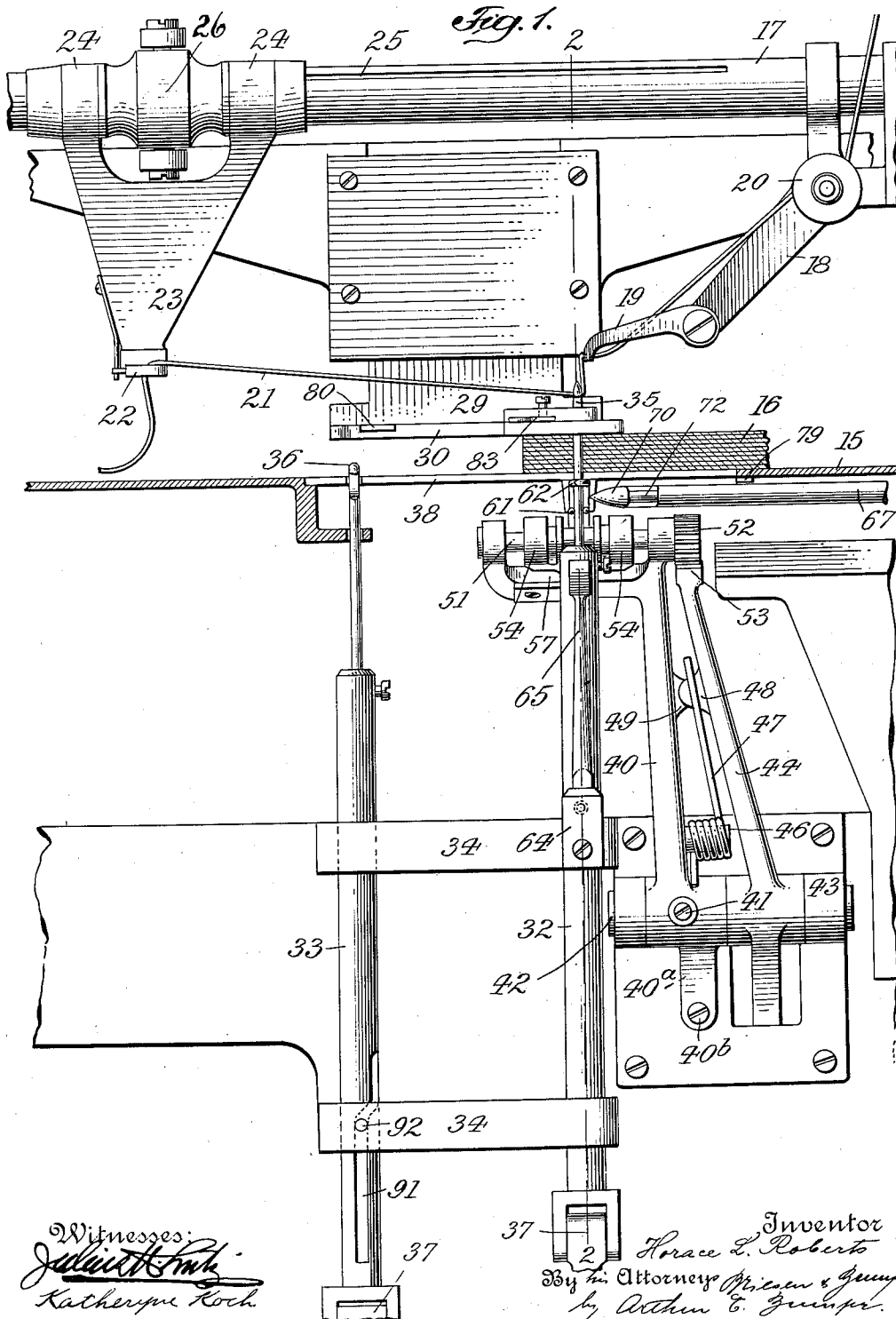


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4 SHEETS—SHEET 1.

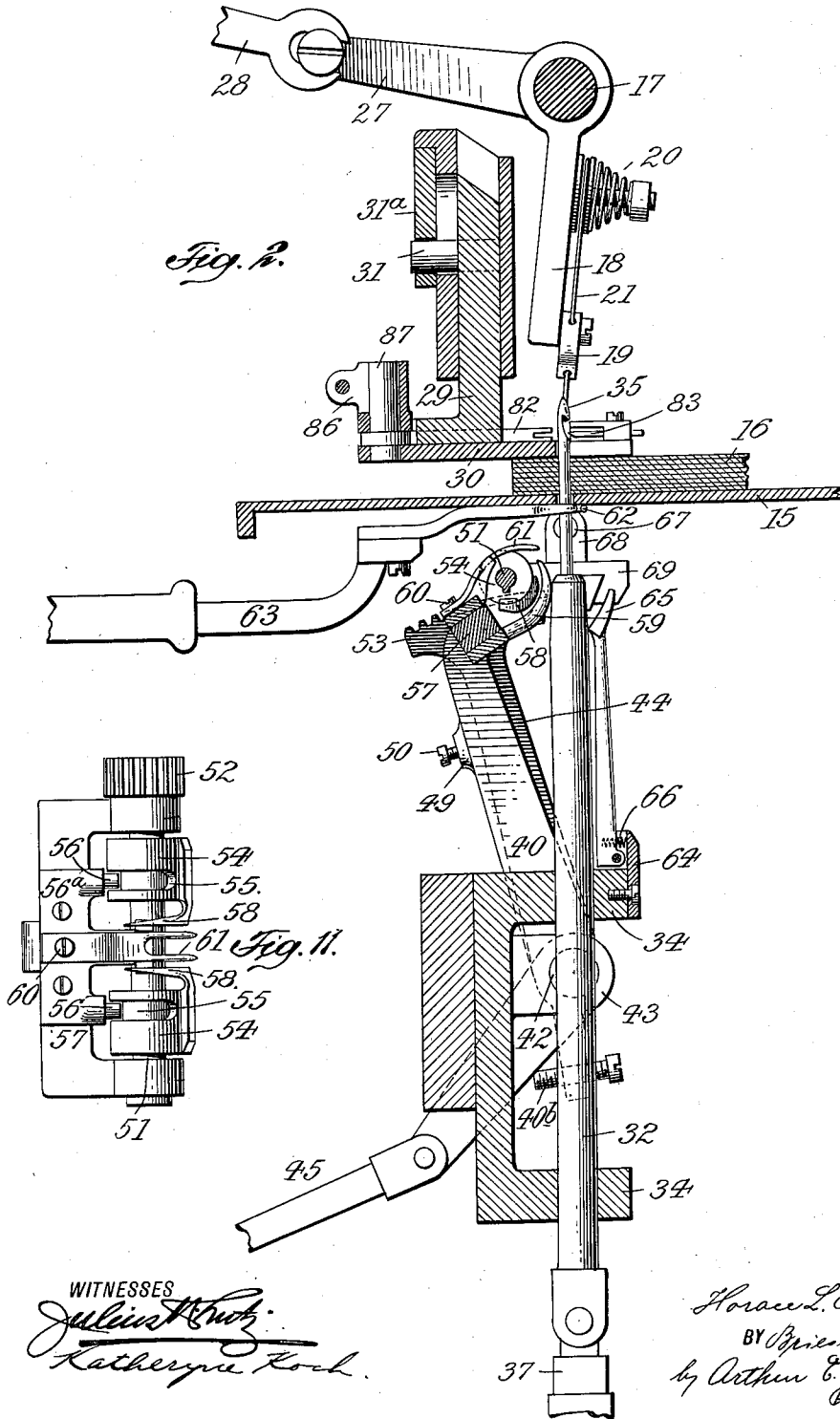


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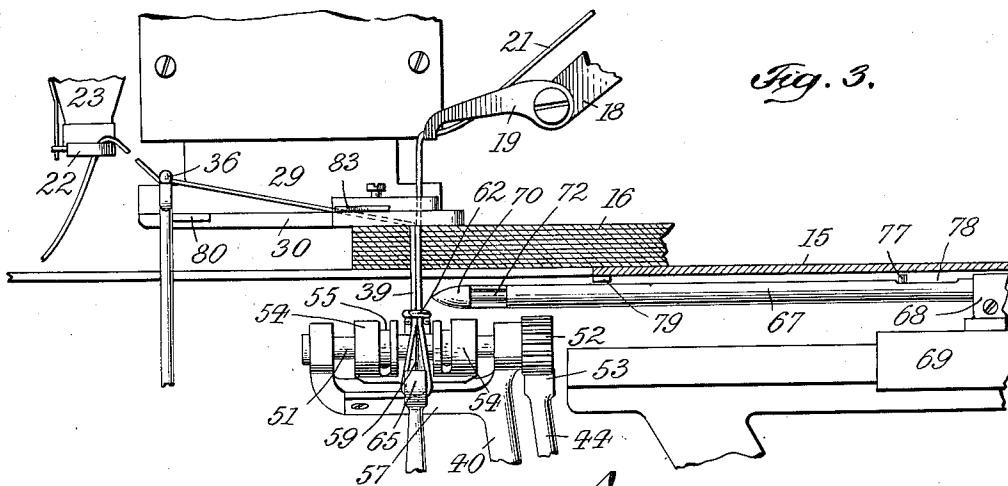


Fig. 3.

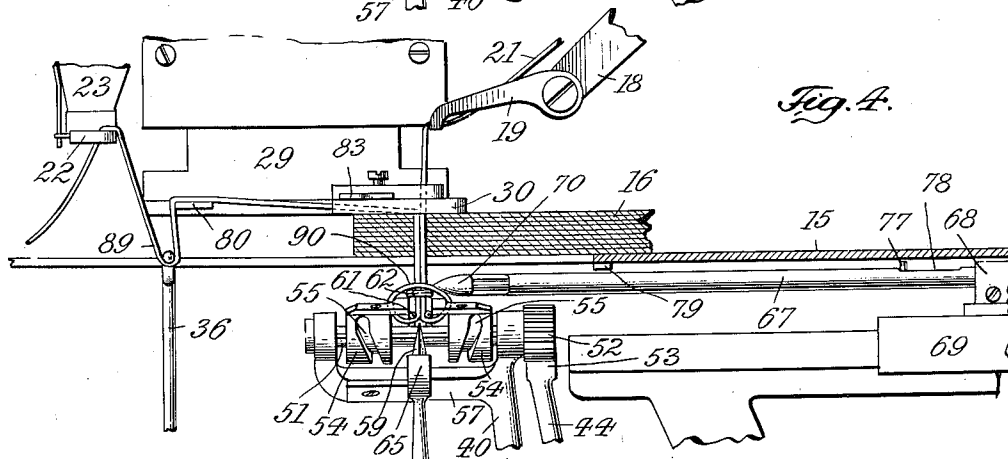


Fig. 4.

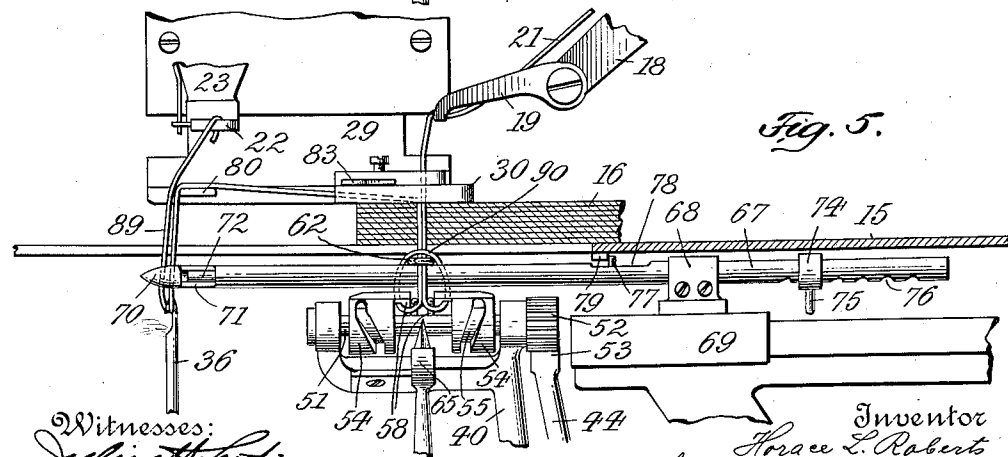


Fig. 5.

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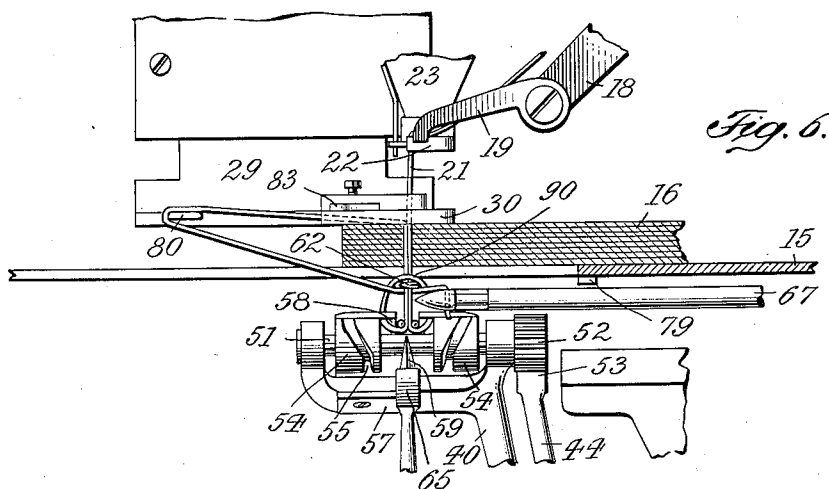


Fig. 6.

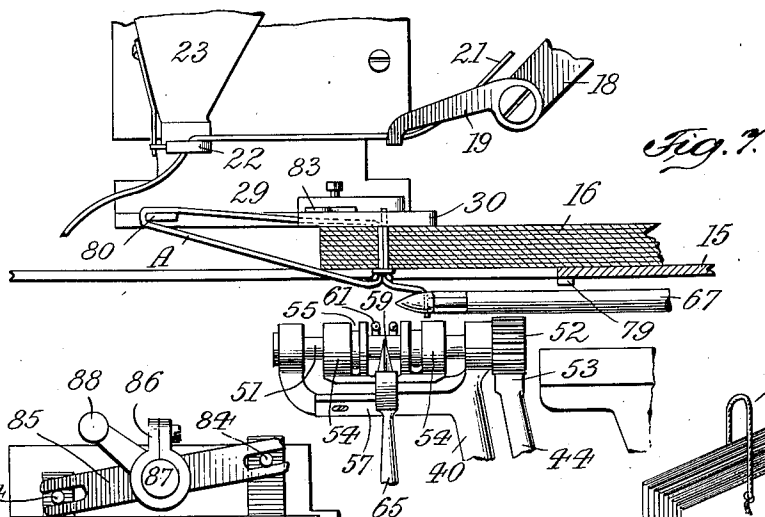


Fig. 7.

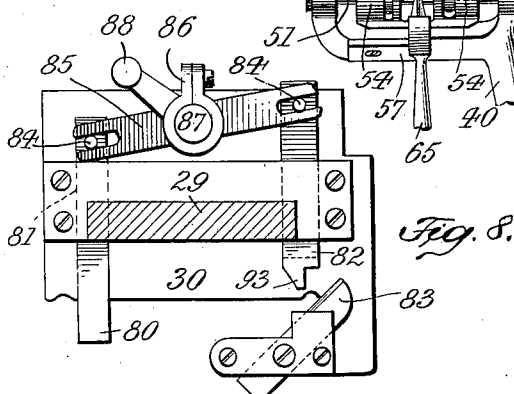


Fig. 8.

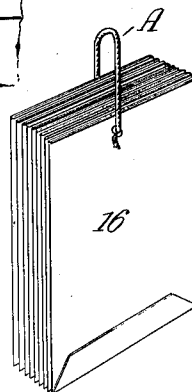


Fig. 10.

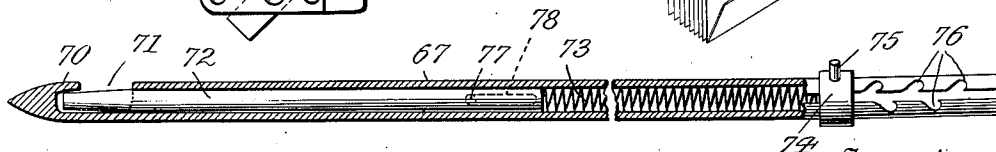


Fig. 9.

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UNITED STATES PATENT OFFICE.

HORACE L. ROBERTS, OF NEW YORK, N. Y.

BAG-LOOPING MACHINE.

1,019,186.

Specification of Letters Patent.

Patented Mar. 5, 1912.

Application filed October 25, 1910. Serial No. 589,017.

To all whom it may concern:

Be it known that I, HORACE L. ROBERTS, a citizen of the United States, residing at New York city, Brooklyn, county of Kings, and State of New York, have invented new and useful Improvements in Bag-Looping Machines, of which the following is a specification.

This invention relates to a machine of novel construction for drawing a string or string-like member through a number of paper bags or similar articles, and forming said string into an open loop which constitutes a suspension device for the bags. During use, the bags are successively torn from the string as they are used up from time to time, so that the loop is frequently subjected to considerable strain. By my invention the loop is closed in such an efficient manner, that it is not liable to become opened under the aforesaid strains.

Briefly stated, the machine comprises essentially means for supplying a length of thread necessary for forming a loop, a vertically reciprocative needle which pierces the batch of bags and subsequently draws a sling therethrough, means for turning and doubling said sling, a hook which pulls the end of the thread downward, and into the path of a looper that passes through the doubled sling; grasps the thread end and pulls the same through the sling thereby tightening the latter into a so-called "square" knot, a suitable spreader determining the length of the loop formed. The knot applied to the loop prevents an accidental opening thereof so that the loop may be used as a hanger for the bags from which they may be consecutively torn as needed.

It may here be stated that the drawings disclose all the essential features of construction necessary for producing the desired result, while the merely mechanical details, such as cams, cam levers etc. for effecting the proper movement of the loop-forming parts have been omitted for the sake of greater clearness.

In the accompanying drawing: Figure 1 is a sectional front elevation of part of my improved bag-looping machine; Fig. 2 a vertical cross section on line 2-2, Fig. 1; Figs. 3, 4, 5, 6 and 7 represent in sectional front elevations, consecutive positions of the loop-forming parts; Fig. 8 is a sectional

plan view of the thread cutter, loop-spreader and cooperating parts; Fig. 9 a longitudinal section through the looper; Fig. 10 a perspective view of a number of looped bags; and Fig. 11 a plan view of part of the loop forming mechanism.

Above a suitable flat table or work holder 15, which supports the bags 16 during the loop-forming operation, is mounted a longitudinal shaft 17. To the latter is clamped or otherwise secured a bent arm 18 carrying at its free end a perforated thread guide 19. Upon arm 18 is mounted a tension device 20 that adjusts the tension of the string or other flexible member 21 supplied from a spool (not shown). Thread 21 extends from guide 19 to a clamp 22 into which it is inserted in manner hereinafter described. Clamp 22 is formed at the lower end of an arm 23, the eyes 24 of which are slidably mounted on shaft 17, a groove and feather connection 25 preventing rotation of arm 23 on said shaft. Arm 23 may be reciprocated at predetermined intervals by suitable means engaging a sleeve 26 that loosely embraces shaft 17 intermediate eyes 24. Arm 18 has a rearward extension 27 engaged by the forked end of a lever 28 which is adapted to impart a slight rocking movement to shaft 17 for a purpose hereinafter described.

Back of arms 18, 23 there is mounted in the machine frame a vertically reciprocative slide 29 carrying a relatively fixed forwardly extending plate 30 that constitutes a presser foot. Slide 29 receives its movement through a pin 31 engaging a corresponding cam groove of a horizontally reciprocative slide 31^a in such a manner that upon the introduction of a stack of bags 16 and the subsequent start of the machine, the presser foot is lowered to firmly hold the bags to the work table 15 when the loop is formed, while it ascends after the completion of the loop to permit a ready withdrawal of the looped bags and the introduction of a new set of bags.

Below table 15 are arranged a pair of vertically reciprocable holders 32, 33 guided in bearings 34 and carrying an open beaked needle 35 and a hook 36 respectively. Holders 32, 33 receive properly timed movement by links 37 (Fig. 1). Needle 35 and hook 36 pass through corresponding holes of

table 15, which are connected by a longitudinal slot 38 extending a distance beyond the same.

The correlation of the parts is such that
 5 after a length of thread has been suspended between arms 18, 23 and after a batch of bags has been clamped to table 15, needle 35 ascends to pierce the bags whereupon shaft 17 together with arms 18, 23 is turned
 10 backward to place the thread into the beak of needle 35 (Figs. 1 and 2). This needle next descends to draw a sling 39 through the bags. In the meantime hook 36 has risen and an additional fractional turn of
 15 shaft 17 has laid the thread into said hook.

The means for preparing sling 39 for the formation of the square knot hereinabove referred to, comprise an oscillative arm 40 secured by a set screw 41 to an arbor 42
 20 which turns in stationary brackets 43. Arm 40 has a lower projection 40^a into which is tapped a screw 40^b adapted to engage the machine frame thereby checking the forward movement of lever 40. Arbor 42 is
 25 loosely embraced by a two-arm lever 44, the lower arm of which is connected to link 45 actuated in suitable manner and imparting to lever 44 a rocking movement. Upon
 30 a laterally projecting stud 46 of arm 40 is coiled a spiral spring 47, one end of which bears against the hub of arm 40 while its other end rests upon a lug 48 projecting laterally from the upper arm of lever 44.
 35 Lug 48 is adapted to engage a similar projection 49 of arm 40 into which is tapped an adjusting screw 50.

Within the upper forked end of arm 40 is journaled a spindle 51 carrying at one end a relatively fixed pinion 52 which
 40 meshes into a toothed sector 53 forming part of the upper arm lever 44. To spindle 51 are splined a pair of axially rotatable collars 54 each being provided with a circumferential groove 55 which is engaged
 45 by a pin 56 secured to a plate 56^a which is in turn fastened to the upper face of the cross web 57 of arm 40. To collars 54 are attached a pair of opposed hooks or sling carriers 58 which coact with a curved sling-
 50 opener 59 of triangular cross-section. This sling opener is rigidly secured to the lower face of web 57 and projects forwardly therefrom and partly around the front of carriers 58. To plate 56^a is rigidly secured by screw
 55 60 a sling contractor 61 made preferably in the form of a fork, the prongs of which extend above carriers 58 and sling opener 59 as clearly illustrated in Figs. 2 and 11.

Above contractor 61 is arranged a vertically and horizontally reciprocative split
 60 eye 62 which is attached to an arm 63 receiving motion in suitable manner. The diameter of eye 62 is such as to readily permit the passage of needle 35 which in
 65 descending will draw its thread through

said eye. In front of needle holder 32 there is secured to the machine frame a bracket 64 to which is pivoted a brake lever or sling retainer 65 which is forced toward sling
 opener 59 by a spring 66 (Fig. 2).

Intermediate the loop-forming parts described and table 15 is arranged a horizontally reciprocative looper 67 which is clamped to a holder 68 of a suitably driven
 70 slide 69. Looper 67 is hollow and is provided at its forward end with a pointed hook 70 and a forwardly opening throat 71 which is adapted to be closed by a plunger 72 (Fig. 9). Plunger 72 is engaged by a
 75 spring 73 which in turn bears against an adjustable abutment 74. The latter has a radial pin 75 which may be pushed into any of the notches 76 of the looper so as to permit an adjustment of the tension of spring
 80 73. Plunger 72 is provided with a radial pin 77 passing through a corresponding slit 78 of looper 67 and adapted to bear against a fixed stop 79 depending from table 15.

For sustaining the loop A while the knot is formed, a spreader 80 is slidably mounted
 90 in a corresponding guide way 81 of presser foot 30, said spreader being arranged intermediate needle 35 and hook 36, in close proximity to the latter. In proximity to needle
 35 there is slidably mounted in presser foot
 95 30 a notched slotted pusher 82 adapted to catch the thread depending from guide 19 and to force the same against the rearward oblique cutting edge of a knife 83 firmly clamped to an L-shaped forward extension
 100 of the presser foot. The relative arrangement of the parts is such, that knife 83 obliquely traverses the open recess formed between the presser foot and the extension. In this way the cutter is freely exposed in
 105 front of the pusher so as to be straddled by the latter while severing the thread. Spreader 80 and pusher 82 are provided with pins 84 which are engaged by the
 forked ends of a two arm lever 85. The
 110 latter forms part of a clamp 86 encircling a pintle 87 that loosely turns in a corresponding socket of presser foot 30. An arm 88 of clamp 86 serves for imparting the desired oscillative movement to lever 85, there-
 115 by alternately advancing and retracting spreader 80 and pusher 82.

When the machine is in the position for looping a batch of bags, a length of thread is suspended between thread guide 19 and
 120 clamp 22 (as will be hereinafter more fully described), needle 35 and hook 36 are lowered and presser foot 30 is raised. The bags are then slipped between table 15 and presser foot 30 whereupon the machine is started, to
 125 first lower said foot upon the bags. Needle 35 will now ascend to pierce the bags from below and will continue to rise until the needle hook has arrived opposite the suspended thread 21. Shaft 17 is now slightly 130

turned to swing arms 18, 23 backward and thereby place the thread into the needle hook. Needle 35 will then descend to pull a sling 39 through the bags and through split eye 62 which now occupies its raised forward position, as illustrated in Figs. 1 and 2. During the descent of the needle, the necessary thread for forming sling 39 is furnished from the supply spool by tension device 20. Meanwhile hook 36 has ascended and shaft 17 has again been slightly turned backward to place thread 21 into the hook, whereupon the latter is lowered to form a downwardly extending sling 89. During this operation clamp 22 is moved toward the right while the thread is almost completely slipped through the clamp, to supply the material necessary for sling 89. As soon as needle 35 has reached its lowermost position, lever 44 is swung forward, during which movement lug 48 takes along the upper end of spring 47. As the latter cannot turn on stud 46 of arm 40 owing to engagement of the lower spring-end with the hub of said arm, the latter will participate in the advance movement of lever 44, while at the same time retainer 65 having lost its bearing on holder 32 will be thrown against opener 59. In this way the upper section of the sling has been received by the forked sling-contractor 61, while the lower sling section has been spread by being drawn over opener 59. During this forward movement, eye 62 has been lowered upon fork 61 as illustrated in Fig. 3. As soon as screw 40^b abuts against the machine frame, the further advance of arm 40 will be checked while lever 44 continues its forward movement thereby rotating spindle 51 together with collars 54. In this way carriers 58 will enter sling 39 and will during their continued rotation be moved apart owing to the engagement of pins 56 with the grooves 55 of collars 54. During this rotation and simultaneous spreading of hooks 58, the distended bight 90 of sling 39 will be thrown over eye 62 as illustrated in Fig. 4. Eye 62 will now ascend to expand the double bow thus formed (Fig. 5) and thereby bring said bow in condition for permitting the unobstructed passage of looper 67 therethrough. The looper will now advance to the left to grasp the sling 89 formed by the lowered hook 36. In order to facilitate the entrance of looper 67 into this sling, hook 36 is turned through an angle of 90° during the last stage of its descent, for which purpose holder 33 is provided with a cam groove 91 engaged by a stationary pin 92 as clearly illustrated in Fig. 1.

During the last part of the advance of looper 67, pin 77 engages abutment 79 to open throat 71 of the looper and permit the ready entrance of the thread into said throat (Fig. 5). Upon the subsequent receding

movement of looper 67, its throat will again be closed by plunger 72 to frictionally hold the thread therein, while it is withdrawn from clamp 22 and pulled through the expanded knot bows (Fig. 6) during which operation the loop is held distended by the projected spreader 80. While looper 67 arrives at its right hand terminal position (Figs. 6 and 7) lever 44 is swung back during the first stage of which operation spindle 51 will be returned into its original position to withdraw carriers 58 from the knot. As soon however as lug 48 of lever 44 abuts against lug 49 of arm 40, the latter will be swung into the position shown in Fig. 2. During the last described operation clamp 22 has completed its travel toward the right and has clasped the thread depending from guide 19 and leading to the still untied knot. Upon its subsequent movement toward the left, clamp 22 will contact the unfinished knot whereby the thread slips over the meanwhile advanced nose 93 of pusher 82. After the knot has thus been properly tied, lever 85 is actuated to still further advance pusher 82 toward the knife 83 and thereby cut the finished loop off the thread supply while simultaneously spreader 80 is retracted to release the loop A. Presser foot 30 will now be withdrawn from the bags, while clamp 22 completes its movement toward the left to suspend a fresh length of thread between guide 19 and clamp 22. The machine now comes to a standstill whereupon the looped bags are removed from table 15.

It will be seen that by the construction described, the bags are looped in a quick and reliable manner. Owing to the formation of a so-called "square knot," any accidental opening of the loop is prevented even when under the heavy strain to which it is subjected, when the bags are torn off.

As the knot is located near one mouth of the needle hole, and as furthermore one of the free ends of the loop is concealed within said hole while the other end terminates in proximity to the knot, a neat appearance of the finished article is insured.

Although my improved looping machine is illustrated in connection with batches of bags to be united, it is obvious that it may also be used for providing pamphlets, calendars, books and similar articles with open loops, without departing from the spirit of my invention.

I claim:

A bag looping machine comprising a flat table adapted to support a batch of bags, a cooperating presser foot having an L-shaped extension and an intervening recess adapted to compress that section of the bag-batch to which the loop is to be applied, a cutter secured to said extension and obliquely traversing the recess, a vertically reciprocative single needle adapted to pierce a single

hole through the compressed bag-section and draw a thread through said hole, a spreader, a looper, a vertically reciprocative hook adapted to draw the thread over the spreader and present it to the looper, means coöperating with the looper for uniting the thread ends, whereby a loop is formed, the bight of which extends beyond the bags to constitute a hanger therefor, and a notched slotted pusher adapted to straddle the cutter and carry the thread forward into engagement therewith.

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