

Aug. 9, 1949.

C. O. SWENSON ET AL

2,478,435

APPARATUS FOR APPLYING BAG TIES

Filed Feb. 23, 1946

2 Sheets-Sheet 1

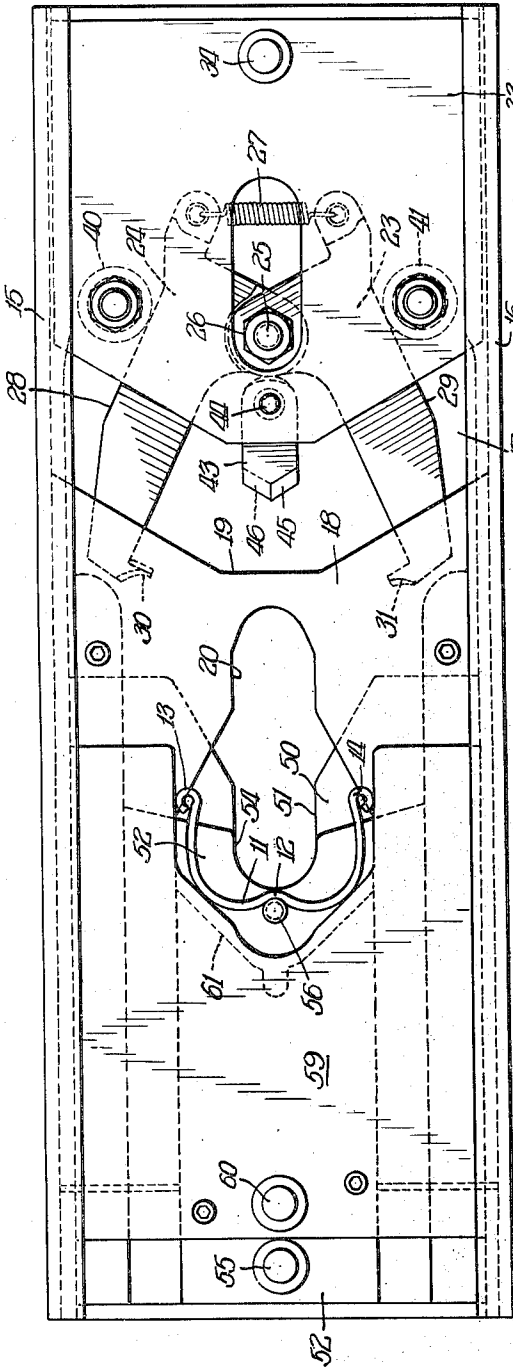


Fig. 1

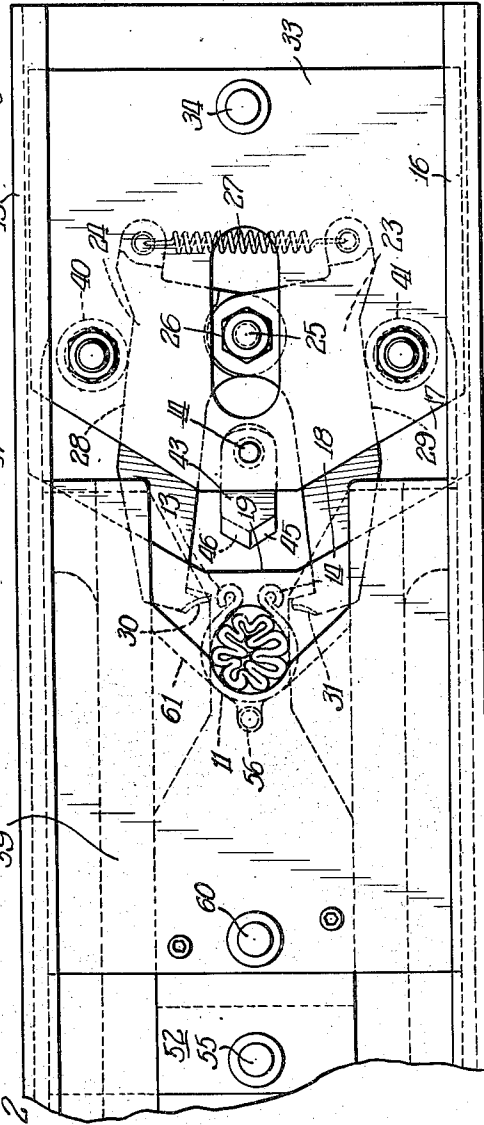


Fig. 2

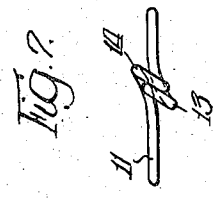


Fig. 3

INVENTORS.
Carl O. Swenson,
BY Alf Johanson.

Wilkinson Huber Byron & Knight
ATTYS.

Aug. 9, 1949.

C. O. SWENSON ET AL

2,478,435

APPARATUS FOR APPLYING BAG TIES

Filed Feb. 23, 1946

2 Sheets-Sheet 2

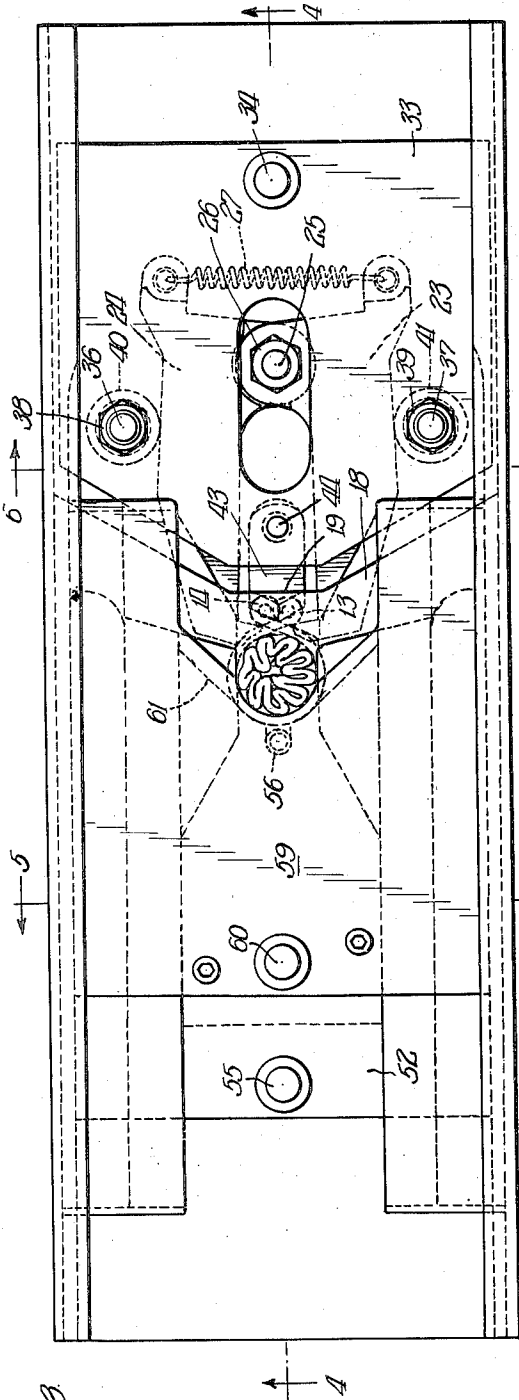


FIG. 3

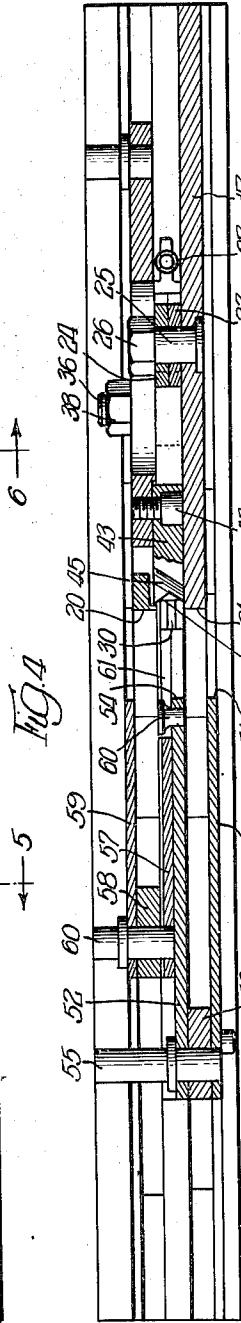


FIG. 4

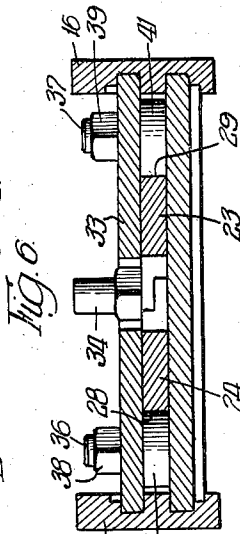
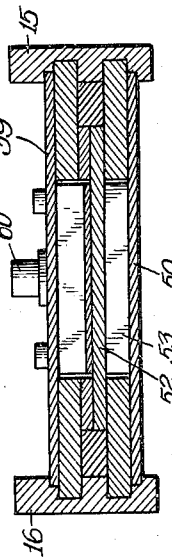


FIG. 5

FIG. 6



INVENTORS:

Carl O. Swenson,
BY Alf Johanson,

McKinism, Hudley, Byson & Knight
attys

UNITED STATES PATENT OFFICE

2,478,435

APPARATUS FOR APPLYING BAG TIES

Carl O. Swenson and Alf Johanson, Chicago, Ill.,
assignors to The Columbia Malting Company,
Chicago, Ill., a corporation of Illinois

Application February 23, 1946, Serial No. 649,622

5 Claims. (Cl. 140-93)

1

This invention relates to a new and improved apparatus for applying bag ties, and more particularly to apparatus for applying to bags a readily removable metallic tie member.

The invention relates to means for tying the open mouths of bags formed of fabric, paper or other flexible material when such bags are filled with materials in powdered or granular form, such for example, as grain. Bags used for many such purposes are relatively expensive and are therefore returned to stock for reuse. Various methods of bag closures, such as sewing, have been used which are efficient but are not suitable for bags to be reused, as complete removal of stitching is expensive and slow and the bag is often damaged in the removal.

A satisfactory bag tie must not only be readily applied and must not damage the bag, but must also be readily removable. Various types of metallic ties have been developed for this purpose. In general, they include a metallic loop manually placed around the bag neck with the ends of the metal piece twisted together by hand. The manual application and removal of such ties is expensive in that it requires substantial time to bunch the bag mouth and apply the tie and also to remove it. The present invention provides apparatus for quickly bunching the bag mouth and rapidly and uniformly applying a tie thereto. The tie is also quickly removable.

It is an object of the present invention to provide a new and improved apparatus for applying bag ties.

It is an additional object to provide apparatus for mechanically applying such a tie to bags.

Other and further objects will appear as the description proceeds.

A preferred embodiment of the invention has been shown in the accompanying drawings, in which—

Figure 1 is a plan view of the apparatus and tie, the apparatus being in its initial or open position;

Figure 2 is a view similar to Figure 1, but showing the parts in an intermediate position;

Figure 3 is a view similar to Figure 1, but showing the apparatus and tie in the closed position;

Figure 4 is a longitudinal section taken on line 4-4 of Figure 3;

Figure 5 is a cross section taken on line 5-5 of Figure 3;

Figure 6 is a cross section taken on line 6-6 of Figure 3; and

Figure 7 is a face view of the closed tie member.

The bag tie of the present invention is shown in plan view in Figure 1 in its open form and in face view in its closed form in Figure 7. In the form shown, the tie 11 comprises a length of resilient wire bent to a generally U-shaped form with a re-entrant angular portion 12 formed in approximately the middle of the U. The ends of

2

the legs of the U are finished with the flat end loops 13 and 14.

The apparatus for applying the tie comprises side guide rails 15 and 16 which are fixedly secured together by a lower plate 17 and an upper plate 18. The upper plate 18 is short and has a rear edge 19 and its forward edge is formed with the bag neck closing notch 20. The lower plate 17 has its left or inner edge formed to the same contour as the upper plate with a notch 21 as shown in Figure 4. This plate 17 extends to the right for the length of the apparatus.

The tie closing arms 23 and 24 are pivoted on the pin 25 which is secured to plate 17, being held on the pin by nut 26. The rear ends of arms 23 and 24 are connected together by the coil spring 27. The arms 23 and 24 are provided with cam surfaces 28 and 29, respectively, and with notched tie engaging and closing ends 30 and 31.

The slide plate 33 is longitudinally movable by means of the operating lug 34 and slides on the rails 15 and 16 as best shown in Figure 6. The bolts 36 and 37, held in place by nuts 38 and 39, carry the rollers 40 and 41 which engage the cam surfaces 28 and 29 on arms 23 and 24 when the slide 33 is moved to the left in Figures 1, 2 and 3 to progressively swing the arms toward each other. The slide 33 also carries the interlocking cam 43, held in place by machine screw 44. This cam, which serves to interlock the overlapping tie ends, has two cam faces 45 and 46. As best shown in Figure 4, the cam surface 45 slopes upwardly and rearwardly, while the cam surface 46 slopes downwardly and rearwardly.

The slides at the left of Figures 1 to 4 inclusive, shown in cross section in Figure 5, will next be described. The lower slide comprises plate 50 having a bag neck gathering notch 51 formed therein, this notch being opposed to the notch 21 in plate 17. The lower slide includes plate 52, held to plate 50 by the bar 53. This plate 52 is also notched at 54, above the central portion of the notch 51 in plate 50. The actuating pin 55 passes through the plates 50 and 52 and the bar 53. The plate 52 carries the button or headed pin 56, which as shown in Figure 1, engages the re-entrant angle 12 in the tie 11.

The upper slide comprises lower plate 57, bar 58 and top plate 59 secured together and carrying the actuating pin 60. The lower plate 57 has a notched cam surface 61, the notch fitting about the headed pin 56 carried by the lower slide, and the cam surfaces engaging the legs of the U-shaped tie member to force them toward each other around the bag neck, this action of the tie legs being largely accomplished by straightening out the re-entrant bend 12 in the tie clip.

In the operation of the apparatus, the gathered neck of a filled bag is thrust upwardly through the facing notches 20 and 51. A tie clip

is then placed in the position in which it is shown in Figure 1 with the re-entrant angle 12 engaging the headed pin 56. The ends 13 and 14 fit against the slide surfaces, as shown in the drawing. The upper and lower slides on the left hand side are then moved jointly inwardly toward the fixed notch by force applied through pins 55 and 60. The button 56 brings the tie clip firmly against the gathered bag neck, as shown in Figure 2. The lower slide carrying pin 55 is then stopped, while the upper slide is forced further to the right by means of pin 60. The cam surfaces 61 on the lower plate 57 of the slide engage the legs of the U-shaped clip and force the legs around the bag neck to the position shown in Figure 2.

At this time, the right slide is moved forward by means of force applied through pin 34 and the cam rollers 40 and 41 pressing against cam surfaces 28 and 29 swing the arms inwardly so that the notched ends 30 and 31 engage the looped ends 13 and 14, respectively, of the tie clip. These ends are notched so that as the ends 13 and 14 are forced together, the end 14 is forced to pass above the end 13. The position of the notched ends of the arms at the completion of this movement is clearly shown in Figure 3. As the right slide continues forward, it carries with it the cam member 43 and the cam surface 45 engages the lower positioned loop end 13 to force it upwardly, while the oppositely inclined cam surface 46 engages looped end 14 to force it downwardly. This causes the two end loops to overlap and hook together to retain the clip in place upon the bag neck.

The resilience of the metal from which the tie is made is adequate to keep it fixed firmly in place. At the same time, the clip may be readily removed either by inserting a tool in the openings in the looped ends of the tie or merely by pressing them apart by means of the fingers. It will be apparent that the reversed movement of the slides to their outer limits of movement restores the parts to the position to which they are shown in Figure 1 and opens up the notches so that the tied bag may readily be removed by a downward movement thereof.

It will be understood that various forms of apparatus may be used for inserting the bag necks in the notch in the machine, or they may be inserted manually. It will also be understood that any desired system of cams or levers connected to a source of power may be used for reciprocating the three slides in the proper timed relation. These additional driving means form no part of the present invention and will not be disclosed in detail herein.

The reversed bend or re-entrant angle 12 in the clip has been found to be particularly effective in centering the clip for applying it by means of the headed pin 56 to the neck of the bag. It is also important in that it provides a point about which the two halves of the clip bend when the clip is applied to the bag neck. Thus, the application of the tie clip to the bag neck is accomplished largely by a localized bending of the tie rather than by continuous deformation. The resilience of the tie is preserved and it interlocks to hold the bag effectively closed.

While we have shown certain preferred embodiments of our improved tie and apparatus, they are capable of being modified to meet differing conditions and requirements, and we contemplate such variations as come within the spirit and scope of the appended claims.

We claim:

1. Bag tying apparatus for applying a generally U-shaped bag tie which comprises a notched plate, a sliding plate having an opposed notch formed therein, the two notches serving to tightly gather a bag mouth, a second slide adapted to force the U-shaped bag tie about the bag mouth, and means for engaging and overlapping the bag tie ends.

2. Bag tying apparatus for applying a generally U-shaped bag tie which comprises a notched plate, a sliding plate having an opposed notch formed therein, the two notches serving to tightly gather a bag mouth, a second slide adapted to force the U-shaped bag tie about the bag mouth, and swinging arms for engaging and overlapping the bag tie ends.

3. Bag tying apparatus for applying a generally U-shaped bag tie which comprises a notched plate, a sliding plate having an opposed notch formed therein, the two notches serving to tightly gather a bag mouth, a second slide adapted to force the U-shaped bag tie about the bag mouth, means for engaging and overlapping the bag tie ends, and means for interlocking the overlapped ends.

4. Bag tying apparatus for applying a generally U-shaped tie, the tie having a re-entrant bend intermediate its ends, which comprises a pair of relatively movable notched plates, the notches serving to jointly gather and compress a bag neck, one of said plates having a lug adapted to fit into the re-entrant bend in the tie member to force said member against the bag neck, a slide engaging the legs of the U-shaped tie to flex the tie at the re-entrant angle and swing the legs about the bag neck, means adapted to engage the legs to overlap their ends and means for interlocking the overlapped ends.

5. Bag tying apparatus for applying a generally U-shaped tie, the tie having a re-entrant bend intermediate its ends which comprises a pair of relatively movable notched plates, the notches serving to jointly gather and compress a bag neck, one of said plates having a lug adapted to fit into the re-entrant bend in the tie member to force said member against the bag neck, a slide engaging the legs of the U-shaped tie to flex the tie at the re-entrant angle and swing the legs about the bag neck, arms adapted to simultaneously engage the tie ends and swing them to overlapped position, and cam means for engaging and interlocking the overlapped ends.

CARL O. SWENSON.
ALF JOHANSON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
191,039	Ellis	May 22, 1877
557,378	Gill	Mar. 31, 1896
784,114	Moock	Mar. 7, 1905
1,074,587	Curry	Sept. 30, 1913
1,151,752	Bates	Aug. 31, 1915
1,306,163	Bates	June 10, 1919
1,531,531	Walker	Mar. 31, 1925
1,593,090	Markwick	July 20, 1926
1,598,799	Blair	July 7, 1926
1,720,152	Sigmund	July 9, 1929
2,267,532	Moberg	Dec. 23, 1941