United States Patent [19]

Janssen

[11] **3,823,528**

[45] **July 16, 1974**

[54] **DEVICE FOR PACKING IN FOIL A BUNCH OF ELONGATED OBJECTS**

[76] Inventor: **Wilhelmus Henricus Janssen,** Scheepvaartweg 3, Roermond, Netherlands

[22] Filed: **Jan. 19, 1973**

[21] Appl. No.: **324,961**

[52] **U.S. Cl.** ..... **53/198 R,** 53/182, 53/184

[51] **Int. Cl.**... **B65b 13/04,** B65b 11/50, B65b 53/06

[58] **Field of Search** ..... 53/3, 28, 29, 180, 182, 53/198 R

[56] **References Cited**

UNITED STATES PATENTS

3,172,246	3/1965	Ruff	53/182 X
3,432,988	3/1969	Minten	53/182 X

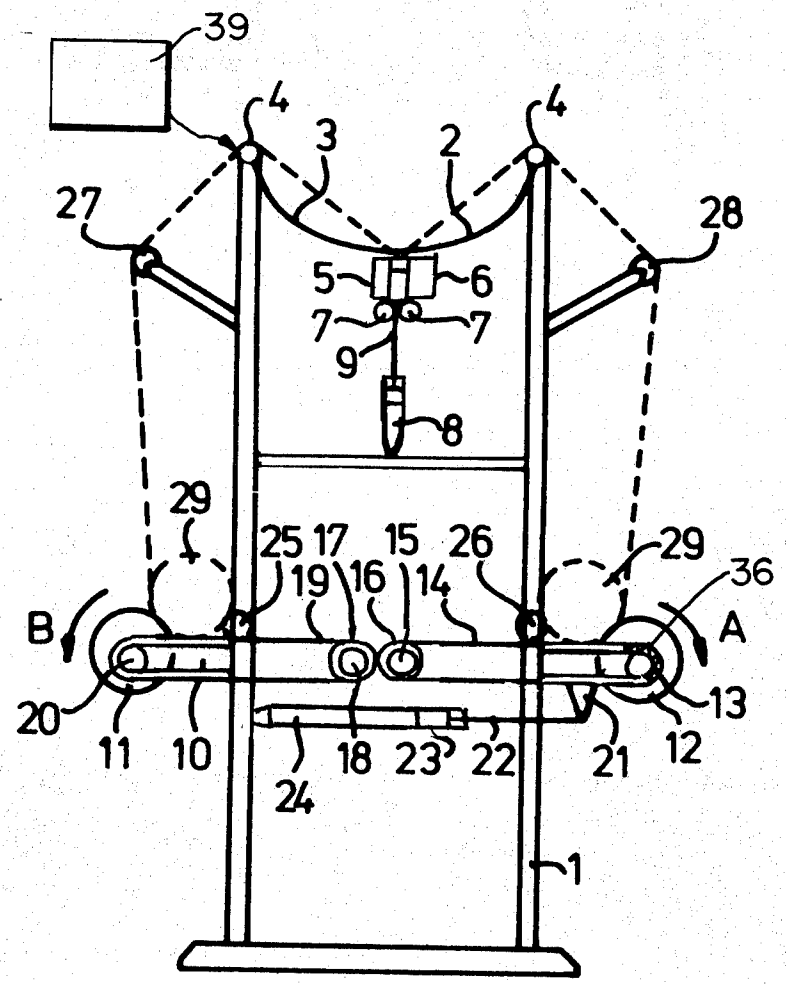
Primary Examiner—Robert L. Spruill

Attorney, Agent, or Firm—Spensley, Horn & Lubitz

[57] **ABSTRACT**

A device for packing a bunch of elongated objects, such as flowers, in a tight foil wrapping. The device having two foil strips feeding to a supporting member from two foil feed rollers. The supporting member receives the foil strips, permits joining of the ends, supports the bunch of objects and then opens, permitting the foil and bunch of objects to sink down. The supporting member then closes and foil rollers rotate in the opposite direction bringing the foil tightly around the bunch of objects, joins the strips together and cuts the wrapped bunch free from the strips.

17 Claims, 11 Drawing Figures



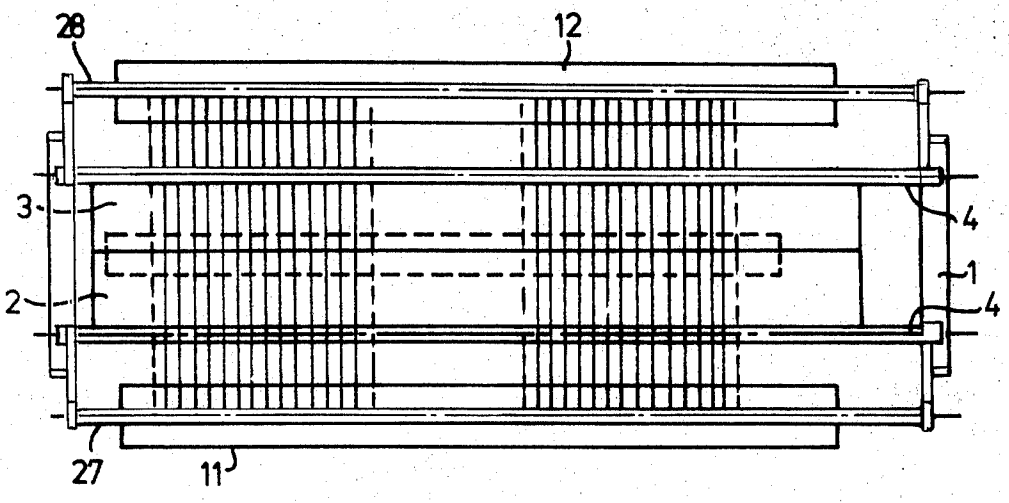


FIG. 1

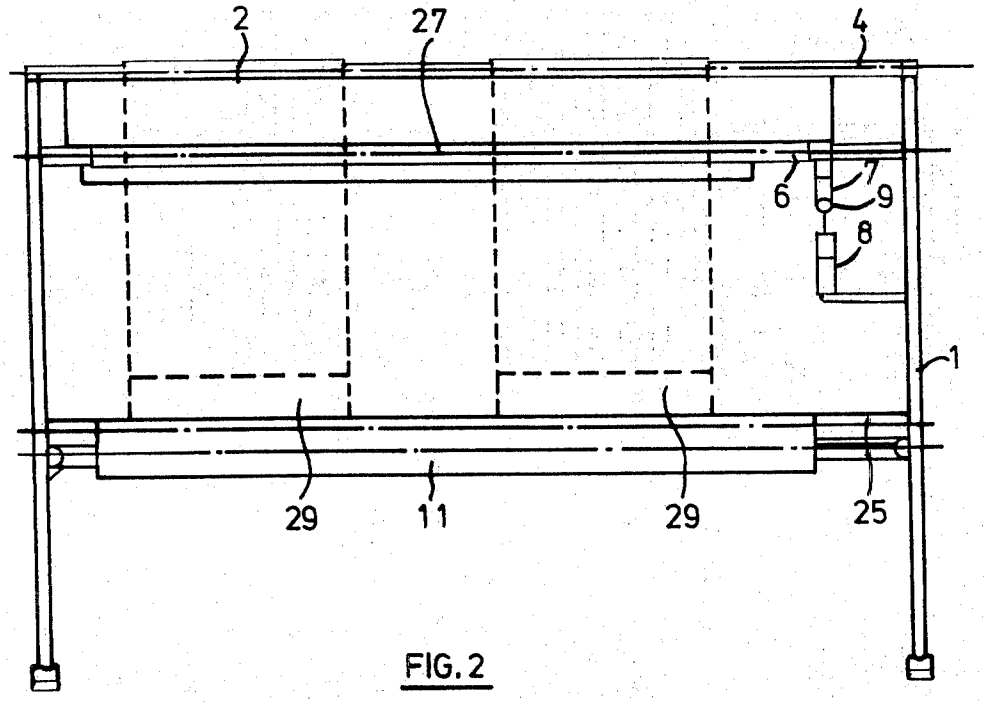


FIG. 2

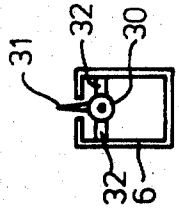


FIG. 5

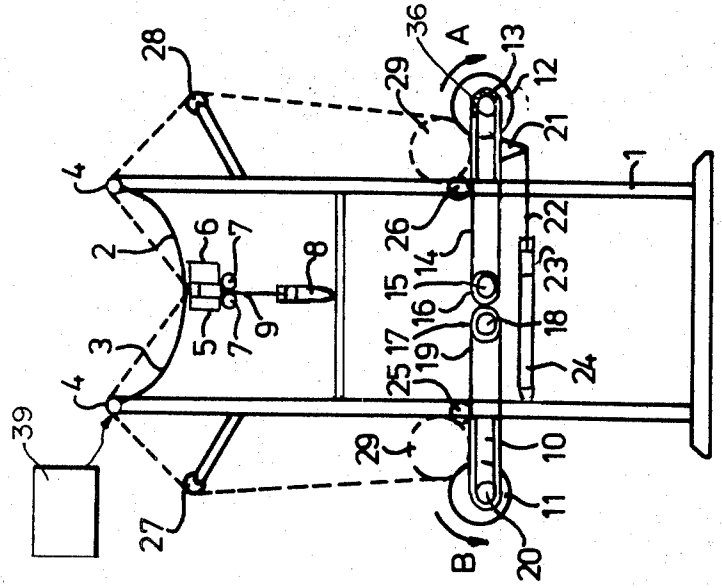


FIG. 3

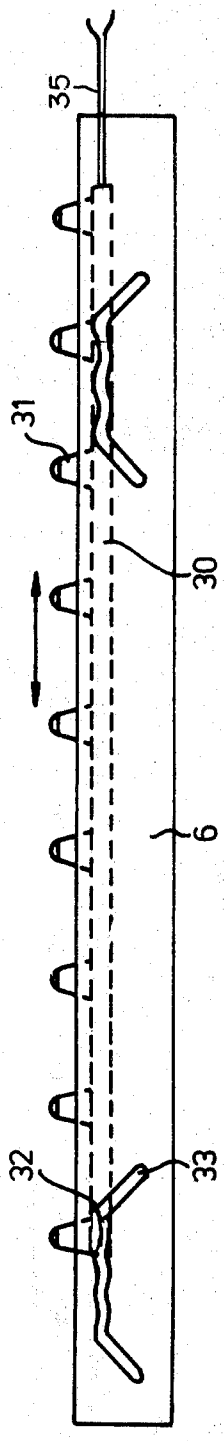


FIG. 4

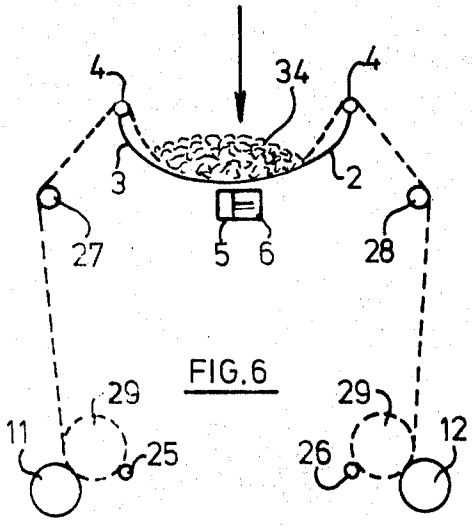


FIG. 6

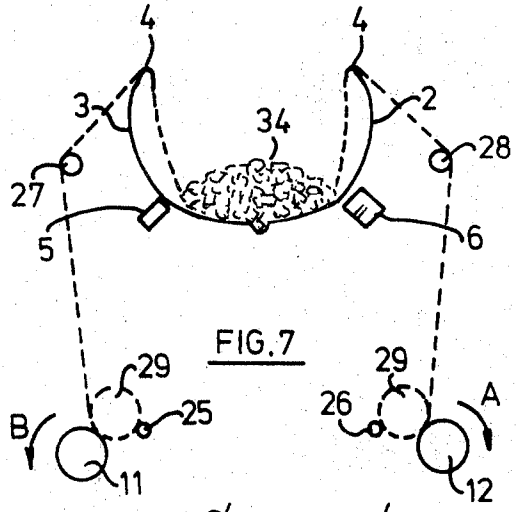


FIG. 7

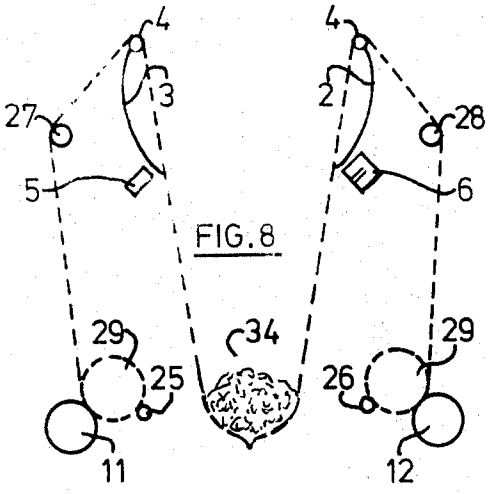


FIG. 8

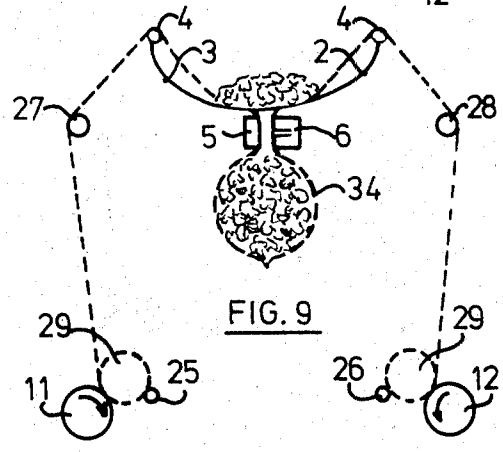


FIG. 9

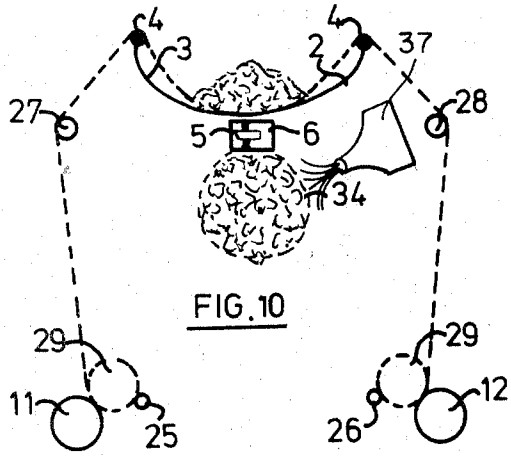


FIG. 10

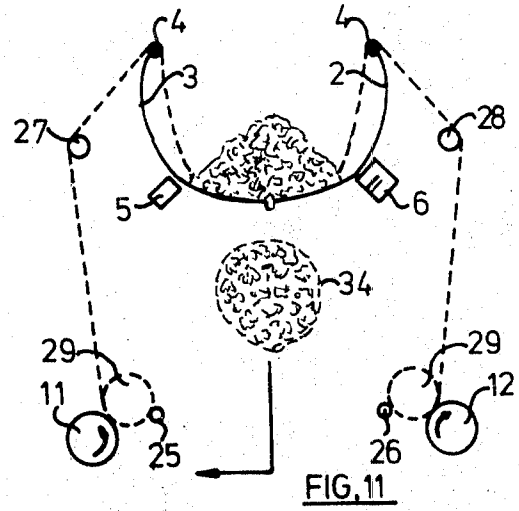


FIG. 11

DEVICE FOR PACKING IN FOIL A BUNCH OF ELONGATED OBJECTS

BACKGROUND OF THE INVENTION

The invention relates to a device for packing a bunch of elongated objects in foil, e.g., a bunch of flowers. The device comprising means for feeding two strips of foil from foil feed rollers supported by two parallel rollers to a support member which supports the interconnected ends of the foil strip ends and on which the objects to be assembled in a bunch can be placed. The arrangement being such that, when the support member opens, the bunch of objects with the foil can sink down through the gap then formed by the support member.

SUMMARY OF THE INVENTION

A simple and effective device in which a bunch of elongated objects, particularly flowers, can be packed in foil so that the foil tightly surrounds the objects in the desired manner is described

Driving means for driving at least one of the rollers supporting a foil roller, after the support member is closed, in the same direction in which the foil roller is rotated by said driven roller so that the foil is wound on the foil roller, the foil being thus tightly drawn around the bunch of objects.

In this way a satisfactory tight foil envelope around bunch of objects can be obtained.

The device is preferably constructed so that the two foil rollers are supported by the driving roller the drive being such that one driving roller rotates with a higher speed than the other driving roller, thus providing a quick tightening of the foil around the bunch of objects. The difference between the driving speeds of the roller causes the bunch of objects to rotate about its longitudinal axis during tightening of the foil. This is advantageous, for example, in packing flowers, since projecting leaves tend to flatten themselves about the circumference of the bunch of objects and will not tend to project outwardly between the foil portions, but be fixed to each other.

As will be described this effect may be obtained by providing means, by which unwinding of the foil from one foil roller is performed more slowly than unwinding of the foil from the other foil roller. It will be obvious that in this case the bunch of objects to be packed, will rotate about its longitudinal axis.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a plan view of a device (embodying the invention).

FIG. **2** is a side elevation of the device shown in FIG. **1.**

FIG. **3** is a side elevation corresponding with FIG. **2.**

FIG. **4** shows schematically a mechanism for cutting and simultaneously fixing two foil strips to each other.

FIG. **5** is a side elevation corresponding with FIG. **4.**

FIGS. **6** to **11** show various stages of the operation of the device.

DETAILED DESCRIPTION OF THE INVENTION

The device comprises a frame **1,** in which two half-

cup-shaped flaps **2** and **3** forming a support member are journalled. The flaps **2** and **3** are rotatably connected to the frame since they are coupled to the horizontal pivotal shafts **4** which are disposed in a horizontal plane and extend along the top edges of the flaps.

With the aid of a preferably pneumatic setting cylinder **39** the flaps **2** and **3** can be turned about the pivotal shafts from the closed position of the support member formed by the flaps as shown in FIGS. **1** to **3** into an open position, which will be explained more fully hereinafter with reference to FIGS. **6** to **11.**

The free edge of the flap **3** is secured to a stop beam **5** and the free edge of the flap **2** is secured to beam **6** in which a cutting and welding mechanism is contained, which will be described more fully hereinafter. Rollers **7** are fastened to the beams **5** and **6,** between which a wedge **9** can be inserted or withdrawn with the aid of a preferably pneumatic setting cylinder **8.** When the wedge **9** is disposed between the rollers, the free edges of the flaps **2** and **3** and the facing sides of the beams **5** and **6** are kept a given distance from each other, whereas after withdrawal of the wedge **9** from between the rollers **7** by means of the setting cylinder **8** the facing sides of the beams **5** and **6** will come into contact with each other.

Arms **10** project from either side of the frame and are adapted to receive rollers **11** and **12,** which extend parallel to the pivotal shafts **4.** Rollers **11** and **12** are coupled to the arms **10** so as to be rotatable about their longitudinal axis. The roller **12** has fastened to it a chain sprocket **13,** which is linked by a chain **14** to a chain sprocket **15,** which is disposed near the center of the frame and rotatably journalled in said frame. The chain sprocket **15** is integral with a gear wheel **16,** the teeth of which are in mesh with a further gear wheel **17.** The gear wheel **17** is integral with a chain sprocket **18,** which is linked by a chain **19** to a chain sprocket **20,** which is secured to the roller **11.**

The chain **14** is fastened to a support **21** which is coupled the end of a driving rod **22.** The other end of the driving rod **22** is secured to a piston **23,** disposed in a preferably pneumatic, double-acting setting cylinder **24.**

Referring to FIG. **3** it will be apparent that between the rollers **11** and **12** are further rollers **25** and **26** extend parallel to rollers **11** and **12.** The roller **25** is spaced apart from the roller **11** by a comparatively short distance and the roller **26** by a comparatively short distance from the roller **12.** The rollers **25** and **26** are journalled in the frame so as to be freely rotatable about their longitudinal axis.

It will be apparent that the rollers **25** and **26,** of FIG. **3** are located approximately perpendicular beneath the pivotal shafts **4,** whereas the two rollers **11** and **12** are located further to the outside.

Approximately vertically above the rollers **11** and **12** the frame comprises, freely rotatable guide rollers **27** and **28.** One or more reels of a synthetic foil **29** can be arranged on the rollers **11** and **25** and **12, 26** respectively. When the flaps **2** and **3** are opened, the ends of the synthetic foil emanating from the reels **29** are passed across the edges **4** of the flaps **2** and **3** drawn downwards between the flaps. Prior to the first bundling operation the ends of the foil strips are welded together by operating the device through one complete cycle.

The cutting and welding mechanism disposed in beam **6** is shown in detail in FIGS. **4** and **5.** From these Figures it will be apparent that the beam **6** accommodates an elongated support **30,** which extends in the longitudinal direction of the beam **6** and is provided at regular intervals with a row of pointed or knife-like members **31,** having cutting edges on either side.

The support **30** has secured to it guide pins **32,** the ends of which are located in slots **33** in the beam **6.** From FIG. **4** it will be seen that the slots have a corrugated portion extending parallel to the longitudinal axis of the beam **6** and terminate at the ends in two inclined portions which extend away from each other towards the side of the beam **6** opposite extensions **31.** The entire length of support **30** can be displaced into beam **6** for example, by means of a pneumatic setting cylinder (not shown). It is apparent from FIGS. **4** and **5** that, when the guide pins reach the rearwardly inclined portion of slot **33,** the sprocket **30** is displaced within beam **6** such that the knives or extensions **31** are withdrawn into the hollow beam **6.** The length of the corrugated portions of the guide slots extending parallel to the direction of length of the beam **6** is equal to or slightly greater than the distance between the extensions **31.** The operation of the device described above will be described more fully with reference to FIGS. **6** to **11.**

The first step of the operation, as stated above, includes welding together the ends of the strips of opposite foil reels **29.** The welded ends are located across the free edges of the flaps **2** and **3** and between the beams **5** and **6.** In the closed position of the flaps shown in FIG. **6** the objects to be wrapped, for example, a bunch of flowers **34,** can be disposed on the foil located on the supporting member formed by the flaps **2** and **3.** When subsequently the flaps are opened, as is shown in FIG. **7,** and when at the same time comressed air is admitted in the cylinder **24** on the piston side, foil is wound from the reels **29** because of the weight of the bunch of flowers and also because the cylinder **24** coupled to the rollers **11** and **12** causes the latter to turn in the direction of the arrows B and A respectively, so that the bunch of flowers sinks down between the flaps and arrives at the position shown in FIG. **8.** When the bunch of flowers has passed by the flaps, the latter are returned to the closed state, it being ensured, however, that the wedge **9** is located between the rollers **7** so that the beams **5** and **6** and the edges of the flaps **2** and **3** are held at a given distance from each other. At the same time compressed air is admitted into the cylinder **24** so that the driving rod **22** and the chain **14** coupled herewith are displaced so that the rollers **11** and **12** are turned in the directions opposite the arrows B and A respectively. The foil strips are thus rewound on the reels **29** and the bunch of flowers bearing on the foil is drawn upwardly into the position shown in FIG. **9.** The upward movement of the bunch of flowers is stopped when it hits the lower sides of the beams **5** and **6,** which are located fairly close to each other. Upon a further turn of the rollers the foil is drawn tightly around the elongated objects, which presses the flowers tightly to each other. Further tightening of the foil around the bunch of elongated objects is no longer possible, and the driving rollers **11** and **12** will slip with respect to the reels **29** so that excessive tightening of the foil is automatically avoided. The instant of slipping is determined by the weight of the foil reels and can be altered by providing weights in the foil reels. In this way the extent of tightening can be varied. After termination of the stroke of the setting cylinder **22** to **24** the wedge **9** is withdrawn from between the rollers **7** so that the facing sides of the beams **5** and **6** are urged against each other, thus clamping the two foil strips to each other. Subsequently the knives or pointed extensions **31,** heated through a current conductor **35,** are displaced in the support **30** in the longitudinal direction thereof from one extreme position to the other extreme position of the support. As a result the heated extensions **31** slide out of the beam **6,** move across the foil strips clamped together and arrive in a recess provided for this purpose in the beam **5.** Next the extension **31** are displaced in the direction of length of the beams **5** and **6** so that they cut the clamped foil strips and simultaneously weld them together on both sides of the cut. Due to the wave-shape of the slot portions **33** parallel to the direction of length of the support the knives will reciprocate during the cutting operation at right angles to the direction of displacement thereof, which favorably affects the formation of the weld. Any leaves present between the clamped foil strips are simultaneously cut and will not hinder the welding of the foil strips. This phase of the operation is illustrated in FIG. **10.** In the meantime, after the flaps **2** and **3** have moved into the substantially closed state, a new bunch of objects is placed on the flaps **2** and **3.** When the flaps **2** and **3** are re-opened, this next bunch of objects will sink down on the foil strips, as described above, while the wrapped bunch of objects drops freely down and can be conducted away.

It will be obvious that the movements of the various driving members are adjusted to each other and a control mechanism is provided for ensuring the correct order of succession of the various movements.

In this way a simple and effective device is obtained for packing objects in a bundle in a rapid and simple manner.

It is, for example, possible to provide a plurality of foil reels, if desired, of different widths or to provide a long reel so that a bunch of objects can be held together at two or more places by comparatively narrow foil strips having equal or differents widths or can be enveloped entirely by a wide foil strip. Moreover, a plurality of bunches of objects may be placed one behind the other on the flaps. With different diameters of the bunches of objects of, for example, flowers, e.g., in the case of chrysantemums which have comparatively large flowers and thin stems, the desired tightening of the foils is nevertheless ensured because the various foil reels will slip at different instants. Moreover, at different places different values of tightening may be obtained by varying the weights of the foil reels. It may, for example, be desirable to tighten the foil more around the stems of the flowers than around the flowers themselves. Moreover, given foil strips may be formed by shrinking foil, for example, the foil strips wrapped around the stems and the device may be provided with blower **37** for passing air along the foil strips concerned. In this way the foil is further tightened owing to the shrinkage of the foil after application.

Instead of using a double-acting cylinder **24,** a single-action cylinder may be used, which drives the rollers positively for winding up the foil, in which case springs **36** are preferably coupled with the rollers **11** and **12** for driving the rollers in the direction in which the foil is unwound.

It has furthermore been found to be particularly effective to ensure that unwinding or winding of one foil reel is performed more rapidly than winding or unwinding of the other foil reel. Rapid winding on of one foil reel with respect to the other foil reel may be obtained by providing a transmission ratio of the transmission formed by the chain sprockets **13** and **15** and the chain **14** differing from that of the transmission formed by the chain sprockets **18** and **20** and the chain **19.** Since in this case during winding of the foil, one foil half will move upwards more rapidly than the other foil half, the bunch of objects to be wrapped, for example, the bunch of flowers, will roll along the foil. The result is that any projecting leaves are smoothed down along the periphery of the bunch of flowers so that they join the outer periphery of the bunch so that the risk of leaves being clamped between the beams **5** and **6** during the welding operation of the two foil strips is considerably reduced.

The same effect may be obtained by ensuring that one foil strip unwinds less rapidly than the other foil strip. This may be achieved by reducing the speed of rotation of one of the foil reels during unwinding, for example, with the aid of a friction brake or the like. It will be obvious that also in this case a rolling motion of the bunch to be packed is produced.

Although in the embodiment described above all movements are produced with the aid of mechanical expedients, the various movements may, of course, also be performed manually, if desired with the use of manual levers and the like.

I claim:

1. A device for packing a plurality of elongated objects in flexible sheet packing material comprising:

a. a frame having a plurality of support members rotatably mounted to said frame for providing an upper receiving surface;

b. at least two packing material rollers containing a supply of packing material, said packing material rollers disposed on opposite sides of said frame;

c. at least two support means for supporting said packing material rollers;

d. power means for rotatably moving said support members from a first to second position and back from said second to first position;

e. a first and second stop beam disposed beneath said receiving surface, said first stop beam coupled to the free end of a portion of said support members and said second stop beam coupled to the free ends of said remaining support members such that one side of said first stop beam is adjacent one side of said second stop beam when said support members are in said first position;

f. sealing and cutting means coupled to said first stop beam for sealing and cutting said packing material;

g. first driving means for driving at least one of said support means for supplying packing material from said packing material rollers to said device;

h. second driving means for driving at least one of said support means in a direction opposite to when packing material is supplied to said device, said second driving means for rewinding said packing material on said packing material rollers;

whereby, said elongated objects are tightly packed and sealed in said packing material after said support member is closed, and said second driving means causes said packing material rollers to reel such that said packing material is wound on said packing material roller and said sealing and cutting device is activated.

2. The device of claim **1,** wherein said support means are rollers disposed parallel to and spaced from said packing material rollers.

3. The device of claim **2,** wherein one of said rollers rotates at a higher speed than the others.

4. The device of claim **1,** wherein said plurality of elongated objects are flowers.

5. The device of claim **1,** wherein said packing material is foil.

6. A device as claimed in claim **1** wherein said first driving means unwinds packing material from one of said packing material rollers more slowly than from an opposite packing material roller.

7. A device as claimed in claim **1** wherein said support members are formed by two half-cup-shaped flaps, which are adapted to rotate about pivotable shafts which are located in at least a substantially horizontal plane passing through the distal upper edges of said half-cup-shaped flaps.

8. A device as claimed in claim **1** wherein said power means is a pneumatic setting cylinder.

9. A device as claimed in claim **1** wherein a spring mechanism is coupled to said supporting means such that said spring mechanism tends to urge said supporting means in a direction such that one of said packing material unwinds from at least one of said packing material rollers.

10. A device as claimed in claim **1** wherein a wedge means is provided for spacing apart said first and second stop beams when said support members are near said second position, such that said packing material may be tightened about said elongated objects and after said packing material is tightened, said wedge means being withdrawable allowing said support members to close into said second position.

11. A device as claimed in claim **1** wherein said sealing and cutting means has a plurality of knife-like pointed members adapted to be heated electrically and to be displaced across said foil parallel to the longitudinal direction of said elongated objects.

12. A device as claimed in claim **11** wherein said knife-like or pointed members are fastened to a support element disposed in said first stop beam.

13. A device as claimed in claim **12** wherein said first stop beam is provided with a slot and said support element is provided with a guide which cooperates with said slot such that when said support element is longitudionally displaced, said knife-like members being contained within said first stop beam are forced to project from said first stop beam and travel longitudinally before being retracted into said first stop beam and thereby cut and seal said foil strips.

14. A device of claim **10** wherein said slot has a corrugated longitudinal section and two inclined end sections extending away from each other.

15. A device as claimed in claim **14** wherein said corrugated portion of said slot forces said guide to have reciprocal movement transverse to the longitudinal direction of the elongated objects for forming an effective seal.

16. A device as claimed in claim **1,** wherein a blowing means is provided for blowing hot air along said pack-

ing material after said packing material has been wrapped around said elongated objects.

17. A device for packing a plurality of elongated objects in foil comprising:

a. a frame having a plurality of support members, said support members being half-cup-shaped and adapted to rotate about pivotal shafts disposed in a substantially horizontal plane along the distal upper edges of said frame, said support members serving as a receiving surface for said elongated objects;

b. at least two foil rollers containing a supply of foil, said foil rollers disposed on opposite sides of said frame;

c. at least two support rollers disposed parallel to and spaced below said foil rollers for supporting said foil rollers;

d. a first driving means for rotatably moving the free ends of said support members from a first to a second position and back from said second to first position, said support members in said first position serve as a receiving surface and open eliminating said receiving surface in said second position;

e. a first and second stop beam disposed beneath said receiving surface, said first stop beam coupled to the free end of a portion of said support members and said second stop beam coupled to the free ends of said remaining support members such that one side of said first stop beam is adjacent one side of said second stop beam when said support members are in said first position, said first stop beam is provided with a slot and a support element, said support element having a guide which cooperates with said slot such that when said support element is longitudinally displaced, said guides travel along said slot;

f. sealing and cutting means disposed on said support element in said first stop beam for sealing and cutting said foil, said sealing and cutting means comprising a plurality of knife-like pointed members adapted to be electrically heated, as said support element is displaced longitudinally, said knife-like members being contained in said first stop beam are forced to project therefrom and travel longitudinally cutting and sealing said foil;

g. second driving means coupled to at least one of said support rollers for causing said support roller to unwind and supply foil to said receiving surface;

h. third driving means for driving at least one of said support rollers such that said foil is rewound on said support roller;

whereby, said elongated objects are tightly packed and sealed in said foil after said support member is closed and said second driving means causes said foil rollers to reel such that said foil is wound on said foil roller and said sealing cutting device is activated.

* * * * *