H. ZIMMERMAN.

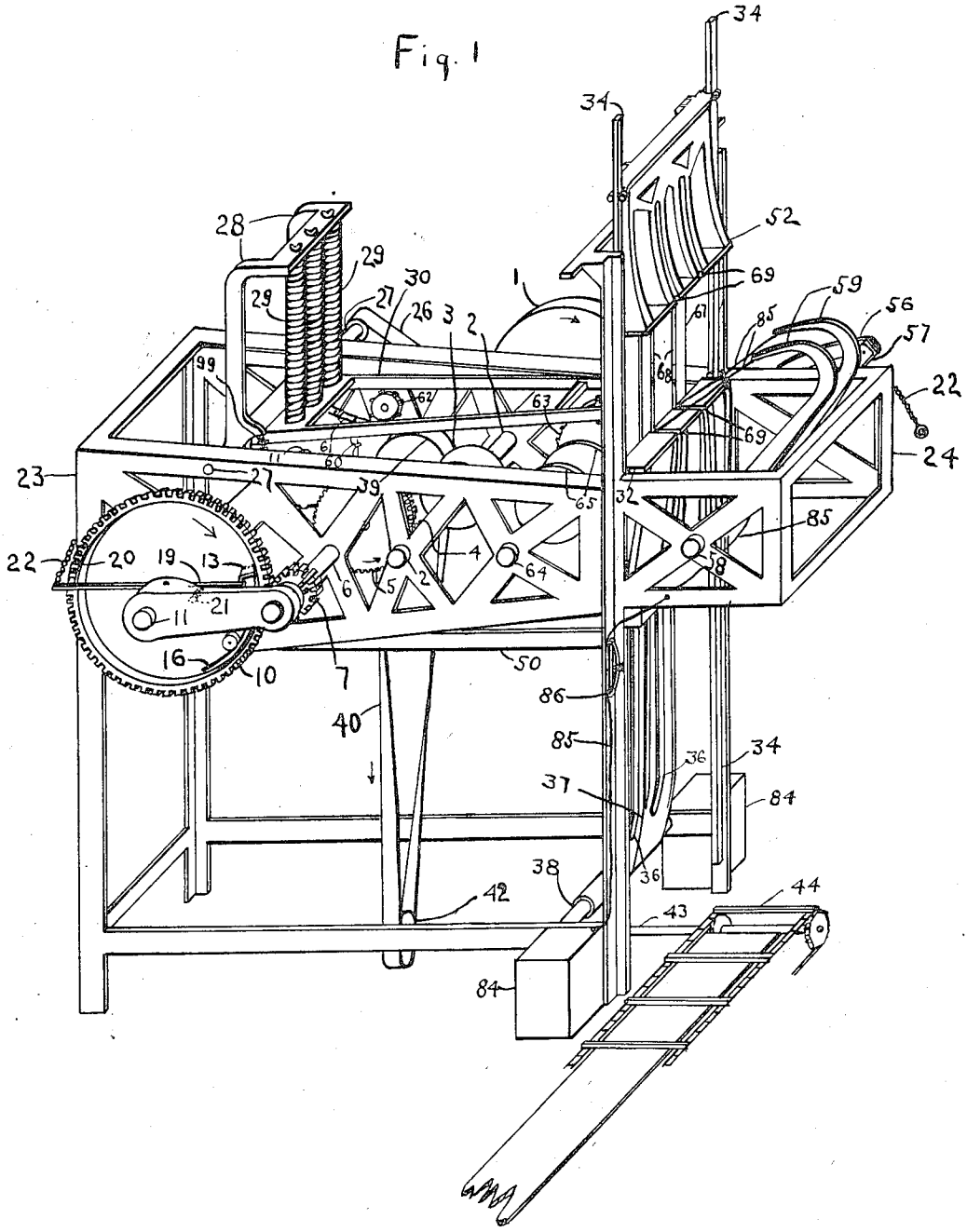
BUNDLING MACHINE.

APPLICATION FILED OCT. 4, 1907.

961,709. Patented June 14, 1910.

3 SHEETS—SHEET 1.

Fig. 1



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3 SHEETS—SHEET 2.

Fig. 2

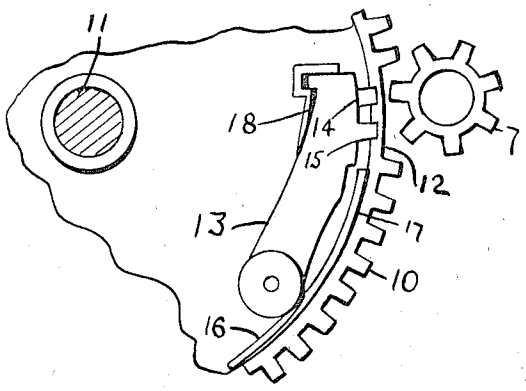


Fig. 3

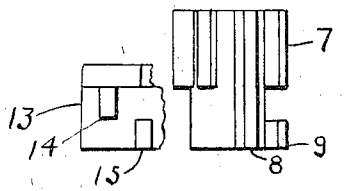
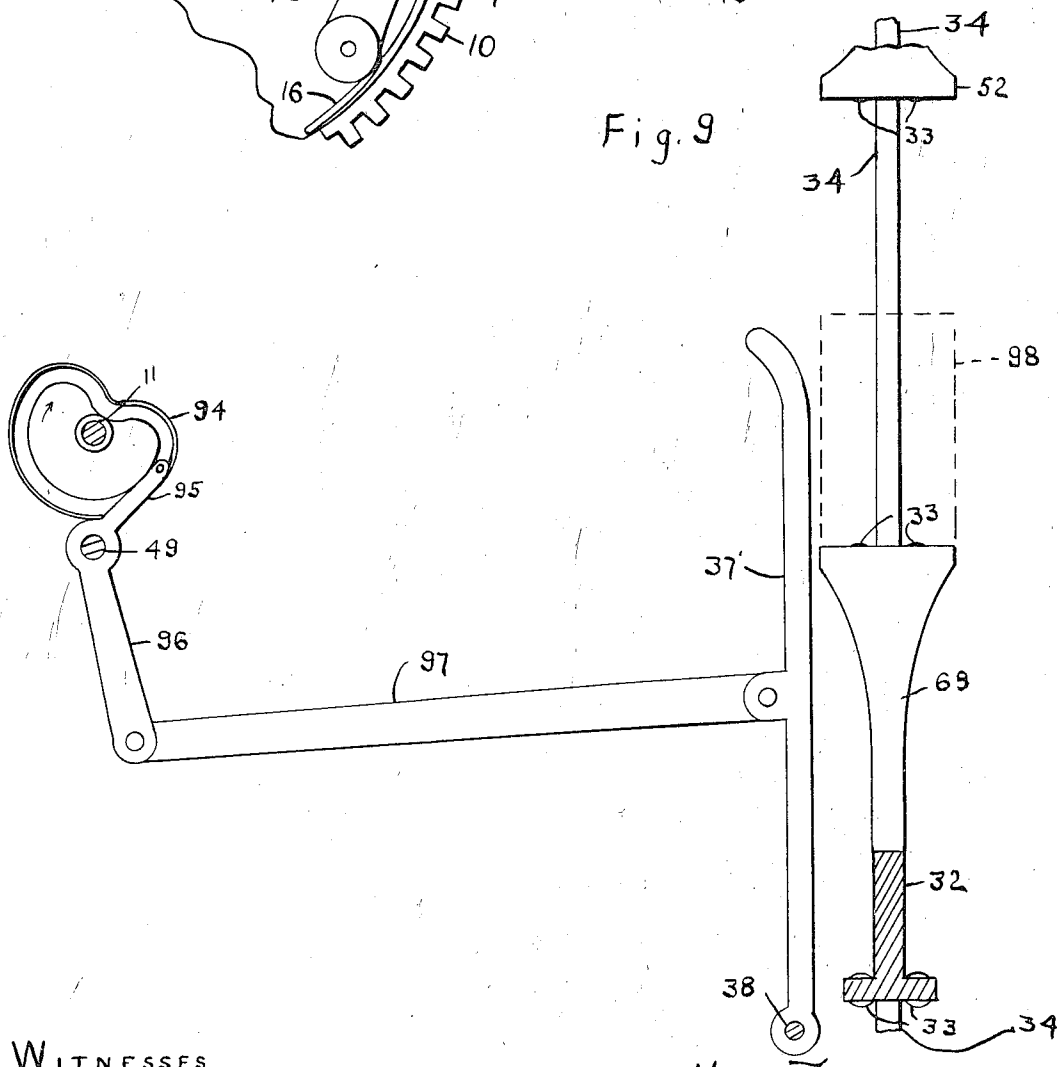


Fig. 9



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3 SHEETS—SHEET 3.

Fig. 4

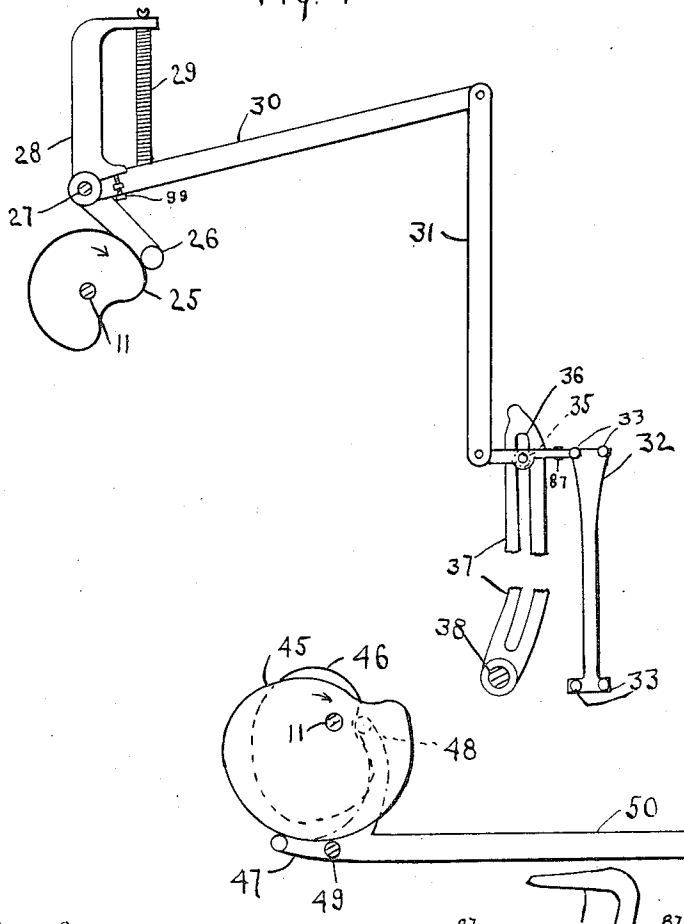


Fig. 5

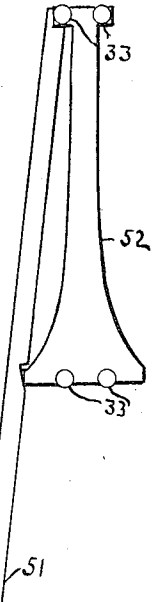


Fig. 6

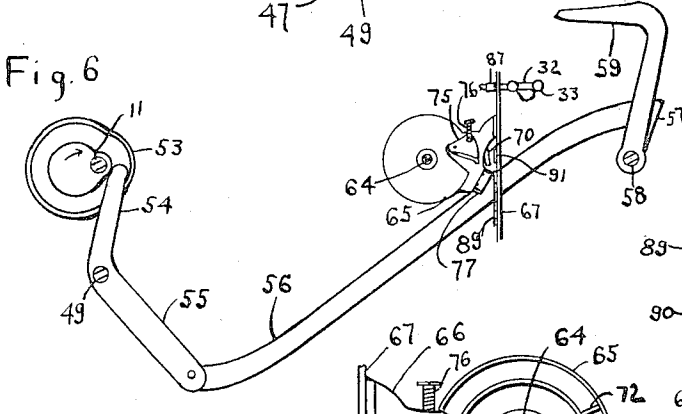


Fig. 7

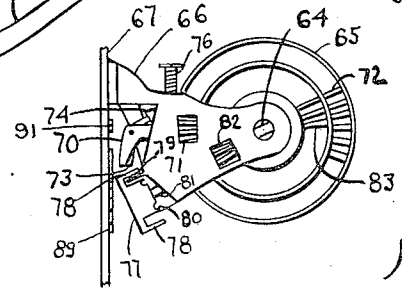
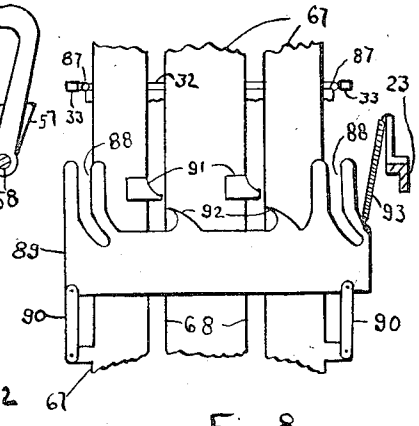


Fig. 8



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UNITED STATES PATENT OFFICE.

HARRY ZIMMERMAN, OF FREMONT, OHIO.

BUNDLING-MACHINE.

961,709. Specification of Letters Patent. Patented June 14, 1910.

Application filed October 4, 1907. Serial No. 395,835.

To all whom it may concern:

Be it known that I, HARRY ZIMMERMAN, a citizen of the United States, residing at Fremont, Sandusky county, Ohio, have invented a new and useful Bundling-Machine, of which the following is a specification.

This invention relates to mechanism for performing a cycle of operations, details operable in connection therewith, and to the control thereof.

This invention has utility when embodied in a machine for compacting articles, binding the same and disposing of the bundles.

Referring to the drawings: Figure 1 is a perspective view of an embodiment of the invention in a machine for bundling and disposing of mittens or gloves; Fig. 2 is a fragmentary view of the starting connector; Fig. 3 is a detail of one of the gears and a portion of the coacting element operable in connecting up the machine for a cycle of operations; Fig. 4 is a showing of that portion of the machine performing the yielding action in compressing and effecting the discharge of the pressed and tied bundle; Fig. 5 is a showing of that portion of the machine performing its cycle in positively compressing the articles; Fig. 6 illustrates the means for carrying the binding means or cord about the compressed bundle to the knotter; Fig. 7 is an elevation from the opposite side on an enlarged scale of the tier and knot completing mechanism; Fig. 8 is a view looking toward the front of the machine showing the means effecting removal of cord from tying device to complete the knots; Fig. 9 is a modification of bundle discharging feature at a position just prior to action.

The continuously driven pulley 1 is mounted on shaft 2 which carries fly wheel 3 and pinion 4. Pinion 4 is in mesh with gear 5 on shaft 6 to which is fixed mutilated gear 7 having teeth 8, 9, without the normal width of the pinion. In the plane of the normal width of the pinion and in meshing relation thereto is gear 10 on shaft 11. This gear 10 is mutilated in having an untoothed portion 12, permitting discontinuance of drive from pinion 7. Carried by mutilated gear 10 is pivoted element 13 of the connector having teeth 14, 15, will be in mesh with teeth 8, 9. gear 7. Spring 16 serves to hold the element 13 against cam wing 17 and the inner side of the toothed portion of gear 10 so that teeth 14, 15, will be in mesh with teeth 8, 9. Element 13 is provided with cam rib 18, which in rotation of gear 10 is engaged by lever 19 and pulled against resistance of spring 16 out of meshing relation with teeth 8, 9. To insure this action of lever 19, cam 20 is provided, although the lever is normally held in position to engage cam 18 by spring 21. The cam 17, diametrically opposite cam 20, when gear 10 is rotated 180° from position shown in Fig. 1, prevents lever 19 from getting caught on element 13. When lever 19 has engaged element 13 to pull it out of mesh with pinion 7, the opposite or unhooked end of the lever 19 is just free from cam 20, so that the lever may be tripped to effect the starting connection by pulling chain 22, passing about frame 23 to extension 24, where it may be convenient for the operator.

Fixed on shaft 11 is cam 25, shown in Fig. 4 in starting position. Riding on this cam is arm 26 on shaft 27, which has rigid therewith arms 28, having yieldable means or springs 29 engaging arms 30 loosely pivoted on shaft 27. The springs may be adjusted to such tension as is desired. The arms 30 are connected by links 31 to reciprocable presser member 32 provided with rollers 33 coacting with guide rails 34. These parallel guide rails 34 are mounted in forward portion of frame 23. Rigid with compressing member 32 are rollers 35 engaging ways 36 in discharger 37 pivoted on shaft 38, whereby after a bundle is compressed and tied, it may be pushed off member or frame 23.

Mounted on continuously rotated shaft 6 is pulley 39, which through belt 40, pulley 42 and shaft 43 actuates endless slat conveyer 44, upon which the discharger 37 pushes the bundles that they may be disposed of.

Adjacent gear 10 are cams 45, 46 fixed on shaft 11, (Fig. 5) engaged by arms 47, 48, on shaft 49. Rigid with these arms 47, 48, is extension 50, connected by link 51 with positively reciprocated presser member 52, provided with rollers 33 coacting with guide rails 34. Presser member 52 is opposed to yieldable presser member 32, and between these members the articles to be compacted are introduced.

On shaft 11, remote from gear 10 and adjacent cam 25 is cam 53 engaged by arm 54 mounted on shaft 49. Extension 55 rigid with arm 54 has link connection 56 with arm 57 on rock shaft 58, on which are mounted the binding means carriers 59 (Fig. 6),

which shows the elements in position before being tripped.

Mounted on shaft 11, Fig. 1, is sprocket wheel 60 over which passes sprocket chain 61, the tension of which is adjusted by means of idler 62. This chain 61 drives sprocket wheel 63, fixed on shaft 64, which carries a pair of knot tier wheels 65. Adjacent wheels 65, see Figs. 6, 7, are brackets 66 extending from shaft 64 to backing plate 67. Plate 67 forms one side of the press against which the articles may be stacked and along which the presser members 32 and 52 may operate. The plate 67 is recessed, having slots 68, while in alinement therewith the compression members 32 and 52 have recesses 69, one series of the recesses being in the plane of rocking of each cord carrier 59.

Mounted in brackets 66 is beak shaped element 70 having a shaft with beveled pinion 71 thereon actuated by teeth 72 on wheel 65. Pivoted in beak 70 is tongue shaped element 73, having an angular rearward extension carrying roller 74, which during a portion of the rotation of beak 70 coacts with cam 75 yieldably positioned by spring 76 to bring the tongue into the beak.

Wheel 77 has diametrically disposed knife extensions 78 coacting with knife 79 to cut cord carried into recesses 80 by arms 59. The wheel 77 is mounted on shaft 81 having beveled pinion 82 actuated by teeth 83 on wheel 65.

Adjacent the forward legs of the frame 23 are boxes 84 for the binding means or cord 85 which is conducted along the frame under spring tension rollers 86 to the carriers 59, through recesses 68, 69 to cord gripping wheel 77.

Carried by member 32, see Fig. 8, are rollers 87 movable to engage guides 88 to laterally actuate frame 89 mounted on links 90. The binding means passed through recesses 68 rests upon brackets 91, until the tying operation, the cord then being engaged by hooks 92 which pulls the tied portion off the beak 70 to complete the knots. After this stripping action, frame 89 is retracted by spring 93 connected to frame 23. In rotating, the cord is looped about beak 70, the tongue 73 has opened out, and by cam 75 the tongue is yieldably pressed inward to pull cord ends through the loop as stripping of knots from beaks occurs.

Instead of actuating the discharger from the yieldable presser member, a cam 94, Fig. 9, may be placed on shaft 11, engaged by arm 95 on shaft 49, and having rigid extension 96 connected by link 97 to discharger 37′ pivoted on shaft 38. The showing is in position just prior to rocking of discharger 37′ into recess 69 to push the bundle 98 of compressed and tied articles off presser member 32.

In addition to the spring adjustment of yieldable presser member 32, the initial position of the presser may be varied by means of bolt 99.

Operation: With the pulley 1 continuously driving the shafts 2, 6, the bundle of articles, as gloves or mittens may be stacked on member 32 against plate 67 to such number as is desired. Chain 22 is then pulled, which through lever 19 releases element 13 so that starting connection is had by meshing of teeth 14, 15 with 8, 9, to bring gears 10 and 7 into operation, the gear 10 for one complete rotation. The positively actuated presser member 52 starts down to compact the rectangular shaped stack of articles which may be of any varying thickness within the charging limits of the machine. Springs 29 are so set that yielding action will not occur until articles are well compacted, and then the yielding permits accommodation of varying size of bundles. As member 52 has moved downward, cord carriers 59 rock forward to loop the string 86 into a pair of recesses 80, one on each side of a knife 78, after which the carriers 59 retract through the recesses 68, 69, as they entered. Meantime the shaft 64 rotating in unison with shaft 11, through chain 61, has through teeth 72 on wheel 65 given beak 70 a complete rotation to loop the cord ends thereabout, while just following, the teeth 83 have given wheel 77 a half rotation to cut the string 86 and cut the ends, the two tiers acting in synchronism. Continued rotation of shaft 11 permits further lowering of yieldable presser member 32, as arm 26 rides on cam 25 closer to shaft 11. During this action, rollers 87 actuate the strippers 92, which pulls the ties off beaks 70 to complete the knots. In sequence, the rollers 35 or the cam 94 may then rock the discharger 37 or 37′ to push the compacted and doubly tied bundle off the presser member 32 to fall on conveyer 44 to be taken away. The starting connector insures positive starting at a predetermined point and continuance of operation so that the several cycles of action shall take place but once, the distribution of functions and speed reduction so dispose the working load on shaft 11 that there is no momentum tending to have the machine run ahead. Lever 19 engaging element 13 is a positive stop device effective at a predetermined point. The several cycles of operations occur in such sequence as to automatically effect the bundling and disposal of the bundles of articles.

The press has three open sides, permitting ready feed of articles of varying dimensions, while the three remaining sides of the press are recessed that the tying steps may be taken independently of the compacting of the bundle, thereby permitting of a stiffer construction to do the heavy work of press-

ing, while the binders may be light and not subjected to strains liable to work their destruction.

The machine is especially adapted to the bundling of articles, as apparel. Hand coverings, as gloves and mittens, may be made in a wide range of sizes and weights or thicknesses, and with a machine of the character herein disclosed such a wide range of product may be expeditiously taken care of in a most effective manner.

What is claimed and it is desired to secure by Letters Patent is:

1. A bundling machine having parallel guides, a positive pressing member and a yieldable pressing member reciprocable along the guides.

2. An intermittently operable bundling machine comprising a continuously operable driver, a driven member, and a trip connector engaging the driven member for driving at a predetermined point in the operation of the driven member.

3. An intermittently operable bundling machine comprising a continuously operable driver, a driven member, and a connector automatically releasing the driven member from the driver at a predetermined point in the operation of the driven member.

4. An intermittently operable bundling machine comprising a continuously operable driver, a driven member, and a connector normally releasing the driven member at a predetermined point in the operation of the driven member, said connector being tripable to engage the driven member at such predetermined point.

5. A machine having a cycle of operations, comprising members movable to compress a bundle, a binding means carrier and pay out device swingable about three sides of the bundle, a knotter for the binding means, and a bundle discharger successively performing.

6. A bundling machine having a presser member, a knot tier, and means coacting with the presser member and reciprocable between the bundle and tier to complete the knot by forcing it off the tier.

7. A bundling machine having a knot tier, a bundle presser member, and yieldably retracted means actuated by the member to complete the knot by removing it from the tier, said means operating between the tier and bundle.

8. An intermittently operable bundle compressing and binding machine, and a starting connector therefor including a pair of mutilated gears and a trip for throwing in the gears.

9. An intermittently operable bundle compressing and binding machine, and a starting connector therefor including a pair of gears, and an element movable with one of the gears and releasable to coact with the other gear.

10. An article bundling machine having a press with a plurality of movable recessed sides, and a carrier for binding means operable through the recesses.

11. A mechanism for handling hand covering articles comprising a positive pressing member and a yieldable receiving member for compacting the articles, a plurality of binders for tying the articles together, and a discharger for the articles after they move from tied position.

In testimony whereof I affix my signature in the presence of two witnesses.

HARRY ZIMMERMAN.

Witnesses:
JAMES B. JOHNSON,
FRANK C. KISER.