(No Model.) 3 Sheets—Sheet 1.

B. POULSON.

BUNCHING MACHINE.

No. 588,007. Patented Aug. 10, 1897.

Fig. 1.

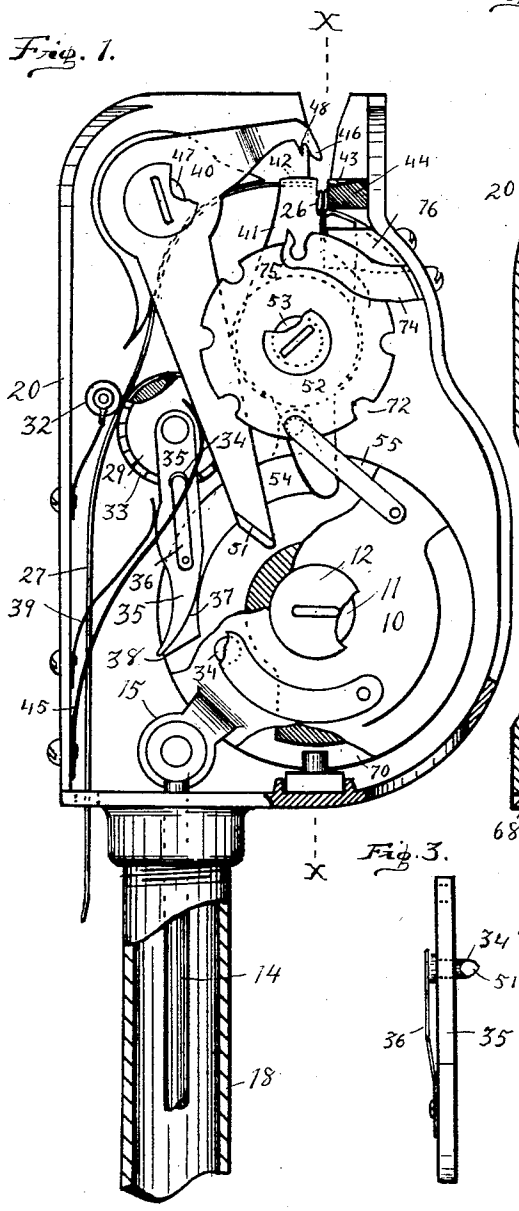

Fig. 2.

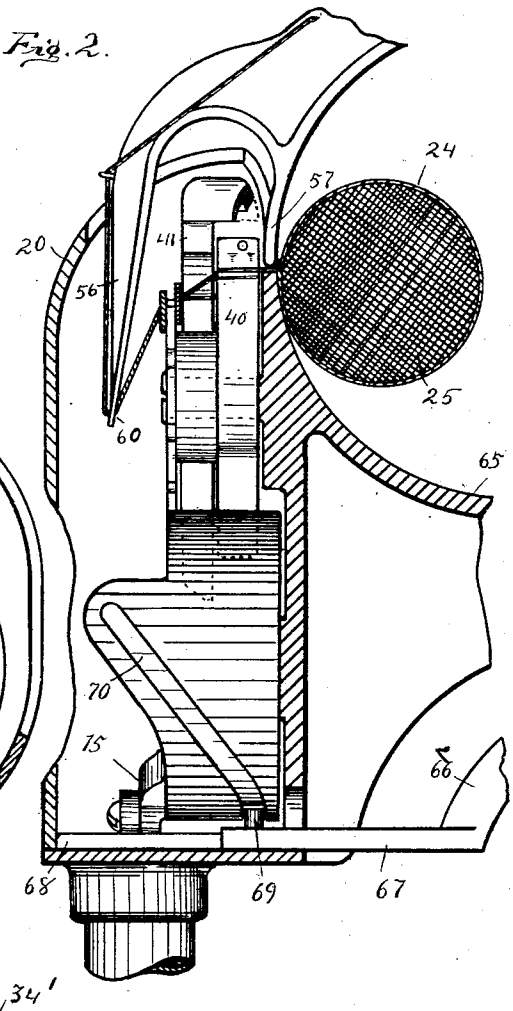

Fig. 3.

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Fig. 4.

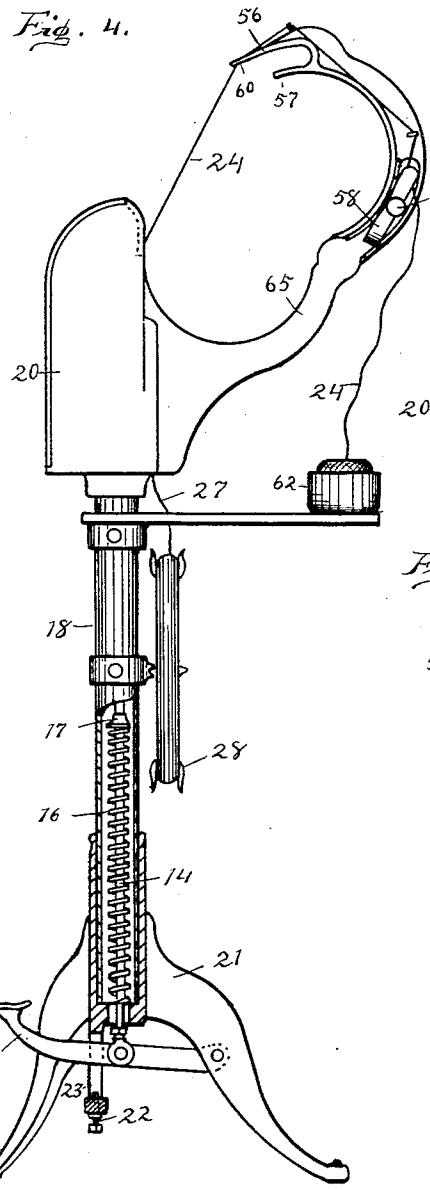

Fig. 5.

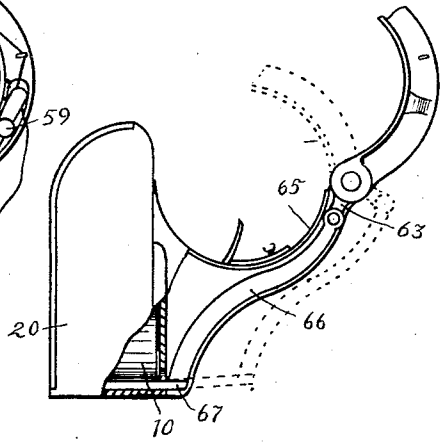

Fig. 6.

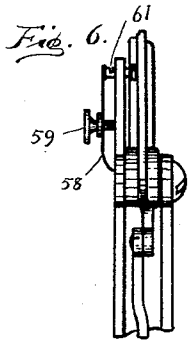

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Fig. 7.

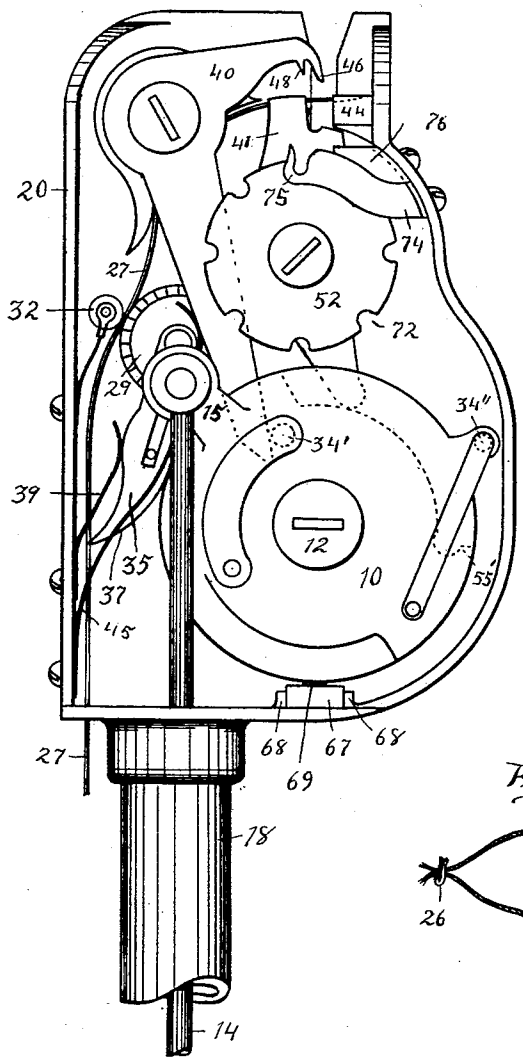

Fig. 8.

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UNITED STATES PATENT OFFICE.

BRITTON POULSON, OF FORT WAYNE, INDIANA, ASSIGNOR TO THE FORT WAYNE NOVELTY COMPANY.

BUNCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 588,007, dated August 10, 1897.

Application filed June 24, 1896. Serial No. 596,757. (No model.)

To all whom it may concern:

Be it known that I, BRITTON POULSON, a citizen of the United States, residing at Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Bunching-Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in machines of the class named, and its objects are to provide a machine which will be more easily and positively operated, be automatic in its action, economical of construction, and adapted, primarily, to tie bunches of vegetables and other kinds of gardeners' products and similar articles; and the invention consists in the construction and novel combination of parts hereinafter described, pointed out in the appended claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a front view of the machine, the supporting-stem broken away and the cover of the case removed, (needle not shown,) the machine being in the position assumed by the parts when the operating-rod has reached its downward limit. Fig. 2 is a side view of parts shown in Fig. 1, showing also the needle and a bunch of vegetables. Fig. 3 is a detail of the spring pawl or catch pin. Fig. 4 is a side view of the machine with part of pipe or supporting-stem broken away. Fig. 5 is a detail of part of Fig. 4, showing connecting-rod in dotted lines. Fig. 6 is a detail of the needle-twine-tension mechanism. Fig. 7 is a front view similar to Fig. 1, but showing the mechanism in the position assumed by the parts when in normal position, (needle not shown;) and Fig. 8 is a detail showing the staple secured to the twine.

Similar numerals of reference refer to similar parts throughout the several views.

All of the mechanism shown in Figs. 1 and 7 is operated by a cam 10, mounted revolubly on a pin 11, attached to the case 20 and secured on said pin by a screw-cap 12. The cam 10 is operated by a foot-lever 13 by means of a connecting-rod 14, pivoted to a lug 15 on the cam 10. The cam 10 is held in normal position (shown in Fig. 7) by a strong spring, preferably by a spiral spring 16, coiled around the lower part of the connecting-rod 14, one end of the spring engaging a collar 17 on the rod 14 and its other end resting against the tripod 21, in which the pipe 18 is inserted. This pipe 18 and the tripod 21 form the frame supporting the case 20. For successful operation of the machine the cam 10 must be delicately adjusted to a limited forward movement on account of the compression of the staple 26 requiring exact limits. This is secured by a set-screw 22, against which some part attached to the cam shall strike and thereby arrest at exactly the desired point the forward movement of the cam 10. Such set-screw 22 is shown in Fig. 4, operating in an extension 23, attached to the frame and arranged to receive and arrest the downward movement of the foot-lever, whereby the forward movement of the cam 10 is arrested.

The twine 24 which secures the package or bunch 25 is tied or fastened by a short staple 26, made from a piece of wire, and is clamped upon the ends of the twine 24 close to the bundle 25 with sufficient force to hold the ends of the twine firmly without cutting or abrading them.

The staple 26 is formed as follows: The wire 27 is held on a reel 28, attached to the frame, and one end is passed up inside the case over the feed-wheel 29, which is rotated on a pin attached to the case 20. This wire 27 is held compressed against the periphery of the feed-wheel 29 by a traveler 32, held in position by a strong spring secured to the case 20, whereby the movement of the feed-wheel 29 carries the wire 27 forward. The movements of the feed-wheel 29 are intermittent and of such limit that the wire 27 is carried forward at each movement an exact distance equal to the length of wire required to form the staple 26. Such movements of the feed-wheel 29 are secured by forming the interdental spaces of the crown-ratchet 33 of the feed-wheel 29 exactly such distances apart. In the present instance these spaces are one-half inch apart. The feed-wheel 29 is operated by the move-

ment of the cam 10 against a hanging lever 35, fulcrumed on a projection of the pin on which the feed-wheel 29 is rotated. This lever 35 engages the crown-ratchet 33 by means of a pawl-pin 34, operating through a hole in the lever 35 and actuated by a spring 36. There are three of these spring-catches or pawl-pins used in the machine. Their construction is alike and is illustrated in detail in Fig. 3. This hanging lever 35 is provided with an inward curved edge 37, as shown in Fig. 1, which rides against the cam 10 and is operated by the impingement of a projection 38, operated by the return of the cam 10. A spring 39, attached to the case 20 at one end and impinging against this lever 35 at the other end, restores the lever to its normal position, the pawl-pin 34 rising up over the teeth of the crown-ratchet and dropping down into engagement by means of its operating-spring 36 in position to operate the feed-wheel 29 when again moved outward by the cam 10.

From this feed-wheel 29 the wire 27 is passed up behind the wire-staple lever 40 and through a slot 42 in the top of the staple-compressing lever 41, as shown by the dotted lines in Fig. 1, its end resting on the boss 43, forming part of the staple-die 44. The staple-die 44 is formed by a U-shaped opening made partly in the boss 43 and partly on top of the staple-compressing lever 41, and a portion of the case 20 is cut out to permit the twine to pass through this U and lie on the bottom of the staple 26. The wire-staple lever 40 for forming the staple 26 and cutting it from the wire 27 is fulcrumed on a pin 47, attached to the case 20 and secured thereto by a screw-cap. Its operating end is provided with a die or former 46, and at the upper and inner portion of the former 46 a knife-edged projection 48 is provided and adapted in combination with the upper end of the staple-compressing lever 41 to cut off the wire 27 from the staple 26 when formed. This lever 40 is operated by a spring-catch pin or pawl 34′, (see details in Fig. 3,) operating through a hole in the cam 10, (see Fig. 7,) the outer edge 51 of the lever being chamfered to permit the pawl-pin 34′ to ride over it on its return to normal position. The staple-compressing lever 41 is fulcrumed on the stud 53, on which the twine-disk 52 rotates, and its lower end is operated by a shoulder 55 at one end of a recessed groove 54 in the cam 10.

The mode of operation is obvious from the description. The wire 27 being in position, as described, the former 46 is moved downward, pressing it into the U-shaped die, forming a staple, which is cut by the knife 48 from the wire as soon as formed. The staple-compressing lever 41 then moves against the staple 26, clamping it together upon the twine 24. The wire-staple lever 40 is returned to its normal position (see Fig. 7) by a spring 45 attached to the case. The staple-compressing lever 41 is returned to normal position by its end rising out of the socket 55′. The forward movement of the cam 10 is arrested at the moment of greatest compression of the staple 26 by the impingement against the set-screw 22, as above described, and as the cam 10 is moved backward by the pressure of the spiral spring 16 on the connecting-rod 14 the end of this lever 41 is released from pressure and it resumes its normal position, as described.

The twine-operating mechanism consists of a needle 56, carrying the twine 24 over the bundle 25 and down into the case 20. An inner projection 57 on the needle 56, just below and back of the needle-eye 60, is adapted to compress the upper twine with the lower twine upon the bottom of the U-opening of the case between the staple 26 and the bunch 25, just before and while the staple is being compressed.

A tension-spring 58, regulated by a thumb-screw 59, is attached to the curved arm 65 of the case 20, as shown in Fig. 4, the details of which are illustrated in Fig. 6. The twine 24 is passed from its holder 62 up over the pin 61, attached to the tension-spring 58, and preferably through a slot 61′ in the pin to keep the twine 24 in place. The twine then passes through a guide on the needle 56 and then through the needle-eye 60 into the case, where the end of the twine 24 is held firmly between the twine-disk 52 and the twine-hook holder 72 when in normal position. The pin 61 is movably placed in a hole in the curved arm 65 of the case 20, and when the needle is thrown back into position it impinges against it, forcing it outward, relieving the tension, so that in this position the twine yields freely to the pressure of the bunch. The needle-arm is provided with an extension 63, whereby the needle is operated. Such extension is shown by the dotted lines in Fig. 5. A connecting-arm 66 is pivoted on its upper end to the outer end of this extension 63, its lower part forming a sliding bar 67, which moves in guides 68 in the case 20 and is operated by a pin 69 at its extreme end, which projects into a spiral groove 70, formed in the cam 10, whereby motion is imparted by its oscillation. The operation is obvious. As the cam 10 is moved the spiral groove 70 carries the pin 69 backward and forward, operating the connecting-arm 66, whereby the needle is operated.

The twine-disk 52 is mounted on a stud 53, attached to the case, on which it is rotated, and it is held in place by a screw-cap. It is constructed with U-shaped slots 72 on its periphery, in which a catch or pawl pin 34″ engages to rotate it. This catch or pawl pin 34″ operates and is held in place in a hole in a projection on the cam 10. As the cam 10 is moved forward the pin 34″ engages one of these slots 72 and moves the disk a given distance, sufficient to carry the twine 24 from the needle 56 into engagement with the twine-holder hook 74. The twine-holder hook 74 is a plate of metal provided with a slot or hook 75 and is attached to the case in such position that its flat side presses against the

twine-disk 52, so that when the twine is forced between them it will thereby be held firmly. Its hook 75 is so arranged that it coincides with the slot 72 in the twine-disk 52 when the disk is in its normal position, as shown in Fig. 7. The twine 24 is held in the case 20 by its ends being compressed between the disk 52 and the twine-hook holder 74 at a point to the right of the slot 72. The twine 24 is then moved down into the slot 72 and into the staple 26 by pressure of the bundle 25 against it and is brought over the bunch 25 and down into the slots 72 of the disk 52 and hook-holder 74. (See Fig. 2.) The twine 24 is also compressed by the inner projection 57 of the needle 56, so that its two strands lie close together at the bottom of the staple 26 and slots 72. Back of the twine-disk 52 and holder 74 and attached to the case 20 is a thin flat piece of metal provided with a sharp edge adapted to form a twine-knife 76, and the inner edges of the slots 72 of the twine-disk 52 are also provided with sharpened edges whereby when the twine-disk 52 carries the twine in its slots 72 forward and against the twine-knife 76 the twine is thereby cut off smoothly.

The mode of operation is as follows: A wire is passed from the reel up through a hole in the bottom of the case and over the feed-wheel and through the slot in the operating end of the compression-lever, its end resting on the boss attached to the case, which forms part of the staple-die, as shown in Fig. 7. The machine being in normal position, as shown in same figure, the twine is carried from its receptacle up over the spring-tension through its guides and through the eye of the needle and down into the case, as shown in Fig. 4. When in the case, the end of the twine is placed between the twine-hook holder and the disk to one side of the slot, as shown in Fig. 7, the bunch is then placed against the twine between the needle-eye and the case, and the twine freely gives to such pressure, as the tension is thereby entirely released, and the bunch is placed and lies on the twine and in the curved arm of the case. When the foot-lever is moved downward, the wire-staple lever and the needle commence to be operated simultaneously. The first effect is the forming of the staple, as described, and cutting it from the wire. At this time the needle has carried the twine over the bundle into the staple and slots of the twine-hook holder and the twine-disk, and its inner projection impinges both strands of the twine and the bundle, holding them in position, as shown in Fig. 2. Almost simultaneously with this but subsequent thereto the twine-disk and the compression-lever begin to operate and the staple is clamped upon the twine and the twine is cut free by this further movement, so that as the needle is raised the bundle falls out, secured as described. On the return of the cam the hanging lever of the feed-wheel is operated upon and the wire is fed another distance forward, so that its free end rests upon the boss ready to form the next staple.

This machine is intended, primarily, for tying small bundles and vegetables into bunches for marketing, but I do not confine it to such uses.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a bunching-machine the combination of a case to hold the mechanism; a cam; a staple-die as 44; a staple-former for the die; a knife attached to the staple-former adapted to cut the staple when formed from the wire; a lever adapted to operate said staple-former; a staple-compressing lever as 41; a needle provided with an eye over which the twine passes and fulcrumed so that its other end forms an extension to operate it like a lever; a connecting-arm at the end of said extension, its lower part forming a sliding bar; a pin at the end of said sliding bar adapted to enter a spiral slot in the cam; a twine-disk provided with a series of U-shaped slots for operation and for the reception of the twine; a pawl-pin held in place by a spring attached to the cam and adapted to engage said slots and rotate the disk a given distance by the oscillation of the cam; a twine-hook holder provided with a hook attached to the case, and adjusted so that the hook part coincides with one of the slots of the disk, when the machine is in its normal position, and so adjusted that when the twine-disk carries the twine forward between the disk and the lever, the twine shall be firmly held between them; and a twine-knife attached to the case and adapted to sever both strands of the twine when the disk carries them against it; substantially as described.

2. In a bunching-machine a needle provided with an eye through which a twine for tying the bunch or parcel passes, the needle being pivoted so that its other end forms an extension, whereby it is operated like a lever, to throw the needle in and out of position: a connecting-arm pivoted to the end of said extension of the needle its lower part forming a sliding bar: a pin at the end of said sliding bar adapted to enter a slot in the cam: a cam attached to the case and provided with a spiral slot adapted to move said bar inward and outward by its oscillation: and means to operate the cam.

3. In a bunching-machine a twine-disk provided with a series of U-shaped slots for operation and for reception of the twine: a pawl-pin held in place by a spring attached to the cam, and adapted to engage said slots and rotate the disk a given distance by the oscillation of the cam: a twine-hook holder provided with a hook attached to the case and adjusted so that the hook part coincides with one of the slots of the disk when the machine is in normal position, and also so adjusted that when the twine-disk carries the twine

forward between the disk and the holder, the parts shall be so related as to hold the twine firmly between them.

4. In a bunching-machine a twine-disk provided with a series of U-shaped slots for operation and for reception of the twine: a pawl-pin held in place by a spring attached to the cam and adapted to engage said slots and rotate the disk a given distance by the oscillation of the cam; a twine-hook holder provided with a hook attached to the case and adjusted so that the hook part coincides with one of the slots of the disk when the machine is in normal position, and also so adjusted that when the twine-disk carries the twine forward between the disk and the holder, the parts shall be so related as to hold the twine firmly between them: a twine-knife attached to the case and adapted to sever both strands of twine by the rotation of the disk carrying the two strands of twine against it.

5. In a bunching-machine a die for forming a wire staple, a staple-former attached to the wire-staple lever fulcrumed on a stud attached to the frame: a knife-edge attached to said former adapted to cut the wire from the staple when formed: a staple-compressing lever adapted to compress the staple firmly upon two strands of twine placed in the staple: a twine-disk provided with a series of slots on its perimeter for the purpose of operating and to form guides for the twine: a twine-knife attached to the case and arranged to cut the twine when the twine is carried against it by said disk: and a cam adapted to operate all of said mechanism consecutively, so as to tie the package or parcel.

In testimony whereof I affix my signature in presence of two witnesses.

BRITTON POULSON.

Witnesses:
H. D. WINCH,
H. C. HARTMAN.