Oct. 6, 1925. 1,555,843

G. M. HASEN

SACK TYING MACHINE

Filed Feb. 4, 1924 2 Sheets-Sheet 1

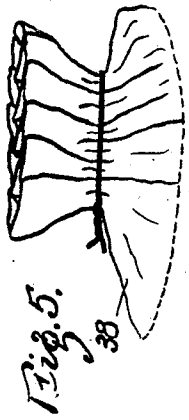


Fig. 5.

Fig. 1.

Fig. 3.

Inventor:
Geo M. Hasen.
By Higdon & Higdon.
Attorneys

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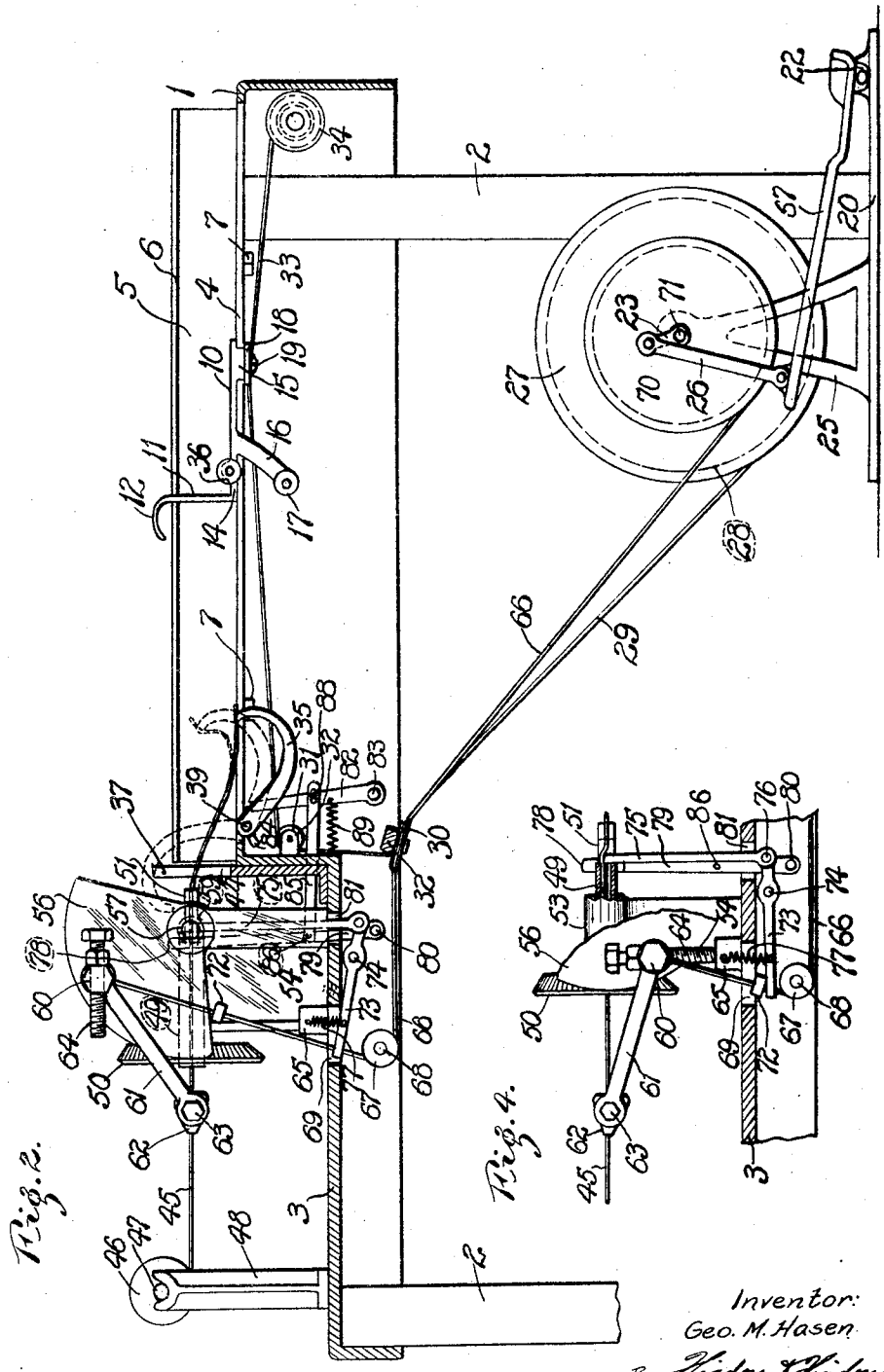


Fig. 2.

Fig. 4.

Inventor:
Geo. M. Hasen
By Wigdon & Wigdon.
Attorneys

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UNITED STATES PATENT OFFICE.

GEORGE M. HASEN, OF ST. LOUIS, MISSOURI.

SACK-TYING MACHINE.

Application filed February 4, 1924. Serial No. 690,549.

To all whom it may concern:

Be it known that I, GEORGE M. HASEN, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Sack-Tying Machines, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention consists in the novel construction and combination of parts hereinafter particularly described and distinctly claimed.

The object of my invention is to provide an improved bag or sack-tying machine, that shall be capable of tucking and tying the open end or mouth of empty cement bags or sacks, that are afterwards to be filled with cement through the usual valved bottom-end; and which machine or apparatus shall operate rapidly and efficiently, to tie large numbers of bags or sacks in a much shorter time than is now required, and thereby save considerable time and labor.

A further object is to provide a sack-tying machine of the class mentioned in the last above paragraph, that shall be of low cost, reliable and efficient in operation, and that can be operated by any suitable power, such as may be convenient and advisable.

In the drawings,

Fig. 1 is a top plan-view of a pedal-operated sack-tying machine constructed in accordance with my invention, a part of the table or bench being broken away, to show the pedals beneath.

Fig. 2 is a vertical longitudinal section of the machine.

Fig. 3 is a detail fragmentary sectional view of the wire-looping, clamping, twisting and cutting devices.

Fig. 4 is a detail fragmentary sectional view of the wire-feeding, clamping, and cutting devices, as they appear during the cutting operation, and Fig. 5 is a view of a tied sack or bag.

In the present form of the machine, I provide a suitable table or bench 1, which may be supported upon legs 2, and provided with a depressed portion 3 at one end. Fig. 1.

A longitudinal slot 4 is made in the main portion of said table, and said slot extends almost the full length of said main or elevated portion of the table, and is located near the rear edge or side of said table, parallel with that edge.

An overhanging sack-gage and guard 5, is adjustably mounted on said main portion of said table 1, and extends thereon parallel to said slot 4, and has substantially the same length as the latter; the said gage being substantially rectangular in cross-section, and having an upper horizontal flange 6 terminating a short distance in the rear of said slot, and elevated above the upper surface of the main portion of the table about one and one-half inches, Fig. 2, so as to overhang and guard the open end of the sack during the tucking operation.

Said overhanging sack-gage and guard 5 is adjustably secured in the position shown and described, by means of bolts or screws 7 passed through slots 8 in the lower or base-flange 9 and through registering bolt-holes formed in said main table, so that said combined gage and guard may be readily adjusted nearer to or farther from said slot 4, in determining the length of the neck on the tied sacks, as may be desired, and as required by the size and length of the sacks to be tied; a long large sack requiring a longer tied neck than a shorter and smaller sack requires.

A reciprocating tucker, composed of a flat horizontal body 10, a vertical tucking-arm 11 having its upper end curved or bent to form thereat an overhanging flange 12, and other parts that will be presently described, is mounted on the upper surface of said main table 1, to slide longitudinally of said slot 4, in tucking the bags to be tied.

Formed in the horizontal body 10 of the tucker is a slot 14, which registers with the said slot 4 in said main table 1 during the reciprocations of the tucker.

Formed on the underside of said tucker-body, and passing downwardly through said slot 4 in the main table 1, to guide the tucker in its movements, is a shank 15 and a roller-carrying arm 16; there being a roller 17 mounted on the lower end of said arm and

a detachable head or washer 18 secured on the lower end of said shank by means of a screw 19, Fig. 2.

Said head or washer 18 loosely slides beneath the underside of said main table 1, and holds the tucker-body in place, although permitting it to slide loosely above said table-slot 4.

Mounted on a suitable base 20, beneath the table 1 at a point convenient for the operator's feet, is a pedal 21, the heel of which is hinged or pivoted to said base by means of hinge-members 22.

The free end of said pedal 21 is connected to a crank 23 that is fixed on one end of a shaft 24 mounted in bearings in suitable stands or brackets 25 rising from said base 20; said connection of said pedal to said crank being accomplished by means of a connecting-rod 26.

A large drive-wheel 27 has a peripheral-groove 28 and is fixed on said shaft 24, to rotate therewith, and a flexible cord, wire, wire-cable or belt 29 has one of its ends attached to said drive-wheel in said groove, by any common attaching-means such as a clamp.

The opposite end of said belt-member 29 is fastened to said tucker-shank 15 by any suitable clamping-means, such as by being clamped in place between said shank and its detachable head or washer 18, just beneath said main table 1.

Intermediate supporting-rollers 30 and 31, mounted upon suitable supports or brackets 32 attached to the frame of the machine, as shown in Fig. 2, carry said belt-member 29 from said drive-wheel 27 to the said tucker-shank 15, so that when said pedal 21 is depressed, said belt-member will be wound around said drive-wheel, and the tucker will be drawn from its normal position at or near the right-hand of said main table 1 towards the left-hand thereof, in tucking a bag or sack mouth or open end.

Said tucker is normally retracted, and returned to its normal position near the right-hand end of said main table 1, by a flexible belt-member, wire or cable 33, one end of which is attached to the said tucker-shank 15, and the opposite end of which is fixed to and wound around a common spring-roller 34, that is mounted at the right-hand end of said table, Fig. 2, beneath said table-slot 4.

The previously-mentioned roller 17 on the lower end of said depending tucker-arm 16 is located a considerable distance below the tucker-body 10, for the purpose of contacting with and lifting a curved looper 35, which will be described in detail later on.

An additional contact-roller 36 is also mounted on the tucker-body 10, to operate in the said slot 4 of the main table 1, a considerable distance above and in the rear of said looper-lifting roller 17, to engage said curved looper 35 after same has been elevated by said last-mentioned roller, and force said looper into position to form a wire-loop around the tucked neck of the bag.

The wire looper, the wire-clamp, the wire-twister, and the cut-off knife.

A vibrating looper 35 that was previously mentioned, is substantially C-shaped in side-elevation, and is pivoted at one end upon a suitable support, so that said looper may vibrate up and downwardly in the left-hand end-portion of the said long slot 4 in said main table 1, and be projected above the table-top as indicated by the dotted lines in Fig. 2, although normally occupying a position entirely below the plane of the upper surface of said table-top, so as to permit the before-described tucker-arm 11 to approach sufficiently near a vertical slotted bag-stop or abutment 37 (while said C-shaped looper is up in a looping-position) to tuck the bag 38 closely against the said vertical bag-stop.

The preferred support for the looper 35 is a short transverse shaft 39 (Fig. 1) having suitable bearings or brackets 40 in which the ends of said shaft may be fixed or journaled; said brackets being secured in any well-known manner to the frame of the machine. Of course, if said shaft 39 is mounted to rock in said bearings or brackets 40, the pivoted-end of said looper 35 will be fixed on said shaft; but if said pivoted end of the looper is loosely mounted on said shaft, the latter should be fixed.

A spring 41 is coiled around said looper-shaft 39 and has one of its ends fixed to an adjacent bearing or bracket 40, and the opposite end of said spring is secured to (or in engagement with) the said looper 35, to normally hold said looper in a position below the upper surface of said main table 1, where it will be out of the way of the bag 38 while the latter is spread flat on the upper surface of said main table, as indicated by the dotted lines in Fig. 1.

The said bag-stop 37 is secured in place by means of screws 42 passing through perforations in an integral flange 43 at the lower edge of said stop and engaging threaded holes in the adjacent top of the said depressed-portion 3 of the table.

A vertical slot 44 is formed in the upper edge of the said bag-stop 37, in alignment with the said slot 4 in the main table to enable the tie-wire 45 to be fed through said bag-stop slot.

A suitable supply of tie-wire 45 is wound off a reel 46, that is shown with its pintles 47 mounted upon common bearing-brackets 48 that rest upon the top of the said depressed-portion 3 of the table; although,

of course, the said reel or spool may be otherwise located, as may be most convenient, and I prefer to take the supply of tie-wire from a wire-reel of my own invention, which forms the subject-matter of recent Patent, No. 1,488,541, granted to me April 1, 1924.

A hollow shaft 49 has a pinion or gear-wheel 50 fixed on its outer end, and has opposite wire-clamping jaws 51 pivoted to its other end by means of suitable pivotal-means 52, and said shaft is mounted horizontally in alignment with the said vertical slot 44 of said bag-stop 37.

Said hollow-shaft 49 and the clamping-jaws 51 carried thereby, form what will be hereinafter termed the wire-twister.

Said shaft 49 is mounted in a bearing 53 carried upon the upper end of a twister-stand 54, that rests upon the upper surface of the said depressed-portion 3 of the table.

The said tie-wire 45 is led from said reel 46 into and through the bore of said twister-shaft 49, and thence between said twister-jaws 51, thence through said vertical-slot 44 of said bag-stop 37, and thence into a notch 55 that is formed in the free end of the said looper 35 (Fig. 1), while the latter is depressed (Fig. 2).

Motion is communicated to the pinion 50 of the twister-shaft 49 by a rocking-segment 56 which has gear-teeth that mesh with the teeth of said pinion; said segment being fixed upon a transverse rock-shaft 57 mounted in bearings in the upper ends of stands or brackets 58 rising from the top of said depressed-portion 3 of the machine table.

A spring 59 is coiled around the segment-shaft 57, and has one of its ends fixed to an adjacent bracket 58, Fig. 1, while the opposite end of said spring is secured to the adjacent hub of said segment 56; so that said spring will return said toothed-segment to its normal elevated position, in which it is shown in Figure 2.

A stud 60 projects from the outer-side of the said toothed segment 56, and has a wire-feeding arm 61 loosely mounted thereon; said arm extending outwardly towards the wire-spool or reel 46, and having common wire-clutching means 62 upon its outer end, to feed the wire step-by-step to the bore of said twister-shaft 49, as the said clutching-means alternately slides upon and grips said wire as the said toothed-segment is rocked by the means hereinafter described, or by any other common or suitable means.

Said outer end of the wire-feeding arm 61 is pivoted to the said wire-clutch 62 by means of a bolt or screw 63, so that as the inner end of said arm moves up and down during the rocking-movement of said toothed-segment 56, the said wire-clutch will be correspondingly slid back upon the tie-wire 45 and slide loosely thereon while so doing, but will tightly grip the wire and feed the same when said segment is returning to its normal position, in which it is shown in Fig. 2.

To limit the downward movement of the toothed-segment 56, and thereby regulate or alter the stroke thereof, as desired, a set-screw 64 is threaded through said stud 60, Fig. 4, so that the end of said screw will contact with a stop-lug 65 rising from the top of said depressed-portion 3 of the table, and stop the movement of said segment, as the same is pulled downward by its operating-cable, belt, or wire 66.

For operating said toothed-segment 56, its operating-cable or belt 66 is connected to said segment-stud 60 by any common attaching-means, and is thence led downwardly to and under a grooved-pulley or roller 67, Figs. 2 and 4, that is mounted on a pin or stud 68 carried by the machine frame, at a point below the top of said depressed-portion 3 of the table, said cable or belt passing through a suitable slot or opening 69 in said top.

From said pulley 67 said cable or belt 66 engages another grooved pulley or roller (as 30), from which it is led to the smaller grooved-wheel 70 carried by a crank-shaft 71 mounted in bearing-brackets 25 and having a crank 23, the same as has been previously described in connection with the crank-shaft of the larger wheel pedal 21.

The usual connecting-rod 26 connects the crank of said small-wheel 70 to its pedal 67.

A collar or enlargement 72 is fixed on the said wire cable or belt 66 at a point directly below the said vibrating wire feeding-arm 61, Figs. 2 and 4, to contact with the free end of a knife-operating lever 73 as these parts approach the position in which they are shown in Fig. 4, and thus operate a vertical wire-cutting knife 75, to sever the wire after a bag or sack has been tied, as will be presently described in detail.

Said knife-operating lever 73 is pivoted at 74 to the frame, and lies in a horizontal position below the said slot 69 in the top of the depressed-portion 3 of the table, the pivotal-point of said lever being sufficiently near to the lower end of said vertical knife 75 to provide ample leverage for the cutting-off operation; the lower end of said knife being pivotally-connected at 76 to the inner end of said knife-operating lever.

The upper end of said cutting-knife 75 is arranged, Fig. 4, to slide up and down across and in contact with the adjacent inner end of the hollow twister-shaft 49, and cut the wire 45 thereat and therein, when the upper end (the cutting end) of said knife is moved upwardly into contact with the wire, and a slight distance past the bore of said twister-shaft.

A suitable spring, as 77, has its upper end attached to the said stop-lug 65, and has its lower end connected to the said knife-operating lever 73, at a point between the fulcrum-point and the outer end of said lever; the arrangement being such that said spring (or its equivalent) will act to normally and yieldingly hold said cutting-knife 75 in a retracted position, below and out of contact with the wire that is carried in the bore of said twister-shaft 49, as well as below the path of the said twister-jaws 51, during the rotation of the latter in twisting the wire and tying a sack, as will be further described.

The before-mentioned twister-jaws (wire-clamping jaws) 51, being pivoted to the said hollow twister-shaft 49, of course rotate therewith, and are arranged so that their centrifugal force will separate their inner (or clamping) ends a sufficient distance to allow the wire 45 to pass freely between them during the feeding of the wire, as will be presently described; or, of course, said jaws may be arranged with common spring-means for normally separating their clamping-ends, as may be desired.

A U-shaped jaw-clamp 78, Figs. 1 and 4, for engaging the sides of said twister-jaws 51 in a cam-like manner, and closing them at the proper time upon the wire 45 and its looped portion, to twist the same and tie a sack in the manner hereinafter described, is fixed upon or formed integral with the upper end of a rocking vertical vice-arm 79. Hereinafter said jaw-clamp will be termed the vice, 78.

Said vice-arm 79 extends downwardly to a point below the top of the depressed-portion 3 of the table, and has its lower end pivoted at 80 to the machine frame or some suitable support, so that when said vice-arm is vibrated on its pivot the said jaw-clamp or vice 78 will be forward to clamp said twister-jaws 51 upon the wire, and backward to release the twisted ends of the wire-loop, after the latter has been placed around the neck of the tied sack, in the manner later described.

The numeral 81 designates a slot or opening formed in the depressed-portion 3 of the table, for the accommodation of the said vertical cutting-knife 75 and the vertical vice-arm 79.

A vertical rock-lever 82 has its lower end pivoted at 83 to the frame, and its upper end is located at a point near to the transversely-mounted looper-shaft 39, and at a short distance in advance of the latter.

A horizontal connecting-rod 85 has one end pivoted at 86 to the said vertical vice-arm 79, Fig. 3, at a slight distance above the top of the depressed-portion 3 of the table, and the opposite end of said connecting-rod is pivotally-connected to the said vertical rock-lever 82 by means of a pin, bolt or rivet 88 that is fixed in said vertical rock-lever, to slide in a short horizontal slot 87 formed in said connecting-rod, for the well-known purpose of permitting a slight or limited amount of lost-motion between the parts that are thus connected by said pin-and-slot device.

A suitable spring 89, Fig. 3, has one of its ends attached to the said vertical rock-lever 82 at a point slightly below the said slotted-end of said horizontal connecting-rod 85, and the opposite end of said spring is fixed to the adjacent frame of the machine.

The function of said spring 89 is to yieldingly hold said vertical rock-lever 82 in the position in which it is shown in Fig. 2, which is inclined towards the left-hand in said figure, with the free upper end of said lever in close proximity to the shaft 39 of the looper 35, and in the path of a cam or lug 84 that projects from the hub or boss of said looper, and comes into contact with the upper end of said rock-lever when said looper approaches the limit of its looping-movement, in which it is shown in Fig. 3.

The power of the said spring 89 also normally forces the said connecting-rod 85 endwise towards the left-hand in the figures of the drawing in which it is shown, and such movement retracts and holds retracted the twister-jaw vice 78, to permit the said twister-jaws 51 to be rotated, after they have released the wire 45 from which the bag or sack ties are made, as will be more clearly described hereinafter.

The operation.

The machine is first threaded by hand, with the parts in the relative positions in which they are shown in Figs. 1 and 2, by taking the tie-wire 45 from the spool or reel 46, passing it through said wire-clutch 62, thence into and through the bore of the hollow twister-shaft 49, thence through the vertical slot 44 of the vertical bag-stop 37, and finally placing the end of the wire in the looper-notch 55, Fig. 1, and pressing the wire into a curved form approximating the curved shape of the looper 35, and permitting the end of the wire to project a slight distance inwardly past said looper-notch, as shown in Fig. 2.

Then the bag to be tied is taken from the top of a pile of flat untied bags or sacks (not shown) that is located on a suitable stand or support convenient for the operator, and the flat bag is spread flat on the main table 1, with its untied end beneath the said overhanging-flange 6 of the sack-gage and guard 5, and against the inside of the vertical wall of said gage, which determines the length of the neck on the tied sacks, and also confines the folds of the bag or sack (after it has been tucked, as well as

during the tucking operation) and prevents said folds from bulging upwards.

Then the operator presses his foot on the pedal 21 of the large drive-wheel 27, winding its belt or wire 29 thereon and advancing the tucker into contact with the adjacent edge of the flat bag, which is pushed towards the looper 35 by the vertical tucking-arm 11, and as the tucker continues to advance the mouth of the sack will be tucked or folded into small compass, and the lower or advance roller 17 of the tucker will come in contact with the curved under edge of said looper, and first raise the latter to the position indicated by dotted lines, in Fig. 2.

However, just previous to this elevation of the said looper 35, the said tucked bag in small compass will be pressed against the vertical slotted bag-stop 37, with the curved wire section beneath said tucked bag neck, ready to be brought up and looped around said neck, as shown by the dotted lines in Fig. 2.

Then, as the looper is contacted by the upper roller 36 of the tucker, said looper is caused to assume the position in which it is shown in Fig. 3, with the tucked bag-neck tightly clamped between the upstanding curved looper 35 and the adjacent vertical bag-stop 37, and with the curved wire section entirely encircling said bag-neck; and when said looper is in said last-mentioned (or final) position it deposits the free end of said wire-loop thus formed in position between the twister-jaws 51, which latter are timed to be open and stationary while the end of the wire-loop is placed between them alongside of the body of the wire that is also between said jaws.

As the looper 35 nears its final looping-position, as just described, a lug 84 on the looper strikes the adjacent upper end of the said vertical rock-lever 82 that is connected, as before described, to the vertical vice-arm 79, and pulls the vice 78 into clamping-position upon said twister-jaws 51, and thus tightly clamps the looped wire between said jaws.

Then, while the first-mentioned pedal 21 is held down, the other pedal 67 is pushed down, winding its belt or wire 66 around the smaller drive-pulley or wheel 70, pulling down the said gear-segment 56 from the position in which it is shown in Fig. 2 to that in which it is illustrated in Fig. 4, rotating the clamped twister-jaws 51, and twisting or tying the wire, until it is in the form in which it is shown in Fig. 5.

Simultaneously with the downward movement of the said toothed-segment 56 the wire-feeding clutch 62 will be slid on the wire 45 towards said wire spool or reel 46, from the position in which it is shown in Fig. 2 to that illustrated in Fig. 4, where it will be in position to grasp the wire, and feed another section thereof into the hollow twister-shaft 49, upon the return of said segment to its normal position, as has been previously described.

After the twisting-operation has been accomplished, the collar or enlargement on the upstanding section of the belt or cable 66 of the smaller drive-wheel 70, Fig. 4, will strike the underlying end of the horizontal knife-lever 73, depress the same from the position shown in Fig. 2 to that illustrated in Fig. 4, project the free end of the vertical knife 75 upwardly into contact with the twisted wire above it, and cut the twisted wire; the movement of the twister-jaws 51 and the knife 75 being timed so that the upper end of the latter may be projected into the circular open space between said jaws, Fig. 1.

The knife 75 is retracted by the spring 77, upon the upward (or return) movement of the said toothed-segment 56, as in Figs. 2 and 4.

To return the parts to a normal position, the pressure on the pedal 21 is released, and the spring-roller 34 will rewind its belt or wire 33 upon itself, and pull back the tucker-body 10 and parts carried thereby to a position ready to receive another flat untied sack, releasing the C-shaped looper 35, and its spring 40, Fig. 1, will swing it back into normal position downwardly through said table-slot 4, as shown in Fig. 2.

When the said looper approaches its normal retracted position, as just described, its lug 84 releases the upper end of said vice-operating vertical rock-lever 82, and releases said twister-jaws 51, by permitting said vice 78 to be retracted by the power of said spring 89.

Then the pressure on the other pedal 67 is released, and the said spring 59 around the segment-shaft 57 will return the toothed-segment 56 and all parts carried thereby to normal positions. Fig. 2. Said knife-spring 77 will also cause the knife 75 to be retracted.

Simultaneous with the approach of the said toothed-segment to its normal elevated position, the said wire-clutch 62 will push the wire 45 into and through the hollow twister-shaft 49, thence between said twister-jaws 51, thence through the slot 44 of the vertical bag-stop 37, and thence a sufficient distance above the looper 35 to enable the wire for another loop to be caught in the said notch 55 in the nose of said looper, ready to form the next loop. Fig. 2.

I claim:—

A sack-tying machine having a longitudinally-slotted table; a reciprocating tucker arranged to move above the slot in said table; an arm depending from said tucker through said slot and carrying a roller on its lower portion; a guide-shank also de-

pending from said tucker through said table-slot; another roller mounted on said tucker above said roller carried by said depending arm; a vertical tucking-arm rising from said tucker a distance above the top of said table, and having a curved overhanging flange for confining the bag during the tucking-operation; a suitable spring-member connected to said tucker and adapted to return same to normal retracted position; a sack-gage and guard adjustably mounted on said table at one side of said table-slot and having an overhanging flange beneath which the open end of the flat bag is placed and confined during the tucking-operation; a vertical bag-stop against which the bag is tucked by said vertical tucking-arm upon the actuation of said tucker, said bag-stop being located at the tying-end of said sack-gage and guard, in the path of said tucking-arm, so that the tucked neck of the bag will be confined between said bag-stop and said tucking-arm; means for passing a wire around the tucked neck of the bag while same is thus confined; means for twisting the wire to tie the same, after it has been looped around said bag-neck; means for cutting-off the looped wire from a coiled supply of wire; after the loop has been tied around the bag-neck; and suitable means for driving said wire-twisting and cutting-off means, and for reciprocating said tucker.

In testimony whereof, I have signed my name to this specification.

GEORGE M. HASEN.