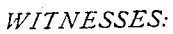


1,056,087.

4 SHEETS—SHEET 1.



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1,056,087.

4 SHEETS—SHEET 2.

Fig - 5 -

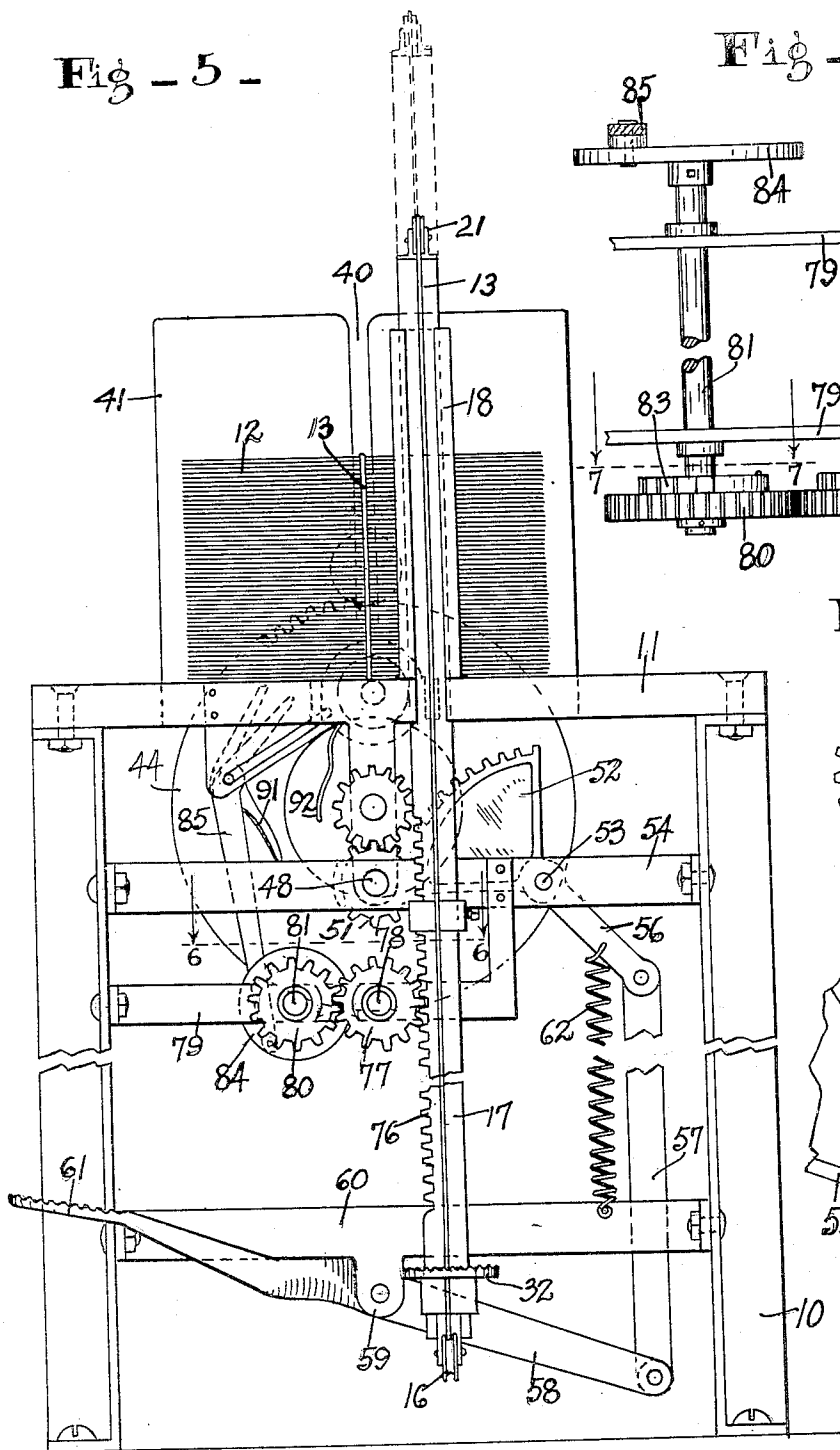


Fig - 6 -

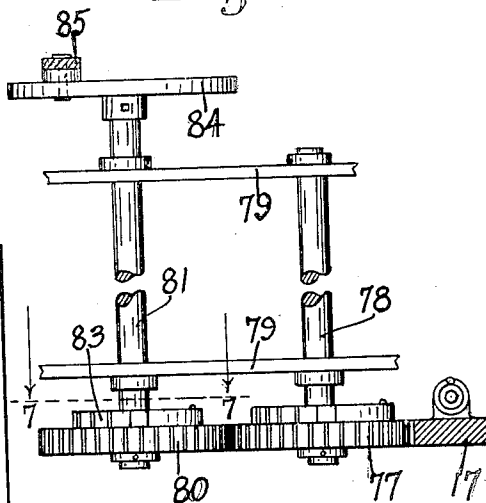


Fig-7 -

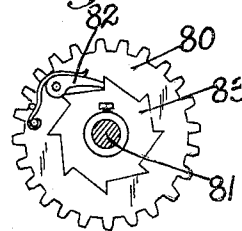
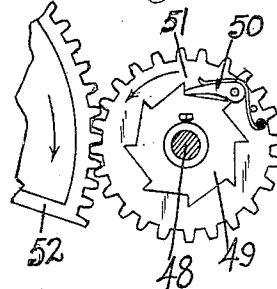


Fig-8 -



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TYING MACHINE.

APPLICATION FILED OCT. 30, 1911.

Patented Mar. 18, 1913.

4 SHEETS-SHEET 3.

1,056,087.

Fig - 9 -

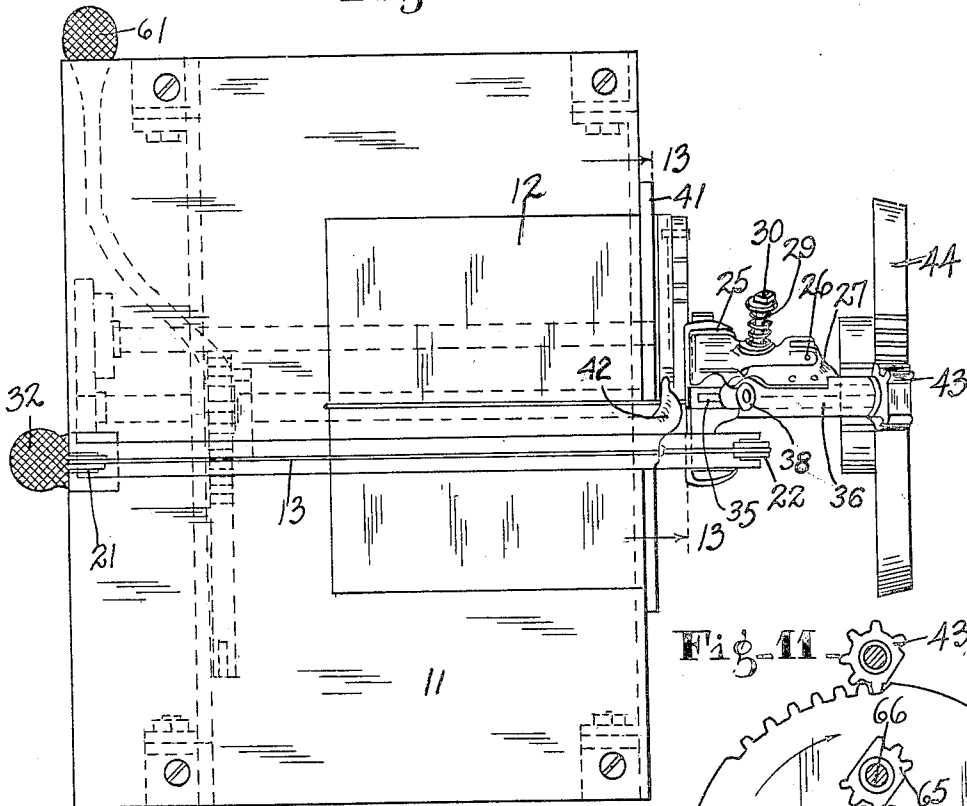


Fig-11-

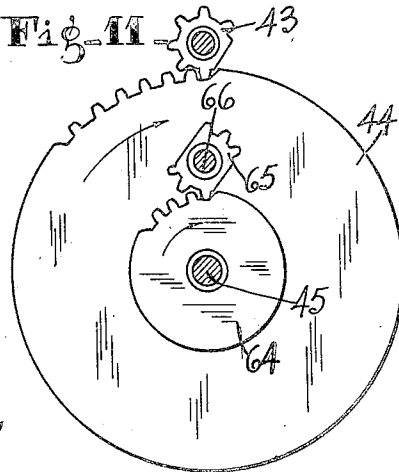


Fig-10-

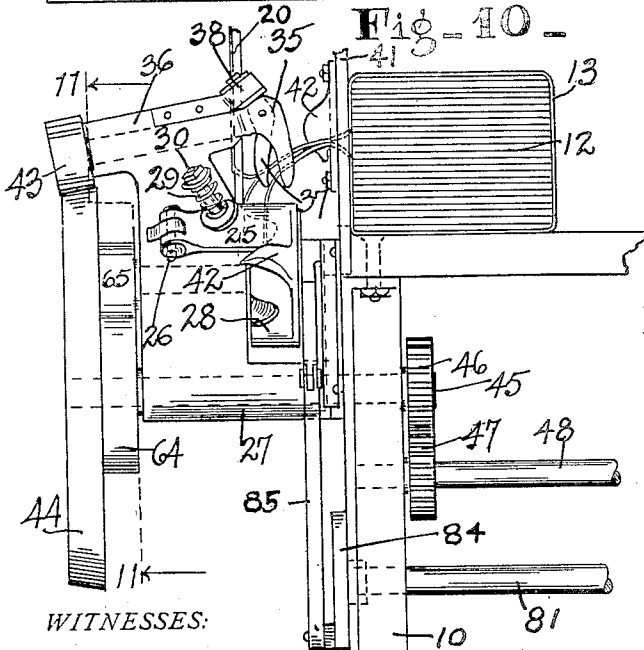
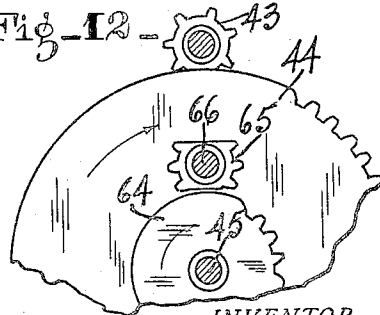


Fig-12-



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4 SHEETS—SHEET 4.

1,056,087.

Fig. 13.

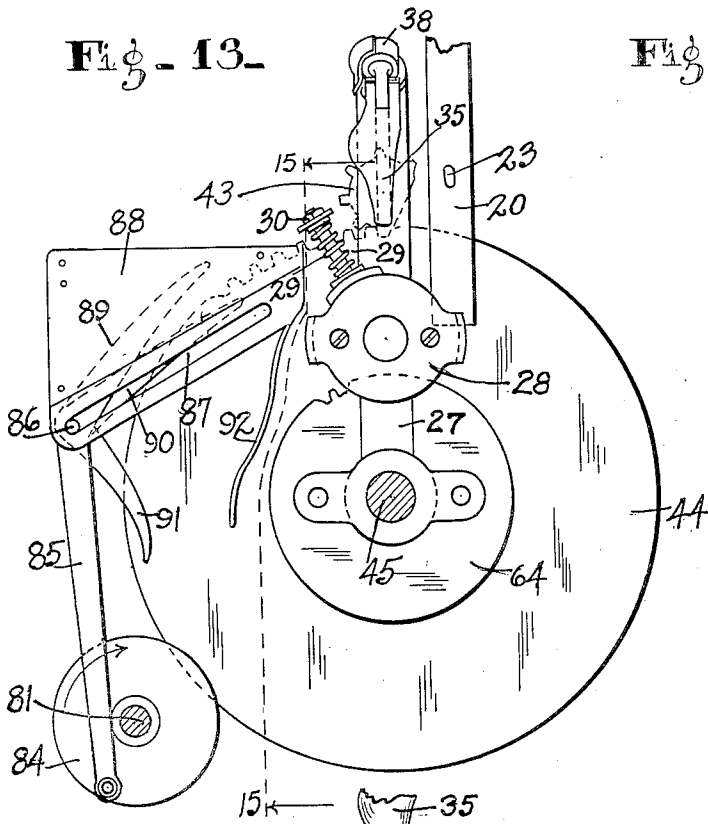


Fig. 15.

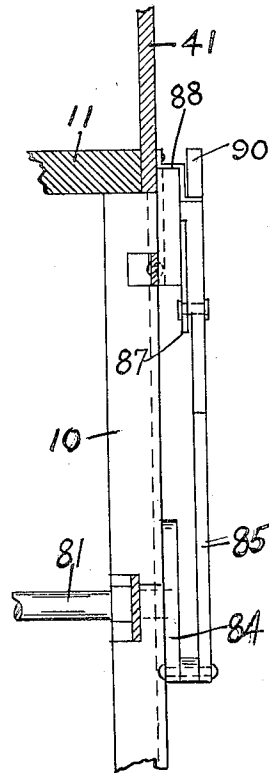


Fig. 14.

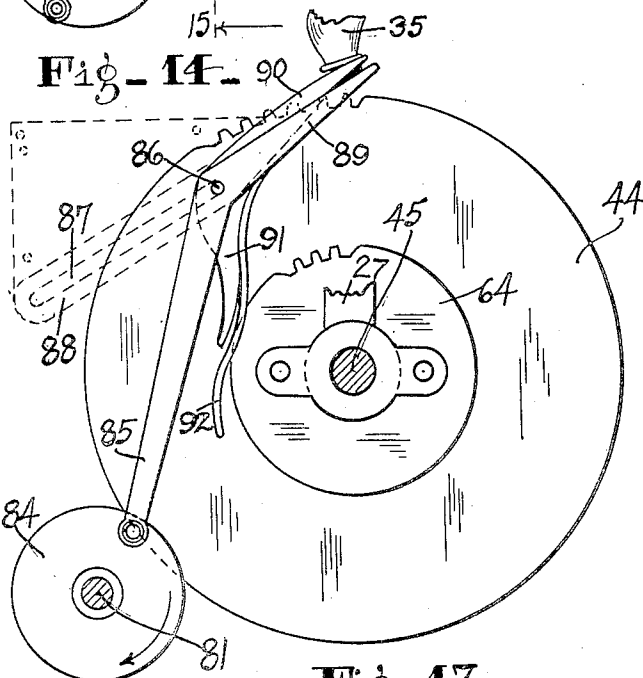


Fig. 16.

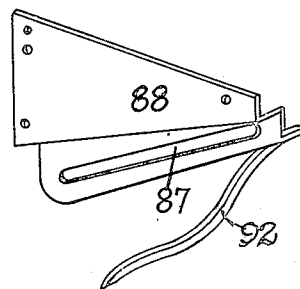


Fig. 17.

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UNITED STATES PATENT OFFICE.

LINDLEY CLARK, OF GREENFIELD, INDIANA.

TYING-MACHINE.

1,056,087.

Specification of Letters Patent.

Patented Mar. 18, 1913.

Application filed October 30, 1911. Serial No. 657,673.

To all whom it may concern:

Be it known that I, LINDLEY CLARK, a citizen of the United States, and a resident of Greenfield, county of Hancock, and State of Indiana, have invented a certain useful Tying-Machine; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings.

The object of this invention is to provide a simple and effective device for economical and easy tying mechanically of small packages, such as bundles of letters, newspapers and small boxes and the like.

The machine has been invented with particular reference to use in postoffices for tying mechanically bundles of letters, but it may be used for other purposes, as above mentioned.

The general features of the knotting mechanism and some of the associated parts are substantially the same as that heretofore in use in twine binders and other tying machines.

An important new feature of the invention is the use of a rectangular needle bar adapted to reciprocate over the package.

Another feature of the invention consists in severing the cord or twine and "stripping it off" from the knotter instead of the machine discharging the bundle as in binders and tying machines heretofore. Small packages of letters cannot be mechanically discharged without injury to the same.

The nature of the invention will be understood from the accompanying drawings and the following description and claims.

In the drawings, Figure 1 is a side elevation of the machine showing a package being tied and with the normal position of the needle bar indicated by dotted lines. Fig. 2 is a side elevation of a portion of the breast plate from the line 2-2 of Fig. 1, portions of the breast plate being broken away. Fig. 3 is a section on the line 3-3 of Fig. 2. Fig. 4 is a plan view of the twine receptacle. Fig. 5 is a front elevation, or an elevation of the left-hand side of the machine as it appears in Fig. 1. Fig. 6 is a horizontal section on the line 6-6 of Fig. 5. Fig. 7 is a vertical section on the line 7-7 of Fig. 6. Fig. 8 is a vertical section on the line 8-8 of Fig. 1, parts being broken away. Fig. 9 is a plan view of the machine. Fig. 10 is an elevation of parts of the machine from the side opposite that shown in Fig.

1, the other parts of the machine being omitted, and showing the position of the parts preceding tying the knot. Fig. 11 is a vertical section on the line 11-11 of Fig. 10. Fig. 12 is the same as the upper part of Fig. 11, showing the parts in a different stage of the operation. Fig. 13 is a section on the line 13-13 of Fig. 9, but on a larger scale. Fig. 14 shows the same as Fig. 13 in a different stage of the operation and with positions of the guide shown by dotted lines. Fig. 15 is a section on the line 15-15 of Fig. 13. Fig. 16 is a side elevation of part of the mechanism shown in Fig. 14. Fig. 17 is a horizontal section on the line 17-17 of Fig. 1.

In detail there is shown herein a skeleton frame 10 with a table 11 forming the upper part thereof upon which the package 12 which is to be tied is placed by hand as hereafter explained. The twine 13 is shown held in the twine receptacle 14 having a hole centrally located in the top and a flat spring 15 is secured to the top of the twine receptacle, see Fig. 4, for frictionally engaging the twine so as to resist slightly the outward pull on the twine. The twine passes about a pulley 16 on the lower end of the needle bar 17. Said needle bar 17 is rectangular, having a long vertical portion which is vertically reciprocable through a guide 18 secured upon the table 11. There is also a horizontally extending portion of the needle bar 17 and a front downwardly extending end which carries a needle 20. The twine passes from the little roller 16 over a little pulley 21 on the upper left-hand corner of the needle bar, as shown in Fig. 1, and another little pulley 22 at the upper right-hand corner of the needle bar, and down through the eye 23 of the needle, see Fig. 13. The twine is drawn through the needle to furnish a slackened portion and the end of it is caught in under a clamp 25 pivoted at 26 on a stationary frame 27 which is secured to the side of the main frame 10 and the table 11, see Fig. 1. The clamp 25 is pressed against the periphery of a rotary twine holder 28 by a spiral spring 29 around a screw 30, see Fig. 9. The package to be tied is moved by hand laterally against the slackened portion of the twine and laid upon the table 11 so that the twine will extend from the twine holder 28 and clamp 25 around the package and through the needle and over the pulleys of

the needle bar to the twine receptacle 14. When this is being done the needle bar and needle are in an elevated position, as shown by dotted lines in Fig. 1, so that there is a metal arm between the knotter, hereafter explained, and the needle above it for lateral movement and placing of the package, as explained. The needle and needle bar are held normally in such elevated position by the spiral spring 130 which extends from the table 11 down to a bracket 31 on the needle bar 17.

When the package is in place ready to be tied, the needle and needle bar are depressed by the operator placing his foot upon the foot piece 32 which is secured to the lower part of the needle bar 17, as shown in Figs. 1 and 5. That moves the needle down to the position shown in Figs. 1 and 10, so that it carries the twine between the knotter fingers 35 and 37. The knotter consists of a finger secured to the knotter shaft 36 which is mounted in the upper part of the frame 27 in a somewhat inclined position. There is another finger 37 pivoted at the junction of the finger 35 and shaft 36 in a customary manner. It is pivoted between its ends and carries a roller 38 on its upper end which engages the cam-like surface of the end of the portion of the frame 27 in which the shaft 36 is mounted. The arrangement and position of this part of the mechanism will be understood by those skilled in the art as it is not different from what is common in tying mechanisms.

As the needle goes down it moves the twine down through a slot 40 in a breast plate 41, see Fig. 2, so that it lies upon a finger 42 which is secured to said breast plate and projects across said slot and yet is placed away from the breast plate, as appears in Fig. 3. At this time the other end of the twine lies under the finger 42 of the slot 40 so that both portions of the twine, as shown in Fig. 10, at this stage of the operation will be in position to be engaged by the knotter and when the latter is given one revolution it will twist or knot the twine together. The knotter is actuated by a mutilated pinion 43, see Fig. 11, which engages a mutilated gear 44 on a shaft 45 mounted horizontally in the lower part of the frame 27 and said shaft carries a pinion 46 which meshes with a pinion 47 on a shaft 48 mounted in the main frame which carries a ratchet wheel 49 adapted to be actuated by a pawl 50, see Fig. 8, which is mounted on the side of a gear 51 which rides loosely on the shaft 48 and is driven by a segmental gear 52 which is pivoted at 53 in a cross bar 54 secured to the main frame, see Fig. 5, and is actuated by an arm 56 pivoted in the upper end of a connecting bar 57 which, at its lower end, is pivoted to a foot lever 58

fulcrumed between its ends in an ear 59 from a cross bar 60 secured to the main frame. When a peddle 61 on the lever 58 is depressed, the segmental gear 52 will cause the mutilated gear 44 to give one revolution. This wheel has only a small portion of the periphery thereof provided with teeth but sufficient to give the knotter shaft one revolution and during the remaining revolution of the wheel 44, a flattened portion of the pinion 43 rides on the smooth periphery of the wheel 44 so that the knotter will be given no more than one revolution during each revolution of the wheel 44 or during one operation of the machine. The segmental gear 52 is returned to its normal position by a spring 62 which extends from the arms 56 to the frame bar 60, see Fig. 5.

On the shaft 45, see Fig. 1, there is a mutilated gear 64, see Fig. 11, secured beside the gear 44, and provided with a front row of teeth meshing with a double segmental pinion 65 on a shaft 66 which carries the twine holder 28, said shaft 66 being mounted in the frame 27, see Fig. 1. The pinion 65 has two oppositely located sets of teeth so that it and the shaft 66 are given one-half revolution during the revolution of the gear 64 or one operation of the machine. During the remaining revolution of the gear 64, the flat side of the pinion 65 slides over the smooth periphery of the gear 64.

After the machine has been started in its operation by actuating the pedal lever 58, the knotter is given a revolution which knots or ties the twine and immediately thereafter the twine is severed or cut by one of the knives 70 which is secured to the inner end surface of the twine holder 28 and revolves therewith. There are two of these knives and their ends are curved over the periphery of the twine holder 28 so as to be parallel with the shaft 66. The twine holder 28 is provided with recesses 71, see Fig. 1, which as the twine holder revolves, the twine carried by the twine holder enters said recess 71, whereby the twine held by the holder is carried in against the clamp 25 and then the knife 70 severs the twine, leaving the end of the twine which passes through the needle, caught under the clamp. This part of the mechanism is substantially the same as that used in twine binders and familiar to those skilled in the art and further explanation is thought to be needless. After the twine has been severed, the knot is left on the knotter and that is removed or gotten off by means actuated by the needle bar 17 as it is returned after being depressed by the spring 130. As shown in Fig. 5, one edge of that bar is provided with teeth 76 to form a rack bar. A gear 77 is secured on a shaft 78 mounted in the bars 79 secured to the main frame, see Figs. 5 and 6. The gear 77 drives a gear 80 which rides loosely

on a shaft 81 mounted in the bars 79 and which carries a pawl 82 and engages a ratchet wheel 83 secured on the shaft 81 and whereby the shaft is driven in only one direction and intermittently and is not affected by the return movement of the needle bar 17. The shaft 81 carries a pitman wheel 84, see Fig. 6, with which a pitman 85 is pivoted, see Fig. 5, which, as seen in Figs. 13 and 14, has a pin 86 toward its upper end which projects through a slot 87 in a guide 88 so as to reciprocate a jaw 89 carried on the extreme upper end of the pitman 85. The jaw 89 is fixed but associated therewith is a movable jaw 90 pivoted on the pin 86 having a downwardly extending shank 91 which engages a stationary spring 92 which is secured to the guide 88, see Fig. 16, and curved so that as the pitman 85 is pushed upward, the movable jaw 90 will close down on the twine near the knot which has previously been formed. As the pitman 85 recedes, the spring 92 is so formed as to tighten the grip of the jaws on the twine still more and cause the receding movement of the jaws to pull the twine from the knoter, and when the pitman 85 operates, its lower portion or movable jaws relax and the jaws disengage the twine and the package is tied.

The cog portions of the wheels 44 and 64 register with each other radially, but as the wheel 44 is of much greater diameter than the wheel 64, the segmental gear 43 will be given an entire revolution, while the gear 65 is given only a half revolution, as shown in Figs. 11 and 12. Also it is obvious that the knoter shaft will be operated faster than the shaft 66 which carries the knives so that the knot will be tied before the knife operates. There are two knives 70 diametrically opposite each other and register, in a way, with the flattened sides of the double segmental pinion 65.

I claim as my invention:

1. A tying machine including a table adapted to hold the package to be tied, a reciprocable needle bar adapted to extend more than half the way around the package on the table, a needle carried by the free end of said bar, and means for tying a knot in the twine when said needle bar is in its closest position to the package.

2. A tying machine including a table adapted to receive the package to be tied, a needle bar vertically reciprocable in said table and having a horizontal portion extending over the package and a short downwardly extending end from said horizontal portion so that said needle bar partially embraces the package, a needle on the short arm of the needle bar, means for reciprocating the needle bar, and means for tying a knot in the twine when the needle bar is depressed.

3. A tying machine including a table adapted to receive the package to be tied, a needle bar vertically reciprocable in said table and having a horizontal portion extending over the package and a short downwardly extending end from said horizontal portion so that said needle bar partially embraces the package, a needle on the short arm of the needle bar, a spring connecting the table and the needle bar for holding the needle bar in an elevated position, means for depressing the needle bar, and means for tying a knot in the twine when the needle bar is depressed.

4. A tying machine including a table, a slotted breast plate secured to and extending from the table against which the package may lie, and a needle, twine holder, cutter and knoter on the opposite side of said plate, whereby the breast plate will hold the package while the twine extending there-through is tied and severed.

5. A tying machine including a table, a slotted breast plate secured to and extending from the table against which a package may be placed so that the twine will extend through said slot, a finger secured to said breast plate and spaced from the breast plate and crossing said slot so that the twine will lie above and below said finger, a needle bar, and a needle, knoter, twine holder and cutter on the opposite side of said breast plate.

6. A tying machine including a table, a slotted breast plate secured to and extending from said table against which a package may be placed, a movable needle bar, a needle and knoter on the opposite side of said plate from the package, a frame in which said knoter is mounted, a revoluble twine holder mounted in said frame, a spring clamp in said frame for engaging said twine holder, and knives secured to said twine holder, whereby the twine will be held, tied and severed.

7. A tying machine including a table, a slotted breast plate secured to and extending from said table against which a package may be placed, a movable needle bar, a needle and knoter on the opposite side of said plate from the package, a frame in which said knoter is mounted, a revoluble twine holder mounted in said frame, a spring clamp in said frame for engaging said twine holder, said twine holder having notches for catching the twine and carrying it against the clamp, and knives secured to said twine holder for severing the twine after the twine has been tied.

8. A tying machine including a table, a slotted breast plate secured to and extending from said table against which a package may be placed, a movable needle bar, a needle and knoter on the opposite side of said plate from the package, a frame in which

said knotter is mounted, a revoluble twine holder mounted in said frame, a spring clamp in said frame for engaging said twine holder, said twine holder having notches for catching the twine and carrying it against the clamp, knives secured to said twine holder for severing the twine after the twine has been tied, and means for driving said knotter and twine holder arranged so that the knotter and twine holder will be simultaneously operated but the knotter will be operated more rapidly and tie the twine before it is severed.

9. A tying machine including a reciprocal needle bar, a knotter and severing means, and means actuated by the needle bar on its return movement for stripping the knot from the knotter.

10. A tying machine including a reciprocal needle bar, a knotter and severing mechanism, and slidable jaws adapted to engage the knot and remove it from the knotter.

11. A tying machine including a recipro-

cable needle bar, a knotter and severing mechanism, slidable jaws adapted to engage the knot and remove it from the knotter, and means actuated by the return movement of the needle bar for operating said jaws.

12. A tying machine including a reciprocal needle bar, a knotter and cutting mechanism, a pitman rod adapted to be actuated by the needle bar and having a fixed jaw, a guide for actuating the jaw end of said pitman rod toward and from the knot, a movable jaw pivoted in connection with said fixed jaw, and stationary means for controlling said movable jaw so that the jaws will engage the knot and withdraw it from the knotter.

In witness whereof, I have hereunto affixed my signature in the presence of the witnesses herein named.

LINDLEY CLARK.

Witnesses:

G. H. BOINK,

E. H. MAYO.