Dec. 31, 1935. B. H. METTERNICH 2,026,284

METHOD AND APPARATUS FOR BUNDLING AND PACKAGING ARTICLES

Filed Sept. 28, 1934 2 Sheets-Sheet 1

Fig. 1

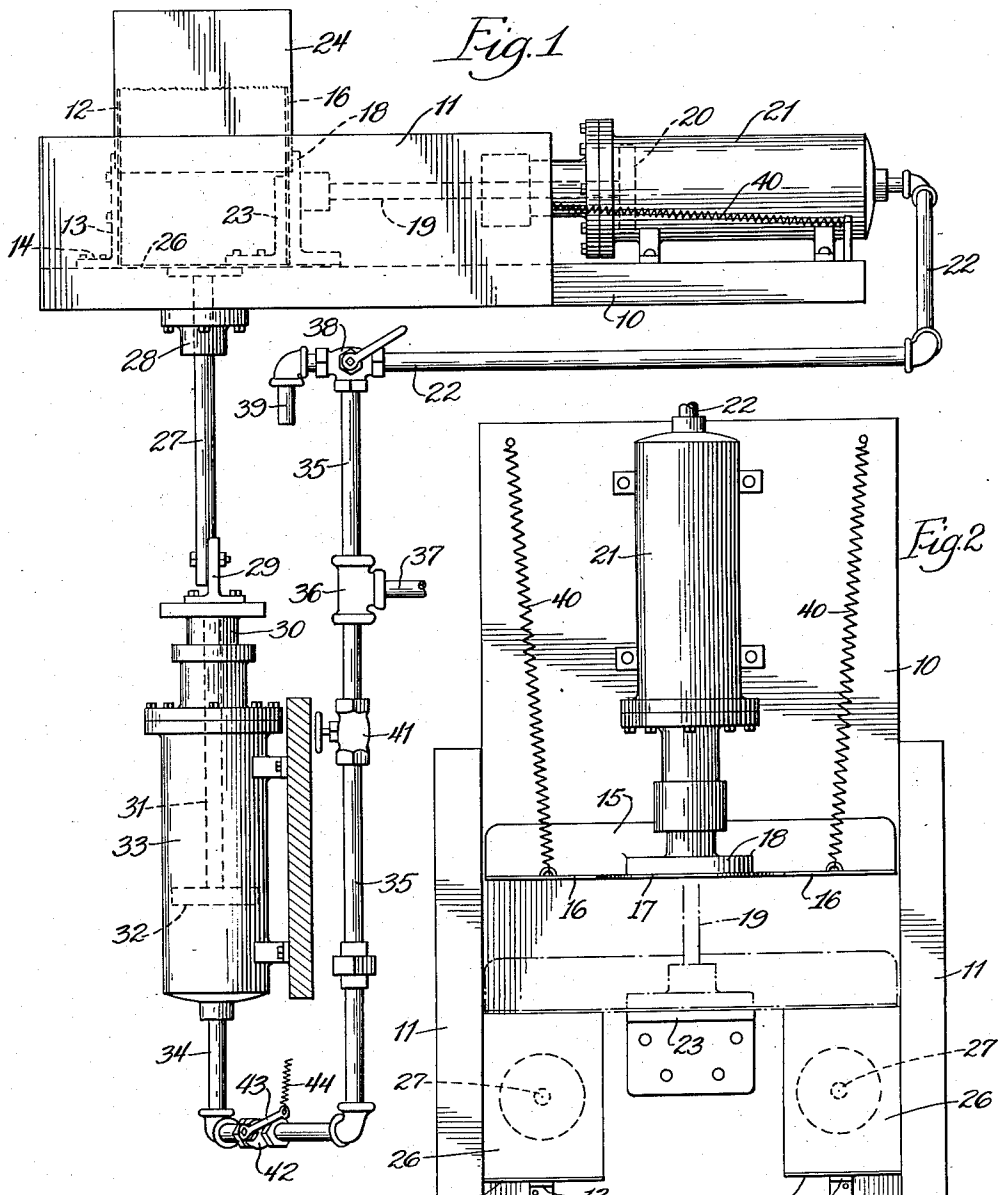


Fig. 2

Inventor:

Benjamin H. Metternich,

By Banning & Banning

Attys.

Dec. 31, 1935. B. H. METTERNICH 2,026,284

METHOD AND APPARATUS FOR BUNDLING AND PACKAGING ARTICLES

Filed Sept. 28, 1934 2 Sheets-Sheet 2

Fig. 3

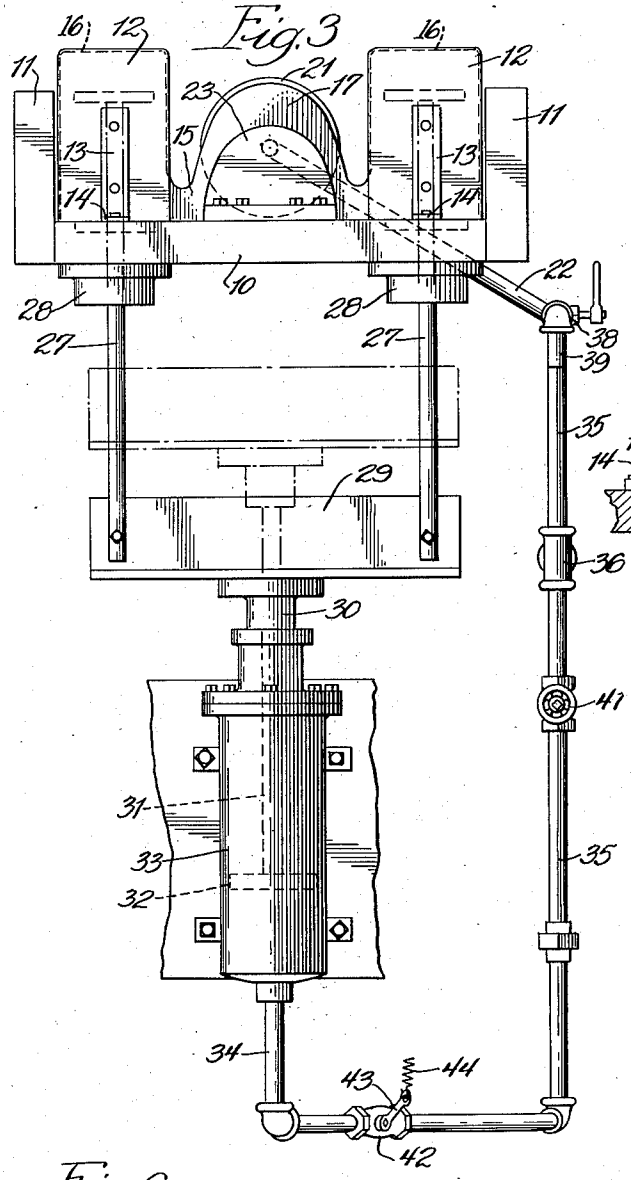


Fig. 4

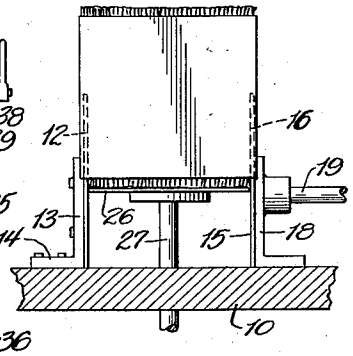


Fig. 5

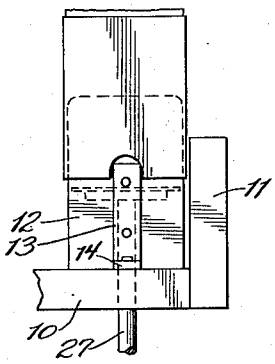
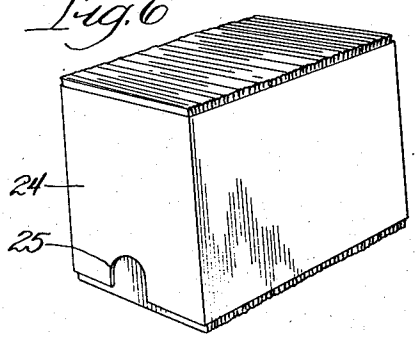


Fig. 6



Inventor:
Benjamin H. Metternich,
By Banning & Banning
Attys.

Patented Dec. 31, 1935 2,026,284

UNITED STATES PATENT OFFICE

2,026,284

METHOD AND APPARATUS FOR BUNDLING AND PACKAGING ARTICLES

Benjamin H. Metternich, Menasha, Wis., assignor to Marathon Paper Mills Company, Rothschild, Wis., a corporation of Wisconsin

Application September 28, 1934, Serial No. 745,873

6 Claims. (Cl. 93—93)

The present invention is directed to the method and apparatus for bundling and compressing sheets of material, such as folded napkins or the like, which are delivered in stacked formation and which must be bundled or wrapped in packages containing the desired number of articles for shipment and use.

The invention is particularly developed and designed to facilitate the packaging of napkins which are delivered folded in prearranged order for subsequent introduction into a dispenser, from which they are delivered singly to the user as occasion may require. In the handling of paper napkins, it is necessary to exercise care to avoid disarranging the napkins as they are delivered from the folding machine and at the same time to make provision for the compact bundling of the napkins in the wrappers, and this operation, as heretofore performed, requires that the desired number of napkins be removed from the trough or chute, through which they are delivered and compressed by hand and wrapped in an orderly fashion without disarrangement, which is a somewhat difficult and tedious operation requiring the employment of skilled labor.

By the use of the present method, the required number of napkins or the like are stacked within a machine which applies the required pressure to compress the bundle to the desired dimensions, and while thus compressed, the packaging is performed by slipping over the bundle a pre-formed sleeve or wrapper of exact dimensions, after which the wrapper with the enclosed bundle is removed from the machine, and the expansion of the napkins within the sleeve prevents accidental removal or displacement of the contents.

Further objects and details of the invention will appear from a description thereof, in conjunction with the accompanying drawings, wherein,

Figure 1 is a side elevation of the machine;

Fig. 2 is a top plan view thereof;

Fig. 3 is a front view thereof;

Fig. 4 is a detail side elevation of the packing box, showing a group of napkins bundled within a sleeve in preparation for removal;

Fig. 5 is a front elevation of the same; and

Fig. 6 is a perspective view of a bundle of napkins after removal from the machine.

The machine as shown is a duplicate machine designed for the bundling of two packages of napkins at each operation, but it will be understood that the principles described are applicable to a single machine without substantial change or modification. The working parts of the machine are mounted upon a base or platform 10 of rectangular form, which is provided at its forward end with upstanding side walls 11, which give to the front end of the machine a trough-like formation.

Near the front of the machine are located a pair of thin stop plates 12, each of which is secured to and reinforced by an angle bar 13, the base portion of which is turned forwardly to afford a foot 14 for attachment to the base 10. The stop plates stand in laterally spaced relation to one another and confront and coact with a thin plunger plate 15, which comprises two upstanding outer sections 16 of substantially equal size with the stop plates 12 and connected by a center bridge portion 17, which latter affords a point of connection for a plunger head 18 carried at the end of a plunger rod 19 terminating in a piston 20 operable within a cylinder 21 which receives compressed air from a pipe 22, thus serving to advance the plunger plate until the bridge portion thereof contacts with a center stop 23 upstanding from the base of the machine. This advance movement brings the two side blades or sections of the plunger plate into predetermined spaced relation to the fixed stop plates 12 and determines the size of the bundle of napkins or the like, which are compressed to the dimensions indicated in preparation for the slipping on of the sleeves 24, each of which is provided in its lower edge with a notch 25 positioned to embrace the upper end of the angle bar 13, which thus serves as a stop to limit the extent to which the sleeve is inserted upon the package at this stage of the operations.

Each of the stop plates 12 coacts with a lifting base plate 26, of rectangular form and of suitable dimensions to afford a support for the lower edges of the stacked napkins and to move freely upward within the space afforded between the associated stop plate and plunger blade when the latter is moved into compressive position.

Each of the lifting plates 26 is mounted upon a vertically disposed rod 27 guided through a bushing 28 and secured at its lower end to an angle bar 29, which latter is mounted upon the head 30 of a plunger 31 carrying a piston 32 operable within a cylinder 33 which is supplied with compressed air through a pipe 34. The lifting plates thus operate in unison to lift the two stacks of napkins after their upper ends have been encircled by the sleeve and to force the napkins upwardly within the sleeve prior to

the removal of the completed package. The pipe 34 connects with a pipeline 35, which also connects with the pipe 22, and the pipeline 35 includes a T-coupling 36 secured to an inlet pipe 37.

A valve 38 controls the flow of pressure to the pipe 22, and the valve is provided with an outlet 39 for the release of pressure, which permits restoration of the plunger plate 15 through the pull of a pair of coil springs 40 suitably connected to the plunger sections or blades 16.

The supply of pressure to the pipe 34 is regulated by a hand valve 41 and a foot valve 42, which latter is provided with a lever 43 in the form of a foot treadle which is normally held in closed position by the tension of a spring 44.

Operation

In use, the operator removes the intended number of napkins or other stacked articles from the trough or other conveyor through which they are carried from the folding machine, and arranges two stacks against the stop plates 12 with the lifting plates 26 in lowered position. Thereupon the valve 38 is operated, which admits pressure behind the piston 20, causing the plunger plate 15 to advance until its movement is arrested by contact with the stop 23, and this serves to compress the two stacks of napkins to the desired degree and to hold them in compressed relation and to the desired dimensions to permit the sleeves to be inserted over the stop plates 12 and the plunger sections or blades 16 forming the respective compressing elements.

The sleeves are preferably formed of paperboard or the like, scored or creased to assume a rectangular formation, which permits them to be easily slipped over the compressed bundles of napkins until the lower notched edges of the sleeves engage with the upper ends of the angle bars 13. Thereupon the foot treadle is depressed to admit pressure to the cylinder 33, which acts upon the piston 32 and serves to elevate the lifting plates 26, thus forcing up the napkins while still compressed and confined. During this portion of the operation, the operator holds the sleeves against elevation while the napkins are being forced into position to completely fill the sleeves, after which the completed packages are removed from the machine. During the removal, the napkins are released from compression and expand sufficiently to snugly fit within the sleeve and ordinarily exert sufficient expansive pressure thereon to slightly bulge or curve the walls of the sleeve, in which condition they are ready for boxing and shipment.

The use of the machine not only speeds up the packaging operations, but results in the delivery of packages of uniform dimensions and firmly confined and retained against displacement. Moreover, by pre-forming the sleeves, it is possible to firmly and uniformly glue the sleeves together in advance of packaging, so that the gluing operations will be performed under favorable conditions and the glue will be permitted to set in advance of use, so that the glue joint will not be subjected to strain prior to the setting of the glue, which is likely to occur in cases where the gluing is performed concurrently with the packaging operation and under the expansive pressure of the bundled napkins.

The method involved is one which relieves the operator of the necessity for wrapping and gluing the packages under adverse conditions and while under the necessity for maintaining the bundles in compressed relation; and the method as a whole is one which permits the operations to be performed rapidly, accurately and easily, and without the requirement for especial skill in performing the details of the operation involved.

I claim:

1. In mechanism of the class described, the combination of a bladelike fixed stop plate, a movable stop blade adapted to be moved toward and from the fixed stop plate to exert compression upon a stack of sheets and permit insertion of a pre-formed sleeve around the stop plate and blade, and a lifting plate located below the stop plate and blade in position to support the base edges of the sheets stacked between the plate and blade and movable to force the same upwardly within the space between the plate and blade while in compressing relation and within the confines of the sleeve surrounding the plate and blade, the parts being configured to permit removal of the stack with the surounding sleeve.

2. In mechanism of the class described, the combination of a bladelike fixed stop plate, a movable stop blade adapted to be moved toward and from the fixed stop plate to exert compression upon a stack of sheets and permit insertion of a pre-formed sleeve around the stop plate and blade, and a lifting plate located below the stop plate and blade in position to support the base edges of the sheets stacked between the plate and blade and movable to force the same upwardly within the space between the plate and blade while in compressing relation and within the confines of the sleeve surrounding the plate and blade, the parts being configured to permit removal of the stack with the surrounding sleeve, controllable means for advancing the movable blade to compressive relation, and controllable means for operating the lifting plate.

3. In mechanism of the class described, the combination of a bladelike fixed stop plate, a movable stop blade adapted to be moved toward and from the fixed stop plate to exert compression upon a stack of sheets and permit insertion of a pre-formed sleeve around the stop plate and blade, and a lifting plate located below the stop plate and blade in position to support the base edges of the sheets stacked between the plate and blade and movable to force the same upwardly within the space between the plate and blade while in compressing relation and within the confines of the sleeve surrounding the plate and blade, the parts being configured to permit removal of the stalk with the surrounding sleeve, pneumatic means for advancing the movable blade to compressive relation, and pneumatic means for operating the lifting plate.

4. In mechanism of the class described, the combination of a base, a bladelike fixed stop plate standing edgewise and extending upwardly from the base, a movable blade standing edgewise with relation to the base and movable toward and from the fixed stop plate to compress a stack of sheets therebetween, the stop plate and blade being of smooth thin formation and adapted to lie closely against the outermost faces of the stack to permit a pre-formed sleeve to be slipped over the stop plate and blade and around the compressed sheets therebetween, and means for advancing the blade toward the stop plate.

5. In mechanism of the class described, the combination of a base, a bladelike fixed stop plate standing edgewise and extending upwardly from the base, a movable blade standing edgewise

with relation to the base and movable toward and from the fixed stop plate to compress a stack of sheets therebetween, the stop plate and blade being of smooth thin formation and adapted to lie closely against the outermost faces of the stack to permit a pre-formed sleeve to be slipped over the stop plate and blade and around the compressed sheets therebetween, means for advancing the blade toward the stop plate, a lifting plate located below the stop plate and blade and beneath the space intervening between said members when in compressive relation and adapted to support the base edges of the sheets included in the stack, and means for operating the lifting plate to thrust the stack of compressed sheets upwardly into the space embraced by the preformed sleeve, the parts being configured to permit the compressed stack and surrounding sleeve to be removed as a unit.

6. The method of packaging sheets which consists in supporting the sheets on edge and with their faces in close contiguous relation to one another in the form of a loosely bundled stack, applying oppositely directed pressure to opposite faces of the loose stack to close up the stack and hold the sheets in compressed facewise relation and in cubical form, then slipping a pre-formed tubular sleeve over the protruding exposed edges of the sheets comprising the compressed stack and over the compression-applying members, then applying inwardly directed pressure to the supported base edges of the stacked sheets while holding the sleeve stationary to project the stack of sheets inwardly while under facewise compression into the confines of the sleeve to effect a final positioning of the sheets within the sleeve, and finally removing the sleeve and the enclosed stack of sheets from the pressure applying members to permit expansion of the stacked sheets within the sleeve.

BENJAMIN H. METTERNICH.