July 28, 1964 E. G. HOERNEMANN 3,142,304

TOBACCO STRIPPER AND BUNDLER

Filed Dec. 19, 1962 3 Sheets-Sheet 1

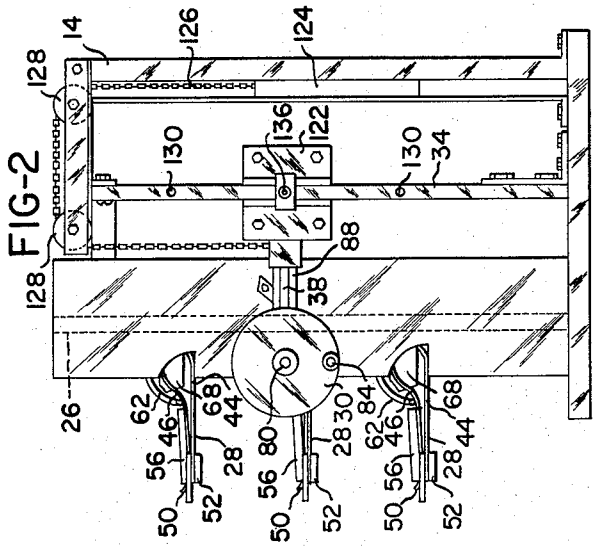


FIG-2

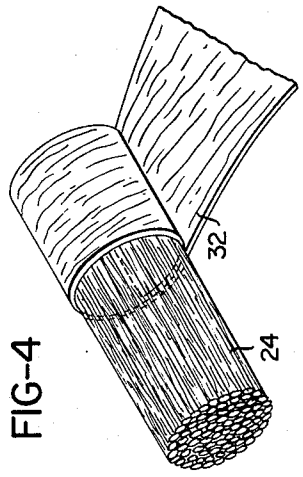


FIG-4

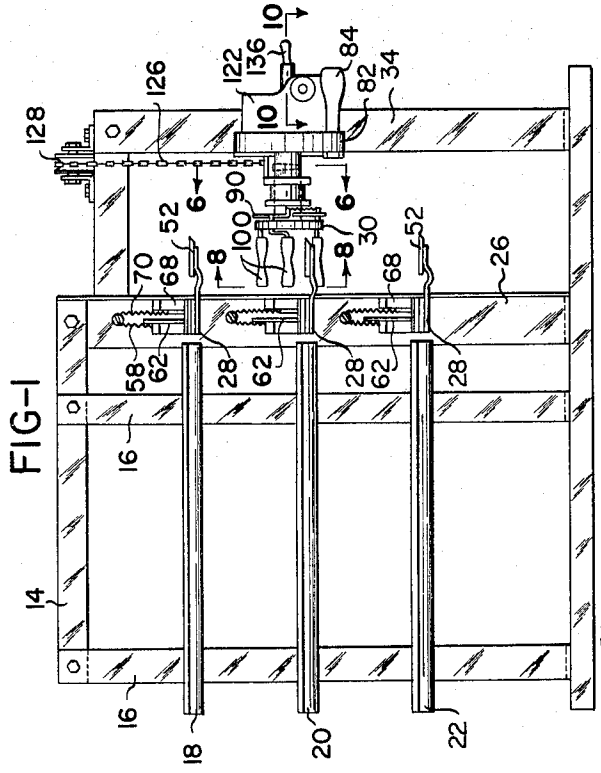


FIG-1

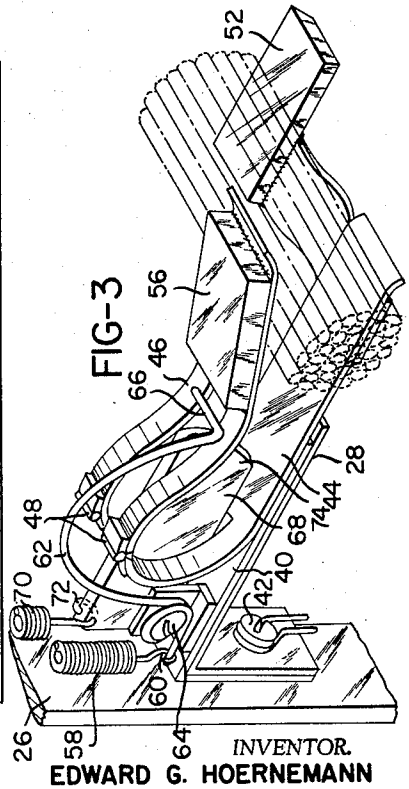


FIG-3

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TOBACCO STRIPPER AND BUNDLER

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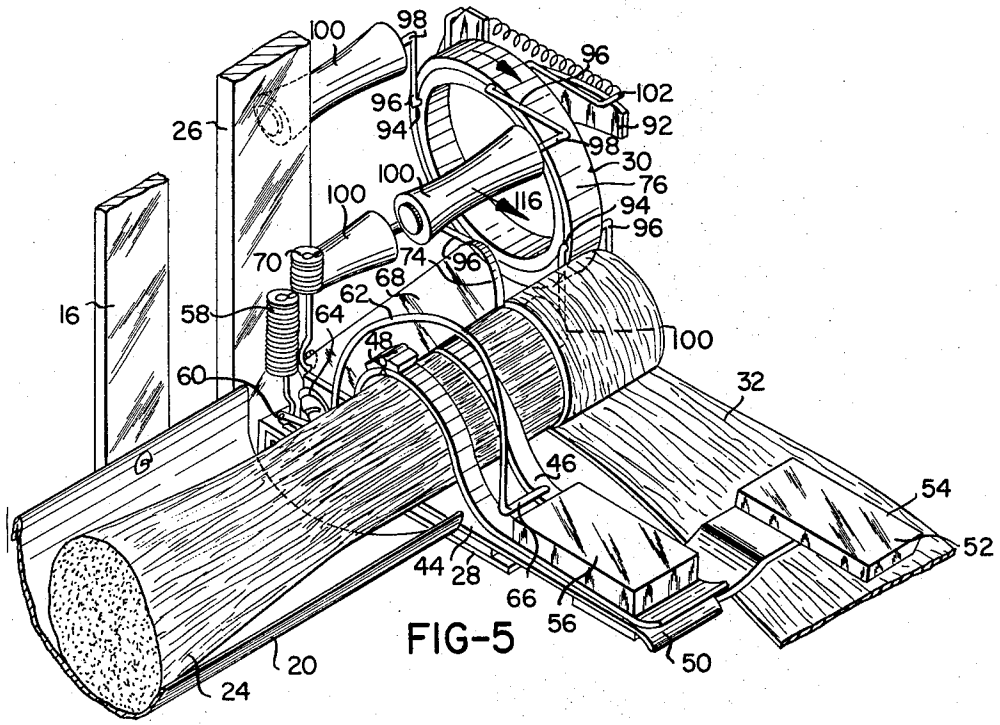


FIG-5

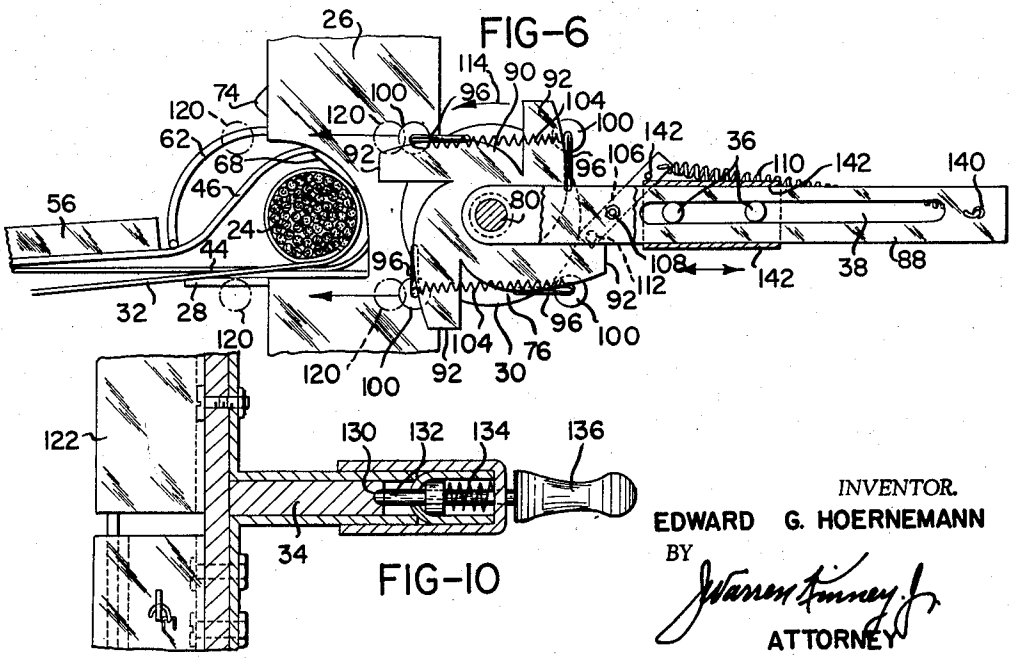


FIG-6

FIG-10

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TOBACCO STRIPPER AND BUNDLER

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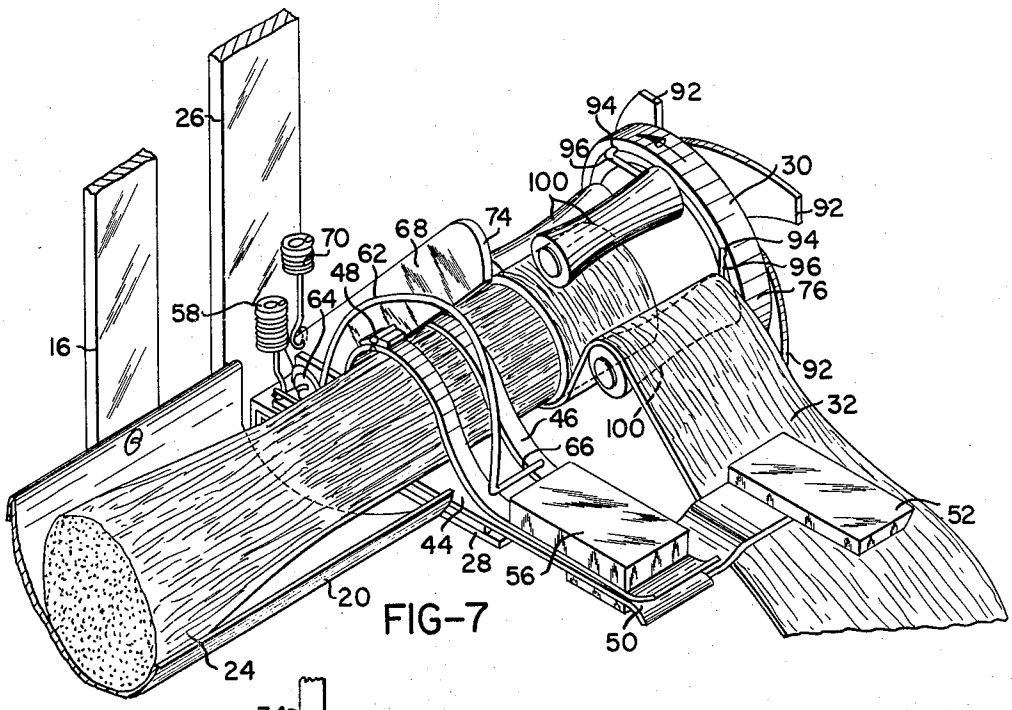


FIG-7

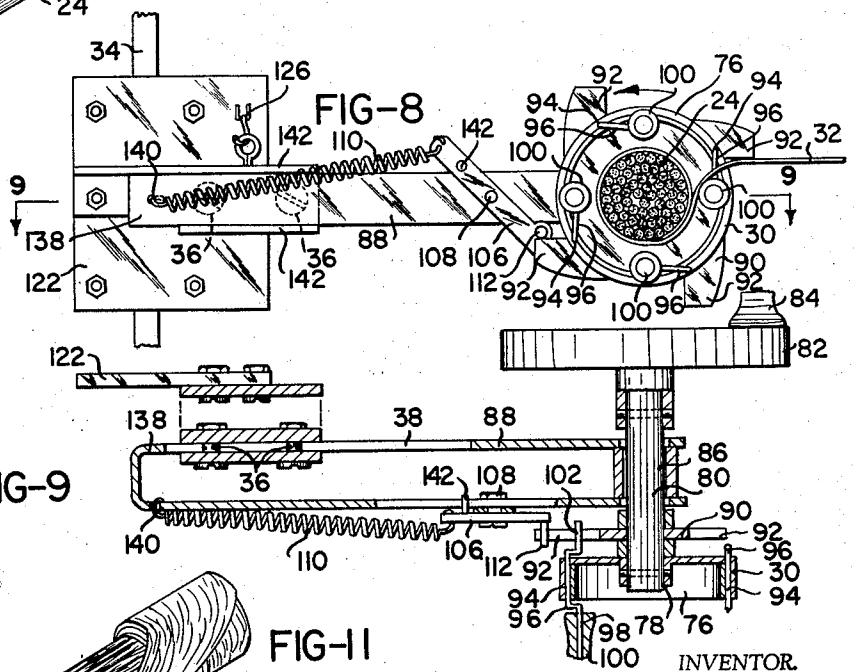


FIG-8

FIG-9

FIG-11

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United States Patent Office

3,142,304

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3,142,304

TOBACCO STRIPPER AND BUNDLER

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Filed Dec. 19, 1962, Ser. No. 245,766
16 Claims. (Cl. 131—149)

The present invention relates to a tobacco stripper and bundler in the form of a machine designed as an aid in removing the stems and forming the leaves of tobacco into hands, and in grading the leaves.

An object of the invention is to expedite and facilitate the work of tobacco stripping, bundling, and grading.

Another object is to provide simple and economical means for the purpose stated, and for promoting convenience in the operation.

The foregoing and other objects are attained by the means described herein and illustrated upon the accompanying drawings, in which:

FIG. 1 is a front elevational view of the device embodying the present invention.

FIG. 2 is an end elevation of the same.

FIG. 3 is a perspective view, on an enlarged scale, showing details of a leaf accumulator unit forming part of the invention.

FIG. 4 is a perspective view showing a hand of tobacco undergoing application of a leaf wrapper.

FIG. 5 is a fragmental perspective view showing the apparatus and a tobacco hand poised for manipulation to a wrapping phase of operation.

FIG. 6 is an enlarged cross-section taken on line 6—6 of FIG. 1.

FIG. 7 is a view similar to FIG. 5, showing the hand undergoing wrapping.

FIG. 8 is a fragmental elevation on an enlarged scale, taken on line 8—8 of FIG. 1.

FIG. 9 is a cross-section taken on line 9—9 of FIG. 8.

FIG. 10 is a fragmental enlarged cross-section taken on line 10—10 of FIG. 1.

FIG. 11 is a perspective view of a completed hand of tobacco as produced with the aid of the instant apparatus.

Tobacco stripping as generally understood in the trade consists in pulling the ripened leaves from the plant, breaking off the stems, arranging the de-stemmed leaves in hands and bundling or wrapping an end thereof using a leaf as the wrapper. Incidental to the process, the leaves of the plant are graded, and each hand is formed using a single grade of tobacco. The device of the present invention is designed to facilitate and expedite the stripping and bundling procedure so as to save time and labor, and remove certain inconveniences which heretofore attended the procedure.

With reference to the accompanying drawings, 14 indicates an upright frame including a pair of spaced parallel upright bars 16 to which are fixed a plurality of trays 18, 20, 22, for supporting tobacco leaves 24 compiled thereon to form a hand. The trays are mounted preferably in horizontal position upon the frame, and are spaced apart one above another. Each tray may be concave in form as illustrated by FIG. 5, and is of such length as to support the leaves placed longitudinally thereon in the course of grading, each tray holding a different grade of tobacco leaves.

The tobacco plant yields leaves of different grades, and these are determined by an attendant who upon examination places the proper leaves upon the proper trays for effecting the separation desired. As the attendant compiles the tobacco leaves upon the several trays, he breaks off and discards the major parts of the stems beyond the leaves, as will be explained.

Upon an upright standard 26 of the frame, and arranged in spaced parallelism with uprights 16, are mounted several identical accumulators 28 which hold and gauge the compilation of de-stemmed leaves fed thereto by the attendant in forming the hands of tobacco. An accumulator is located at an end of each support tray in alignment therewith, so that any given compilation of leaves is supported partly by a tray and partly by an accumulator, FIG. 7.

The apparatus includes means in the form of a winder 30 for winding a wrapper 32 about the de-stemmed end of the hand of leaves 24. The wrapper may be a tobacco leaf, which, of course, is pliable when removed from the plant. The winder, of which only one is needed, may be mounted upon an upright post 34 of the frame, for sliding movement vertically to several positions corresponding to the elevations of the several trays and their accumulators 28. Thus, if a wrapper is to be applied to a hand of tobacco resting upon tray 20, for example, the winder will be shifted along post 34 to a position in alignment with tray 20, where it will be fixed during the wrapping procedure. The winder similarly may be aligned with and fixed relative to any other tray upon which a hand of tobacco is accumulated in readiness for wrapping.

Winder 30 is adjustable as to elevation along post 34, and may also be shifted laterally toward and from said post through the agency of a pin and slot connection 36–38. By means of this sliding connection, winder 30 may be selectively aligned with a tray-supported hand of tobacco as in FIGS. 2 and 7, or displaced to an offset position relative thereto as in FIGS. 5 and 6. By this arrangement, the winder may be shifted to the inoperative position when not in use (FIG. 6), so as to avoid interference with hand-feeding of de-stemmed leaves into the accumulator.

The accumulator 28 may comprise a forwardly extending substantially horizontal support 40, herein shown as an angle iron fixed by means of screw 42 to standard 26. Upon support 40 is fixedly mounted the stationary leg 44 of a curved gauge band, the second leg 46 of which arches over the leg 44 and is hinged thereto at 48. The band parts 44 and 46 form a gauge defining a substantially circular enclosure normally accommodating tobacco leaves in an amount approximating a hand (FIG. 7).

Tobacco leaves are introduced to the gauge band as follows: A leaf is advanced by hand transversely of and toward the throat 50 of the gauge, with the stem end of the leaf resting upon the fixed cut-off plate 52. The attendant then breaks the stem over the knife edge 54 of the plate, letting the stem drop for discard. The leaf so de-stemmed is then advanced along leg 44 and beneath leg 46, which latter yields upwardly about hinges 48 as the leaf passes throat 50 and enters the circular enclosure of the gauge band. Leg 46 may be urged toward leg 44 by a weight 56, assisted by a spring 58 if desired. Spring 58, anchored to standard 26, may be arranged to exert an upward pull on the end 60 of an arched spring arm 62 pivoted at 64 upon member 40, and bearing at 66 atop leg 46 to constantly depress the latter against stationary leg 44. Introduction of a leaf to throat 50 momentarily elevates leg 46 as the leaf passes on to tray 20 and into gauge band 44–46.

In entering the gauge band enclosure, a leaf is required to displace, by lifting, a pressure finger 68 which is pivoted at screw 64 upon support 40. A spring 70 anchored to standard 26 has an end 72 attached to finger 68 for yieldingly urging the finger onto leg 44. Finger 68 readily yields upwardly when its inclined free end 74 is struck by an inserted leaf. As FIG. 7 indicates, finger 68 eventually assumes an inclined position at which a group of leaves is held thereby in assembled condition.

The number of tobacco leaves depicted by FIGS. 5, 6 and 7 constitutes a hand ready for application of a wrapper **32**.

When the number of tobacco leaves accumulated on any one tray such as **20** constitutes a hand of tobacco, the attendant takes a leaf wrapper **32** (FIG. 4) and winds it by hand approximately one turn about the de-stemmed ends of the group of leaves, this being done while the leaves rest upon the tray and within accumulator **28**, as shown in FIG. 5. The wrapper **32** so started onto the bundle of leaves is now prepared for winding about the bundle by the winder indicated generally at **30**.

Winder **30** may comprise a cup-shaped body or head **76** (FIG. 9) having a central hub **78** pinned or otherwise fixed to one end of a rotatable shaft **80**, the opposite end having fixed thereto a handwheel **82** provided with a handle **84**. Shaft **80** is rotatably journaled at **86** in one end of a bracket **88**, so that handwheel **82** may be manipulated to rotate the winder head **76**.

Loosely mounted upon shaft **80** is a cam wheel **90**, having a series of extending lobes **92** of equal length. The cam wheel is disposed in spaced parallelism with head **76**, and may rotate relative thereto.

Head **76** is provided with a plurality of parallel bearing bores **94** spaced equally along the periphery of the head, the bores being parallel to shaft **80**. Each bearing bore rotationally supports one of a plurality of double cranks **96**, the cranks each having one arm **98** to rotationally support a winding roll **100**, and a second arm **102** to bear upon a cam wheel lobe **92**. The number of lobes of the cam wheel equals the number of winding rolls and cranks provided.

Springs **104** shown upon FIG. 6 act to keep the crank arms **102** of all the cranks yieldingly in contact with their respective cam lobes, and to urge the winding rolls bodily inwardly toward the axis of rotation of the winder head. FIG. 7 shows the winder rolls so disposed. In FIG. 5, the winder rolls are outwardly extended, or expanded away from the axis of rotation of winder head **76**. FIG. 7 therefore shows the operative position of the winder rolls, and FIG. 5 the inoperative position thereof. These two positions of the winder rolls result from limited rotational movements of head **76** and cam wheel **90** relative to one another, in opposite directions, which movements effect rotation of cranks **96** in their bearings **94**.

Bracket **88** (FIG. 6) carries a spring-actuated dog **106** pivoted at **108** upon the bracket, and biased by spring **110** to constantly urge the tooth **112** of the dog into the path of movement of cam lobes **92**. Thus, when the winder head **76** of FIG. 6 is rotated by shaft **80** in counterclockwise direction as indicated by arrow **114**, dog **106** stands in the path of movement of a cam lobe **92** as shown, to stop the cam wheel. Head **76** may be rotated a limited amount thereafter, until crank arms **102** ride outwardly along the lobes **92** a distance (FIG. 5) to spread or expand the winder rolls **100**.

With the winder rolls expanded as in FIG. 5, the entire winder assembly may be bodily shifted forwardly in the direction indicated by arrow **116**, to align the axis of winder head **76** with the bundle of leaves **24**. That is, head **76** may be shifted bodily from the FIG. 6 position to the left, until shaft **80** aligns with bundle **24** and rolls **100** surround the bundle as indicated by broken lines **120**. This position is shown also in FIG. 8. The winder is now in condition to wind the previously started wrapper **32** about the bundle of tobacco leaves.

To wind the wrapper **32**, handwheel **82** is manually rotated to turn head **76** (FIGS. 7 and 8) in the direction of the arrows applied to these figures, causing rolls **100** to contract upon bundle **24** while at the same time carrying the tail of wrapper **32** around with the head to wind the wrapper about the stationary bundle **24**. Cam wheel **90** is pulled along with head **76** by crank arms **102**, and as the cam lobes **92** (FIG. 8) strike the dog tooth **112** they override the dog by displacing it against the pull of spring **110**.

Thus, head **76** is to be rotated in the direction of the arrow, until wrapper **32** is completely wound about the bundle **24**. Then by reversing the direction of rotation of the head, a cam lobe **92** will be stopped by dog tooth **112**, assuming the position of FIG. 8. This stopping of the cam enforces a relative rotation of head **76** to a limited extent, and, as previously explained, effects an outward spreading or expansion of winder rolls **100** away from the wrapped bundle. The winder head may thereupon be shifted bodily out of alignment with bundle **24**, to the full line position of FIG. 6 or 5, thereby facilitating removal of the wrapped bundle from the tray and its associated accumulator, by way of throat **50**.

After removing the hand of tobacco from the apparatus, the attendant will tuck in the trailing end of the wrapper substantially as indicated by FIG. 11, to complete the procedure. The hand usually is thereafter supported upon a stick for subsequent handling and processing.

It may be noted with reference to FIGS. 1 and 2, that the winder assembly **30** and its bracket **88** are supported by a vertically adjustable carriage **122** which in any suitable manner is guided along the post **34**. The weight of the winder may be counterbalanced by a guided weight **124** suspended from a chain or equivalent suspender **126** trained over pulleys **128** carried by the frame of the apparatus.

At locations **130** along post **34** corresponding to the elevations of the several trays **18**, **20**, **22**, there may be provided shallow depressions to receive a plunger **132**, FIG. 10, mounted upon the carriage for holding the carriage at desired elevations. A spring **134** is adapted to urge the plunger constantly against post **34** and keep the plunger seated in one of the depressions **130**. A knob **136** on the outer end of the plunger is used to disassociate the plunger from a depression **130** and allow sliding of the carriage to the several elevations of the trays.

Near its rear end **138**, bracket **88** is supported for longitudinal sliding movement upon the carriage, the connection being by means of slot **38** and pins **36** as previously explained. By reason of sliding connection **36–38**, the winding head **76** may be shifted manually from a position offset relative to bundle **24**, as shown by full lines in FIG. 6, to a position at which the head is axially aligned with the bundle. The latter position is indicated by FIGS. 7 and 8, and places the elements in proper relationship for coiling the wrapper **32** about an end of the leaf bundle.

In FIGS. 8 and 9, the character **140** indicates an anchorage for spring **110** upon bracket **88**, and **142** indicates an extending stop pin on dog **106** to limit the extent to which spring **110** may rotate the dog in one direction about its pivot **108**. Bracket **88** slides in guides **142** of carriage **122**.

The device of the invention materially facilitates the work of tobacco stripping and bundling, and is found very effective for the production of hands which are uniform in size and properly assembled. Use of the device effects substantial savings of time and labor, so that production is increased while at the same time promoting greater accuracy in the grading procedure.

The device moreover is simple and durable of construction, and because of the absence of delicate parts, it requires practically no servicing or repairs over extended periods of usage.

It is to be understood that various modifications and changes may be made in the structural details of the device, within the scope of the appended claims, without departing from the spirit of the invention.

What is claimed is:

1. In a tobacco hand bundler for operating upon leaves detached from tobacco plants, the combination of an upright rigid frame and an upright carriage support post, a plurality of elongate trays arranged in spaced parallelism one above another upon the frame and in which may be

deposited tobacco leaves to form a hand, a carriage including a wrapper winder for winding a wrapper about an end of a hand, means for slidably mounting the carriage for movement along the suupport post to selected elevations corresponding to the elevations of the several trays, and means for selectively fixing the carriage at said elevations, with the winder in operative alignment with one of said trays and the bundle of leaves supported thereon for wrapping.

2. The apparatus as set forth in claim 1, wherein the combination includes a device for gauging and holding the leaves in compact bundle condition at one end of each tray, in readiness for wrapping by the winder.

3. In a tobacco hand bundler for operating upon leaves detached from tobacco plants, the combination of an upright rigid frame and an upright carriage support post, a plurality of elongate trays arranged in spaced parallelism one above another upon the frame for receiving tobacco leaves to form a hand, a carriage including a wrapper winder for winding a wrapper about an end of a hand, means for slidably mounting the carriage for movement along the support post to selected elevations corresponding to the elevation of the several trays, and extensible means on the carriage supporting the wrapper winder for selective disposition to alignment and disalignment with relation to the wrapper receiving end of the tray-supported hand of tobacco.

4. The apparatus as set forth in claim 3, wherein the combination includes an accumulator for holding the tobacco leaves in compact bundle condition at one end of each tray, in readiness for wrapping by the winder.

5. In a tobacco hand bundler for operating upon leaves detached from tobacco plants, the combination of an upright frame and an upright carriage support post, a plurality of elongate trays arranged in spaced parallelism one above another upon the frame for receiving tobacco leaves to form a hand, a carriage slidable along the support post to selected elevations corresponding to the elevation of the several trays, accumulator means at an end of each tray for holding the tobacco leaves in bundle condition longitudinally upon and beyond the tray end, a wrapper winder comprising a rotatable shaft supported by the carriage in substantial parallelism with each tray, a winder head fixed upon one end of the shaft for rotation therewith, a plurality of spaced parallel winder rolls, and means mounting said rolls upon the head for bodily shifting of the rolls toward and from the shaft axis in parallelism with said axis, means mounting the rotatable shaft upon the carriage for bodily shifting of the shaft to and from alignment with a leaf bundle carried by a tray, and means operative incident to rotation of the shaft in one direction, to shift all the winder rolls toward the shaft axis and the leaf bundle aligned therewith, and to shift all the winder rolls away from the shaft axis upon rotation of the shaft in the reverse direction of rotation.

6. The apparatus as set forth in claim 5, wherein the accumulator means includes gauging means for determining the size of a hand of tobacco leaves deposited upon a tray.

7. In a tobacco hand bundler for operating upon leaves detached from tobacco plants, the combination of an upright frame and an upright carriage support post, a plurality of elongate trays arranged in spaced parallelism one above another upon the frame for receiving tobacco leaves to form a hand, a carriage slidable along the support post to selected elevations corresponding to the elevations of the several trays, accumulator means at an end of each tray for releasably holding the tobacco leaves in bundle condition longitudinally upon and beyond the tray end, a wrapper winder comprising a rotatable shaft supported by the carriage in substantial parallelism with each tray, a winder head fixed upon one end of the shaft for rotation therewith, a plurality of spaced parallel winder rolls, and means mounting said rolls in a circle upon

the head for bodily shifting of the rolls toward and from the shaft axis in parallelism with said axis, means for disposing the shaft in substantial axial alignment with a leaf bundle carried by a tray, and means operative incident to rotation of the shaft in one direction, to shift the winder rolls toward the shaft axis and the leaf bundle aligned therewith, and to shift the winder rolls away from the shaft axis and said bundle when the shaft is rotated in the reverse direction.

8. The apparatus as set forth in claim 7, wherein the combination includes means to limit rotation of the shaft in said reverse direction and to establish a predetermined disposition of the winder rolls with each such reversal.

9. In a tobacco hand bundler for operating upon leaves detached from a tobacco plant, the combination of a plurality of elongate trays arranged in spaced parallelism one above another and in which may be deposited tobacco leaves to form a hand, means at an end of each tray for bundling leaves fed to the trays, a single bodily shiftable winder for applying a wrapper about one end of a bundle accumulated by one of said trays and means for securing the winder adjacent to an end of a selected one of said trays, for applying a wrapper to the bundle carried by the tray selected.

10. Apparatus as set forth in claim 9, wherein the bundling means aforesaid includes means to limit the size of a bundle accumulated thereby.

11. In a tobacco hand bundler for operating upon leaves detached from a tobacco plant, the combination of an elongate tray for receiving tobacco leaves to form a hand, means at one end of the tray for releasably holding the leaves in bundle condition longitudinally upon and beyond the tray end, and a wrapper winder comprising a manually rotatable shaft supported in substantial axial alignment with the tray and the bundle thereon, a winder head fixed upon one end of the shaft for rotation therewith, a plurality of spaced parallel winder rolls, and means mounting said rolls in a circle upon the head for bodily shifting of the rolls toward and from the shaft axis in parallelism with said axis, and means operative incident to rotation of the shaft in one direction, to shift the winder rolls bodily toward the shaft axis and the leaf bundle aligned therewith, and to shift said rolls away from the shaft axis and said bundle, upon rotation of the shaft in the opposite direction of rotation.

12. Apparatus as set forth in claim 11, wherein the combination includes means for predetermining the maximum size of a leaf bundle accumulated upon the tray.

13. In a tobacco hand stripper and bundler for operating upon leaves detached from a tobacco plant, the combination of a frame, an elongate tray fixed substantially horizontally upon the frame for receiving tobacco leaves to form a hand, said tray having an open end, an accumulator mounted upon the frame at the open end of the tray, and comprising a stationary leg fixed transversely of the tray for guiding leaves fed thereto, said leg having a forward end and a rear end, a movable leg having a rear end hinged to the rear end of the stationary leg, and a forward end overlying the forward end of the stationary leg, the forward ends of the legs being bent away from one another to form a throat for reception of tobacco leaves introduced between the legs, the movable leg being arched over the stationary leg to form an enclosure limiting the size of a bundle of leaves accumulated therein, a cutter at the forward end of the stationary leg having a knife edge offset from the stationary leg and over which may be broken the stem ends of leaves fed to the throat of the accumulator, and a wrapper winder supported by the frame in position to wind a wrapper about the de-stemmed ends of the leaves held by the accumulator.

14. The combination as set forth in claim 13, including a support for the wrapper winder and means for shifting the support relative to the frame, for effecting

disposition of the winder to a location remote from the accumulator while leaves are being fed thereto.

15. In a tobacco hand bundler for operating upon leaves detached from a tobacco plant, the combination of a frame, an elongate tray fixed substantially horizontally upon the frame for receiving tobacco leaves to form a hand, said tray having an open end, an accumulator mounted upon the frame at the open end of the tray, and comprising a stationary leg fixed transversely of the tray for guiding and supporting leaves fed to the tray, said leg having a forward end and a rear end, a movable leg having a rear end hinged to the rear end of the stationary leg, and a forward end overlying the forward end of the stationary leg, the forward ends of the legs being bent away from one another to form a throat for reception of tobacco leaves introduced between the legs, the movable leg being arched over the stationary leg to form an enclosure limiting the size of a bundle of leaves accumulated therein, a wrapper winder supported upon the frame, including a rotatable shaft and a head rotatable therewith, a plurality of spaced parallel winder rolls, and means mounting said rolls in a circle upon the head for bodily shifting of the rolls toward and from the shaft axis in parallelism with said axis, means operative incident to rotation of the shaft in one direction to shift the winder rolls bodily toward the shaft axis,

and to shift said rolls away from the shaft axis upon rotation of the shaft in the reverse direction, the support for the wrapper winder being movable for disposing the shaft of the winder into and out of axial alignment with the bundle supported within the tray and the arched enclosure of the accumulator.

16. The apparatus as set forth in claim 15, wherein the combination includes means to limit the aforesaid reverse direction of rotation of the winder shaft, for establishing a predetermined disposition of the winder rolls with relation to a bundle to be wrapped.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,142,304

July 28, 1964

Edward George Hoernemann

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the grant, lines 2 and 12, and in the heading to the printed specification, lines 4 and 5, for "Raymond M. Brown", each occurrence, read -- Raymond M. Bowman --.

Signed and sealed this 24th day of November 1964.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents