate **81** in the illustrated position. A guide element **82** is arranged between the slots **78** and **79** extending into the zone of a freely movable transport element **85** in the exposure device **83**. This transport element **85** comprises a rotating disc with a pivoted clamping lever **84** which during the exposure moves with the original and the negative layer carrier lying therebetween. A permanent magnet **87** is arranged on a guide element **86** disposed above the guide element **82** near the clamping lever **84**, which is made of magnetizable material, the permanent magnet **87** serving to prevent bouncing vibrations, when the freely rotatable clamping lever returns to its initial position.

Below the slot **79** and above the table **2** a downwardly curved guide element **88** is arranged screening the outlet slot for the original towards the front, which outlet slot is illustrated as being closed. The guide member **21** of the accessory apparatus extends below the guide element **88** defining the guide paths for the positive layer carrier above the table **2** into the slot **80**, and for the returning original between the guide element **88** and the outwardly extending end of the guide element **21**. The positive layer carrier enters the device **1** through the slot **80** between the guide elements **81** and **89** and reaches a roll arrangement **90**, **91**, of which the roll **91** takes over the further transport. The roll **90**, for example, is formed with circumferential grooves into which comb-like projections of the pivotal guide elements **81** extend. When the roll **90** is driven in a direction for advancing the positive layer carrier, the comb-like end of the guide element **81** is lifted out of the circumferential grooves upon passing of a positive layer carrier, whereby the upper end of the guide element **81** is lowered relative to guide element **88**, thereby opening an outlet opening for the original returning in the direction as indicated by the arrow, after it has been exposed. The original then moves back on the guide element **21** and below the belts **18** to the inlet opening **12**.

Many modifications are possible. For example, the roll **90** may be driven by the passing positive layer carrier, and may also be provided with a cam for pivoting the guide element **81**. Instead of the motors **48**, **68** a single motor may be provided to selectively actuate the pairs of rollers **27**, **28** and **36**, **37** on the one hand, or to drive the shaft **69** on the other hand by means of a double acting clutch. Furthermore it should be noted that between the outlet opening **9** on the one hand, and the knives **40**, **41** or **30**, **31** respectively, as well as the actuating member **19** on the other hand equal lengths of the paths are provided.

Although the illustrated embodiment is especially advantageous it is not intended to limit the invention thereto. The range of the invention is determined by the claims, within the scope of which changes and modifications, familiar to those skilled in the art, may be made without departing from the scope of the invention.

What is claimed is:

1. A removable attachment unit for feeding copying sheet material into a copying machine having an inlet aperture for said material, said attachment unit comprising a housing, a pair of oppositely disposed walls in said housing with a feed opening for an original in one of said walls and an outlet opening in the other wall on a level with and facing said inlet aperture of the copying machine, means in said housing for conveying the original from said feed opening to said outlet opening for introduction into said copying machine through said inlet aperture thereof, drive means for said conveying means, means in said housing rotatably supporting at least one roll of layer carrier web, means in said housing for unwinding said web from said roll, guide means in said housing for guiding the unwound web portion to said outlet opening for introduction into the copying machine through said inlet aperture thereof, cutting means in the path of said web from said unwinding means to said outlet opening for severing a length of said web, drive means for said unwinding means and cutting means, and actuator means in the path of said original through the housing for controlling the starting and stopping of said last mentioned drive means, the arrangement being such as to cause the leading edge of said original and the leading edge of said severed length of web to enter the copying machine substantially simultaneously.

2. The attachment unit as set forth in claim 1, in which said conveying means is adapted to receive said original upon return thereof through said inlet aperture of the copying machine and to return it to said feed opening of the housing for discharge therethrough.

3. The attachment unit as set forth in claim 1, in which said guide means extends to said outlet opening and thereby divides said outlet opening into separate slots for the web and the original, means defining a transport roller rotatably mounted in said housing adjacent said outlet opening and said guide means, and means operatively coupling said transport roller with said drive means for the conveying means, whereby said transport roller cooperates with said guide means to move said web through said outlet opening of the housing.

4. An accessory apparatus for copying devices for processing sheet material including an original and at least one layer carrier, comprising a housing arranged in front of inlet means of a copying device, storage means within said housing for said layer carrier, pull-off means for said layer carrier associated with said storage means, cutting means within said housing associated with said pull-off means, a channel extending through said housing, guide and transport means in said housing for transporting said original through said channel, first drive means for said guide and transport means, second drive means for said pull-off means and cutting means, release means extending into the path defined by said guide and transport means for the original so as to cause said release means to be actuated by a passing original, and coupling means between said release means and said second drive means for releasing said pull-off means and cutting means in dependence upon the position of said original in said channel, said channel extending transversely through said housing and having first opening means for introducing said original and second opening means facing said inlet

means of the copying device for discharge of said original and a severed length of said layer carrier into said inlet means of the copying device, the paths for said original from said release means to said second opening means and for said layer carrier from said cutting means to said second opening means being of equal length, whereby said severed length of layer carrier and said original will leave said housing together through said second opening means.

5. The apparatus as set forth in claim 4, in which said guide and transport means comprises an upper guide and transport element, a lower guide and transport element, means movably supporting said upper and lower guide and transport elements in said housing in contact with each other for transporting said original between them past said release means, and a guide member disposed below said lower guide and transport element for coaction with said lower guide and transport element in returning said original through said channel.

6. The apparatus as set forth in claim 4, in which said guide and transport means comprises an upper endless belt, a lower endless belt, two rollers rotatably mounted in said housing supporting each of said upper and lower endless belts with one bight of said upper endless belt in engagement with one bight of said lower endless belt, means drivingly connecting at least one of said rollers with said first drive means, means for tensioning said upper and lower endless belts, and means connected with the rollers supporting one of said endless belts for yieldingly urging said last mentioned rollers against the rollers supporting the other endless belt.

7. The apparatus as set forth in claim 6, in which a guide member extends through said housing within said channel and in such close proximity to the lower bight of said lower endless belt as to cooperate with said lower bight in returning said original through said channel, said guide member being provided with an extension which projects through said second opening means to the outside of said housing.

8. An accessory apparatus for copying devices for processing sheet material including an original and at least one layer carrier, comprising a housing arranged in front of inlet means of a copying device, storage means within said housing for said layer carrier, pull-off means for said layer carrier associated with said storage means, cutting means within said housing associated with said pull-off means, a channel extending through said housing, guide and transport means in said housing for transporting said original through said channel, first drive means for said guide and transport means, second drive means for said pull-off means and cutting means, release means extending into the path defined by said guide and transport means for the original so as to cause said release means to be actuated by a passing original, coupling means between said release means and said second drive means for releasing said pull-off means and cutting means in dependence upon the position of said original in said channel, said channel extending transversely through said housing and having first opening means for introducing said original and second opening means facing said inlet means of the copying device for discharge of said original and a severed length of said layer carrier into said inlet means of the copying device, the paths for said original from said release means to said second opening means and for said layer carrier from said cutting means to said second opening means being of equal length, whereby said severed length of layer carrier and said original will leave said housing together through said second opening means, said second drive means comprising an electric motor, first conduit means defining a first control circuit for said electric motor, second conduit means defining a second control circuit for actuation of said cutting means, a microswitch, actuating means for said microswitch connected with said release means, a first switch arm in said microswitch for control of said first control circuit, a second switch arm connected with said first switch arm to move therewith for control of said second control circuit, means defining a normally open clutch between said cutting means and said first drive means, actuating means for engaging said clutch for the duration of one complete revolution thereof, a switch lever for energizing said actuating means, and a solenoid in said second control circuit for actuation of an armature connected with said switch lever, whereby closing of said first and second control circuits by said microswitch causes operation of said pull-off means and release of said clutch.

9. The apparatus as set forth in claim 8, including a condenser connected in parallel with said solenoid in said second control circuit and normally short-circuited by said second switch arm, and a source of electric energy in said second control circuit, said second switch arm being switched by the engagement of the leading edge of a moving original with said release means into a position closing said second control circuit and breaking said short-circuit thereby causing said condenser to be charged by said source of electric energy, disengagement of the trailing edge of said original from said release means causing return of said second switch arm to its normal position and thereby re-establishment of said short-circuit for discharge of the condenser through said solenoid.

10. The accessory apparatus for copying devices for processing sheet material including an original and at least one layer carrier, comprising a housing arranged in front of inlet means of a copying device, storage means within said housing for said layer carrier, pull-off means for said layer carrier associated with said storage means, cutting means within said housing associated with said pull-off means, a channel extending through said housing, guide and transport means in said housing for transporting said original through said channel, first drive means for said guide and transport means, second drive means for said pull-off means and cutting means, release means extending into the path defined by said guide and transport means for the original so as to cause said release means to be actuated by a passing original, coupling means between said release means and said second drive means for releasing said pull-off means and cutting means in dependence upon the position of said original in said channel, said channel extending transversely through said housing and having first opening means for introducing said original and second opening means facing said inlet means of the copying device for discharge of said original and a severed length of said layer carrier into said inlet means of the copying device, the paths for said original from said release means to said second opening means and for said layer carrier from said cutting means to said second opening means being of equal length, whereby said severed length of layer carrier and said original will leave said housing together through said second opening means, said second drive means comprising an electric motor, first conduit means defining a first control circuit for said electric motor, second conduit means defining a second control circuit for actuation of said cutting means, a microswitch, actuating means for said microswitch connected with said release means, a first switch arm in said microswitch for control of said first control circuit, a second switch arm connected with said first switch arm to move therewith for control of said second control circuit, means defining a normally open clutch between said cutting means and said first drive means, actuating means for engaging said clutch for the duration of one complete revolution thereof, a switch lever for energizing said actuating means, and a solenoid in said second control circuit for actuation of an armature connected with said switch lever, whereby closing of said first and second control circuits by said microswitch causes operation of said pull-off means and release of said clutch, said clutch comprising two normally disengaged clutch members,

means connecting one of said clutch members with said first drive means, a rotatably mounted shaft connected with the other clutch member, a disc carried by said shaft and being provided with a notch in its periphery, a projection on said switch lever for engagement in said notch to prevent rotation of said disc, an actuating member engaging said other clutch member, means in said second control circuit for moving said actuating member to clutch engaging position upon actuation of said switch lever to withdraw said projection from said notch, and means operatively connecting said shaft with said cutting means, whereby withdrawal of said projection from said notch and engagement of said clutch causes operation of said cutting means.

11. The apparatus as set forth in claim 10, including means connecting said projection with said switch lever for limited movability of said projection lengthwise of said switch lever, and spring means connected with said projection and said switch lever biasing said projection in the direction opposite to the direction of movement

of the adjacent peripheral portion of said disc, whereby said biasing means serves as a brake upon said disc for a limited end portion of the rotation thereof.

12. The apparatus as set forth in claim 10, including a bearing member secured to said shaft, another bearing member secured to said disc and cooperating with said first mentioned bearing member to permit limited rotation of said disc on said shaft, and spring means secured to said two bearing members and biasing said disc in the rotary direction of said shaft, whereby said spring means serves as a brake on said disc during a limited end portion of the rotation thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

2,762,176	Knapp et al.	Sept. 11, 1956
2,793,574	Unterberger	May 28, 1957
2,883,929	Eichenbaum et al.	Apr. 29, 1959
2,999,342	Keely et al.	Sept. 12, 1961
3,033,095	Limberger	May 8, 1962