

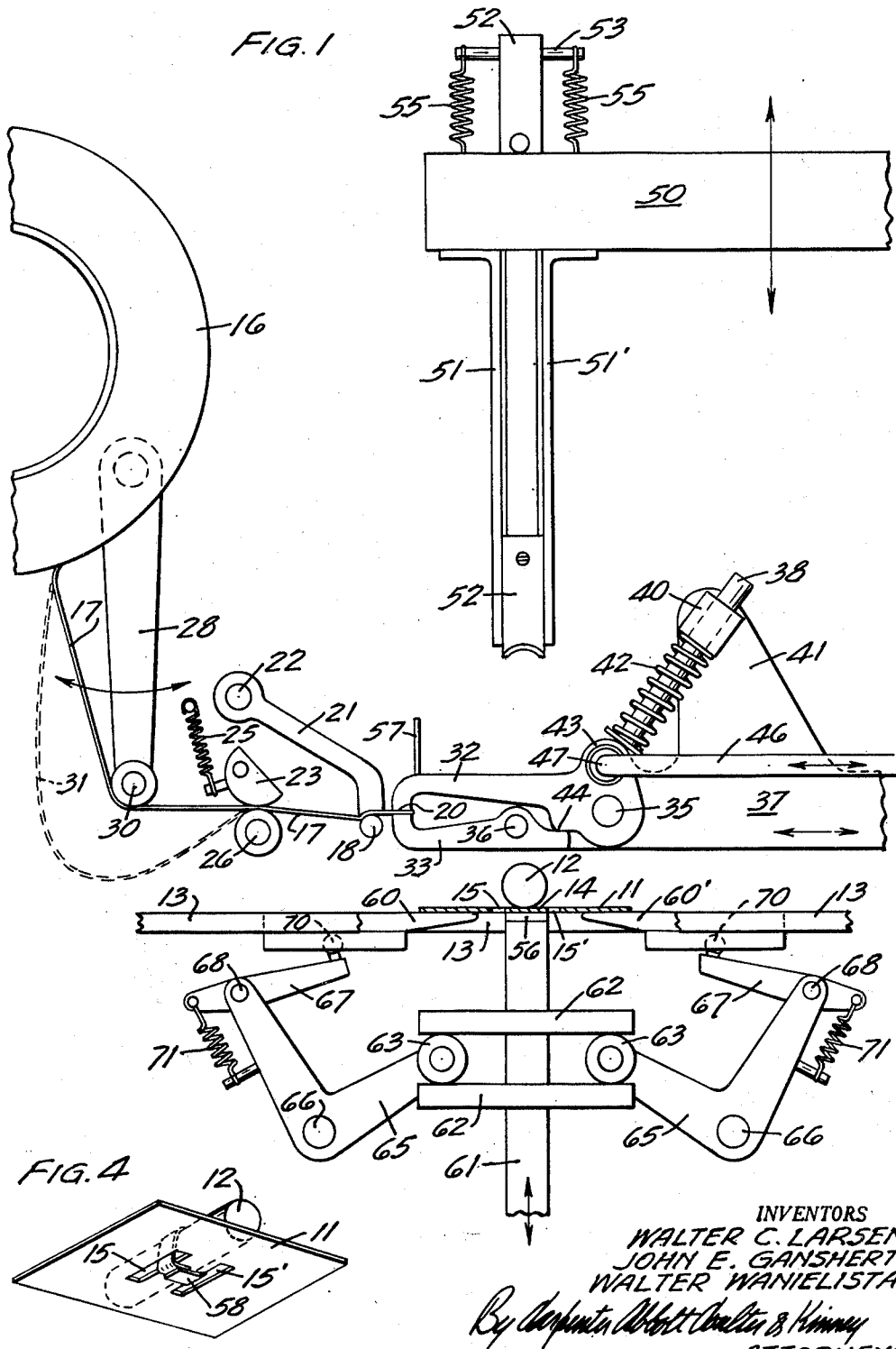
April 16, 1957

W. C. LARSEN ET AL
TAPE STAPLING

2,788,625

Filed Sept. 27, 1955

2 Sheets-Sheet 1



April 16, 1957

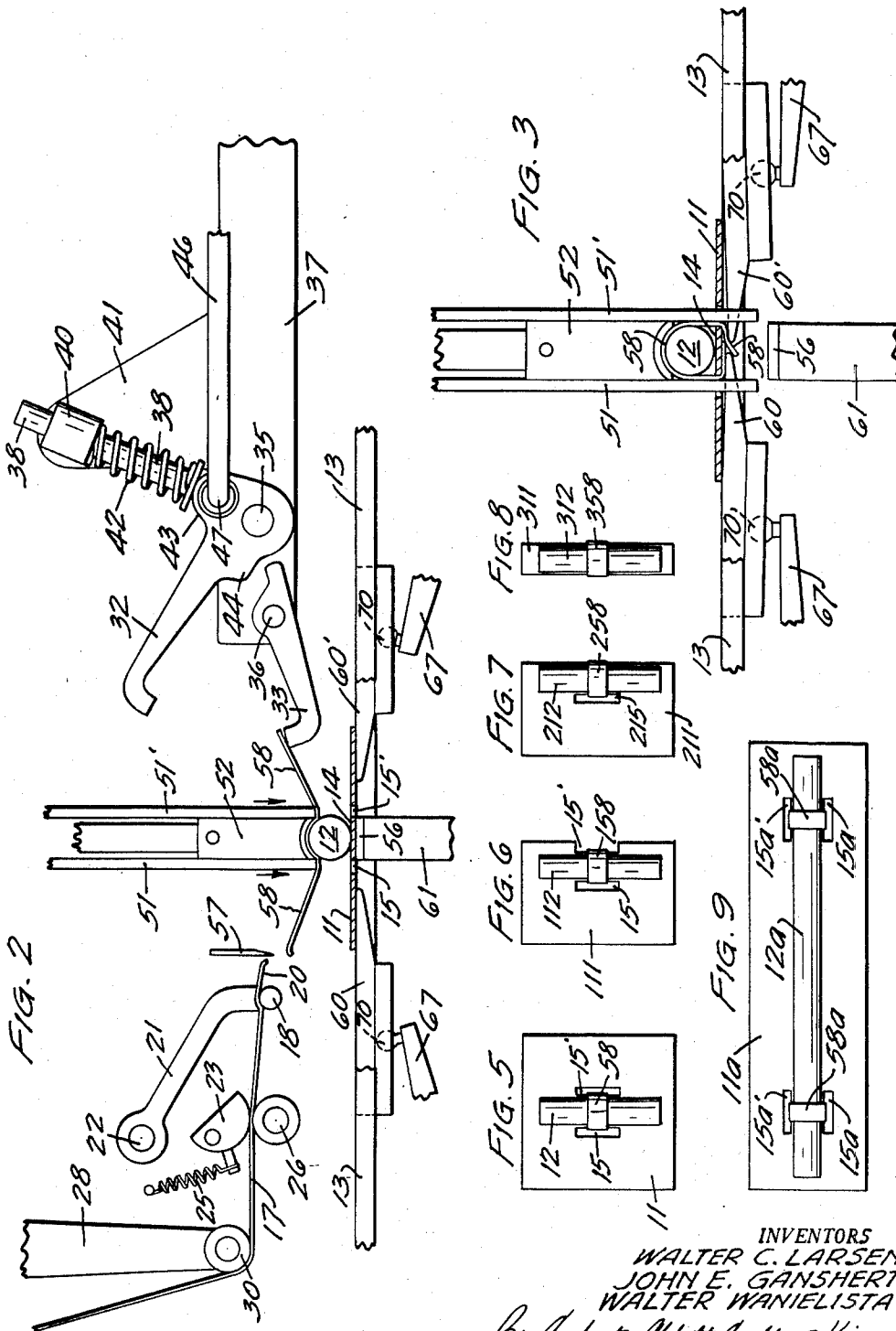
W. C. LARSEN ET AL

2,788,625

TAPE STAPLING

Filed Sept. 27, 1955

2 Sheets-Sheet 2



INVENTORS
WALTER C. LARSEN
JOHN E. GANSHERT
WALTER WANIELISTA
By *Charles H. Hatt, Charles S. Hatt & Company*
ATTORNEYS

1

2,788,625

TAPE STAPLING

Walter C. Larsen, Minneapolis, Minn., and John E. Ganshert, Round Lake, and Walter Wanielista, Westchester, Ill., assignors to Minnesota Mining & Manufacturing Company, St. Paul, Minn., a corporation of Delaware

Application September 27, 1955, Serial No. 537,012

5 Claims. (Cl. 53—198)

This invention relates to the use of adhesive tape for attaching or mounting an object on the face of a card, wherein a length of tape passes over the object and then through and/or around to the opposite side of the card with the two ends adhered to the back surface of the card. In passing from the object to the opposite side of the card, the tape is usually closely adjacent to two opposed boundaries of the area of the card that is occupied by the object, and suitable openings are provided at the said boundaries to permit such passage. These openings may be apertures, slots or notches; or one or two opposed edges of the card may coincide with one or both of the boundaries, with the tape passing around rather than through the card where such coincidence occurs.

Objectives include the provision of an improved mechanism for applying lengths of tape in this manner.

The invention provides means for holding the card in a horizontal position face up with the object resting on and occupying a given area of the face of the card, means for releasably holding a length of tape in a horizontal position above the object adhesive side down, an anvil member below the said area of the card, a vertically reciprocating tape applying plunger above the held length of tape, two vertically reciprocating tape threading plungers above the held length of tape positioned to pass downwardly on each side respectively of the said area to points below the card, means for moving the applying plunger downwardly to press the central portion of the length of tape into engagement with the object and for moving the threading plungers downwardly to conduct the two end portions of the length on each side respectively of the said area to points below the card, a tape wiping finger on each side of the path of the threading plungers mounted for respective horizontal reciprocation toward and away from each other adjacent the back surface of the said area of the card, means for removing the anvil member from the path of the fingers, and means for moving the fingers to adhere the two end portions of the length to the back surface of the said area of the card.

The present invention provides an improved species of the invention broadly described and claimed in the co-pending application of Charles W. Abbott, Serial No. 379,379, filed September 10, 1953.

A mechanism illustrative of the present invention is described below and shown in the accompanying drawings. The illustrative mechanism is adapted to tape an object to the face of a card having an aperture or slot on each side of the area occupied by the object, the tape extending over the object and through the apertures with the two end portions of the tape adhered to the back of the card between the apertures, in the manner of a staple.

Figure 1 is a diagram of the parts at rest in normal starting position;

Figure 2 shows the parts in tape release and cutting position;

Figure 3 shows the wiping fingers in operation;

2

Figures 4 and 5 show the finished article;

Figures 6, 7, 8 and 9 show other forms of cards.

A card 11 to which an object 12 is to be taped or "stapled," rests in a horizontal position on a platen 13 with the object occupying a given area 14 of the top or face of the card and resting thereon. Two apertures or slots 15 and 15' extend through the card on either side of the object-occupied area 14, closely adjacent to the two lateral boundaries of the said area.

A supply roll 16 of normally tacky pressure-sensitive adhesive tape 17 is mounted by means not shown, for free rotation. Withdrawn unsevered tape is releasably held tacky side down by temporary adherence to a smooth-surfaced fixed pin 18, with the leading end portion 20 extending unsupported beyond (to the right of) the holding pin 18. Coacting with the pin 18 is an arm 21, freely pivoted at 22, which rests on the pin with the tape between the arm and the pin.

An eccentric pinch member 23 which is lightly biased against the back of the tape by a spring 25, coacts with a free roller 26 that contacts the tacky side opposite the eccentric, to prevent retraction of the tape toward the supply roll 16. Movement to the left of a pivoted arm 28, bears a roller 30 which is mounted for free rotation on the end of the arm, against the back of the tape at a point between the pinch member 23 and the supply roll 16, thereby withdrawing tape from the roll to form a loop 31. This serves to reduce the force required to effect the hereinafter described movement of the leading end 20 into applying position.

A tape gripper for seizing the end 20 is provided in the form of an upper jaw 32 and a lower jaw 33 respectively pivoted at 35 and 36 to a tape gripper head 37 which is mounted for horizontal reciprocation.

The jaws are held in closed position by an obliquely disposed thrust shaft 38 which is slidably mounted in a collar 40 which in turn is pivotally mounted on an arm 41 that extends upwardly from the head 37. A spring 42 bears the lower end of the shaft against an upper lug 43 that extends upwardly from the upper jaw 32 directly above the jaw pivot 35. To the left of the pivot 35, a lower lug 44 extends downwardly from the upper jaw 32 and engages the right end of the lower jaw 33.

The jaws are opened by a reciprocating horizontal shaft 46 mounted on the gripper head 37, its left end being pivotally connected at 47 to the upper lug 43 of the upper jaw 32. Movement of the shaft 46 to the right in relation to the head 37 raises the upper jaw 32, and the lower jaw 33 drops or lowers by its own weight, the lug 44 being then disengaged from the right end of the lower jaw. The pivotal point of the collar 40 and the pivot points 35 and 47, are positioned to produce an over-center toggle joint whereby the jaws are held in open position. The jaws are closed by moving the shaft 46 to the left.

Above the platen 13 and the tape feeding mechanism, a plunger head 50 is mounted for vertical reciprocation. Depending therefrom and fixed thereto, is a pair of tape threading plungers 51 and 51', registered or positioned and of a shape and size in cross section, to enable them to pass downwardly through the card apertures 15 and 15', respectively. Between the threading plungers, a tape applying plunger 52 is mounted for vertical reciprocation in respect to the plungers 51—51' and the head 50. A cross bar 53 fixed to the top of the plunger 52, is connected by springs 55 to the head 50 so that upon downward movement of the head, the movement of the plungers 51—51' will continue after the applying plunger 52 has been stopped by the object 12.

An anvil member 56 below the card 11 supports the portion 14 of the card between the apertures 15 and

15' against the force of the downward thrust of the plunger 52.

Upon contact of the plunger 52 with the object 12, a knife 57 severs the tape, forming the cut length 58. At the same time, the jaws 32 and 33 are opened, and the two ends of the length 58 are threaded through the card apertures 15 and 15' by the descending plungers 51—51'.

Below the card 11, two horizontally disposed tape wiping fingers 60 and 60' are mounted on either side, respectively, of the path of the threading plungers 51—51', for respective horizontal reciprocation toward and away from each other adjacent the back or under surface of the area 14 of the card, the card-supporting platen 13 and the lower end portions of the plungers 51—51' being suitably apertured to accommodate the fingers.

The horizontal reciprocation of the fingers 60 and 60' is effected by the vertical reciprocation of an anvil shaft 61 whose upper end serves as the previously described anvil member 56. Two spaced horizontal cam bars 62 accommodate two rider rollers 63 which are on the ends, respectively, of two angle arms 65 that are pivoted at 66. Two finger propelling arms 67 are respectively pivoted at 68 to the other ends of the angle arms 65, the inner ends of the arms 67 being respectively connected by ball and socket joints 70 to the fingers 60 and 60' and being impelled to bear upwardly against the fingers by springs 71.

A lowering of the anvil shaft 61 thus serves at once to remove the anvil member 56 from the path of the tape wiping fingers 60 and 60', and to move the fingers inwardly to apply or "wipe" the ends of the length 58 of tape onto the under surface of the area 14 of the card in the manner shown in Figure 3.

In operation, after the card 11, object 12, tape 17 and the machine parts have been positioned as in Figure 1, the arm 28 is swung to the left to withdraw from the roll 16 an amount of tape at least equal to the cut length 58, and then to the right to its normal starting position, whereupon the tape that extends from the roll 16 to the pinch member 23 will form the loop 31 of preliminarily withdrawn or "prestripped" tape.

The gripper head 37 is then moved to the right, the jaw opening shaft 46 remaining unmoved in relation to the head so as to keep the jaws 32 and 33 closed, until the unsevered withdrawn tape 17 extends horizontally across the path of the plungers 51—51' and 52 above the object 12, adhesive side down, in applying position.

The plunger head 50 is then moved downwardly until the tape applying plunger 52 bears upon the object 12 with the tape 17 between them, whereupon the knife 57 is activated to cut the tape 17 to form the severed length 58, and the jaw opening shaft 46 is moved to the right in relation to the now stationary gripper head 37 to open the jaws 32 and 33 and release the length 58 (Figure 2). The downward movement of the plunger head 50 meanwhile continues, to thrust the two tape threading plungers 51 and 51' down through the card apertures 15 and 15', respectively, thereby "threading" or conducting the two end portions of the length 58 of tape through the card apertures.

The anvil shaft 61 is then lowered to remove the anvil member 56 from the path of the tape wiping fingers 60 and 60', and to move the fingers inwardly to the tape applying position they occupy in Figure 3, thereby applying the two end portions of the length 58 of tape to the under or back surface of the area 14 of the card 11 between the apertures 15 and 15'.

The anvil shaft 61 is then raised or returned to its normal position shown in Figures 1 and 2, thus withdrawing the fingers 60 and 60' from their tape applying position and returning them to their normal positions, the top or anvil portion 56 of the shaft serving to press the two end portions of the length 58 of tape into firmer adhesive engagement with the card.

The plunger head 50 is raised or returned to its normal position.

The gripper head 37 is moved to the left to the position shown in Figure 1, and the jaw opening shaft 46 is moved to the left in relation to the gripper head to close the jaws 32 and 33 on the leading end portion 20 of the unsevered tape 17, in readiness for the next full cycle of operation.

Numerous alternatives, equivalents and modifications within the scope of the invention as herein described and/or claimed, may be employed.

For example, means other than that specifically described and shown may be employed for feeding and releasably holding a succession of lengths 58 of tape in applying position, such lengths to be severed either before or after their arrival in the applying position.

The cam and arm mechanism that translates the vertical reciprocation of the anvil shaft 61 into horizontal reciprocation of the tape wiping fingers 60 and 60', may be modified so that the inward wiping movements of the two fingers are not simultaneous. For example, the finger 60 may move in first to wipe or adhere the end of the length 58 that extends down through the card aperture 15; then, after or during the withdrawal of the finger 60 to the left, the finger 60' may move in to wipe the other end of the length 58.

The single means for moving the applying and threading plungers may be two separate means, one for the applying plunger 52 and another for the threading plungers 51—51'.

The illustrated machine and its operation has been described in connection with its use as a means to tape or "staple" an object to a card that has a fully enclosed aperture on each side of the area occupied by the object, such as the card 11 (Figure 5) which has the elongate rectangular fully enclosed slots or apertures 15 and 15' on either side of the object-occupied area 14. It may also be used to tape objects to cards that are otherwise designed in respect to openings adjacent the boundaries of the object-occupied area, through which or by means of which the tape may be passed or led from the object to the opposite or back side of the card. Examples of such cards are shown in Figures 6, 7 and 8.

Figure 9 shows a card of the card 11 type, but with two sets or pairs of the fully enclosed apertures, to permit the use of two lengths of tape to hold the object.

We claim:

1. A mechanism for taping an object to the face of a card comprising means for holding the card in a horizontal position face up with the object resting on and occupying a given area of the face of the card, means for releasably holding a length of tape in a horizontal position above the object adhesive side down, an anvil member below the said area of the card, a vertically reciprocating tape applying plunger above the held length of tape, two vertically reciprocating tape threading plungers above the held length of tape positioned to pass downwardly on each side respectively of the said area to points below the card, means for moving the applying plunger downwardly to press the central portion of the length of tape into engagement with the object and for moving the threading plungers downwardly to conduct the two end portions of the length on each side respectively of the said area to points below the card, a tape wiping finger on each side of the path of the threading plungers mounted for respective horizontal reciprocation toward and away from each other adjacent the back surface of the said area of the card, means for removing the anvil member from the path of the fingers, and means for moving the fingers to adhere the two end portions of the length to the back surface of the said area of the card.

2. A tape applying mechanism according to claim 1 wherein the means for reciprocating the tape wiping fingers comprises a vertically reciprocating anvil shaft, the top of the shaft serving as the said anvil member.

5

and cam and arm means for translating the vertical reciprocation of the anvil shaft into horizontal reciprocation of the fingers.

3. A tape applying mechanism according to claim 1 having a tape feeding means comprising a means for holding a tape supply, means for releasably holding with- 5 drawn unsevered tape with the leading end portion extending unsupported beyond the holding means, a tape gripper mounted for horizontal reciprocation above the level of the object to seize the leading end portion of the tape and draw the tape across the path of the applying and threading plungers, means for severing the re- 10 quired length of tape and means for releasing the gripper.

4. A tape applying mechanism according to claim 3 wherein the tape supply comprises means for rotatably 15 mounting a roll of tape, and means between the roll and the releasable tape holding means for withdrawing a portion of tape from the roll preliminary to the drawing by the gripper of the leading end portion across the path of the applying and threading plungers.

5. A mechanism for taping an object to the face of a card having an aperture on each side of the area occu- 20 pied by the object, the tape extending over the object and through the apertures with the two end portions of the tape adhered to the back of the card between the aper- 25

6

tures; the mechanism comprising means for holding the card in a horizontal position face up with the object resting on the face of the card between the two card apertures, means for releasably holding a length of tape in a horizontal position above the object adhesive side 5 down, an anvil member below the card between the card apertures, a vertically reciprocating tape applying plunger, a pair of vertically reciprocating tape threading plungers shaped and registered to pass through the two card aper- 10 tures, means for moving the applying plunger downwardly to press the central portion of the length of tape into engagement with the object and for moving the threading plungers downwardly to thread the two end portions of the length through the card apertures, a 15 tape wiping finger on each side of the path of the threading plungers mounted for horizontal reciprocation toward and away from each other adjacent the area of the back surface of the card between the card apertures, means 20 for removing the anvil member from the path of the fingers, and means for moving the fingers to adhere the two end portions of the length to the back surface of the card.

No references cited.