June 28, 1932. E. T. STRAUBEL 1,864,775

BUNDLE WRAPPING DEVICE

Filed April 18, 1931 4 Sheets-Sheet 1

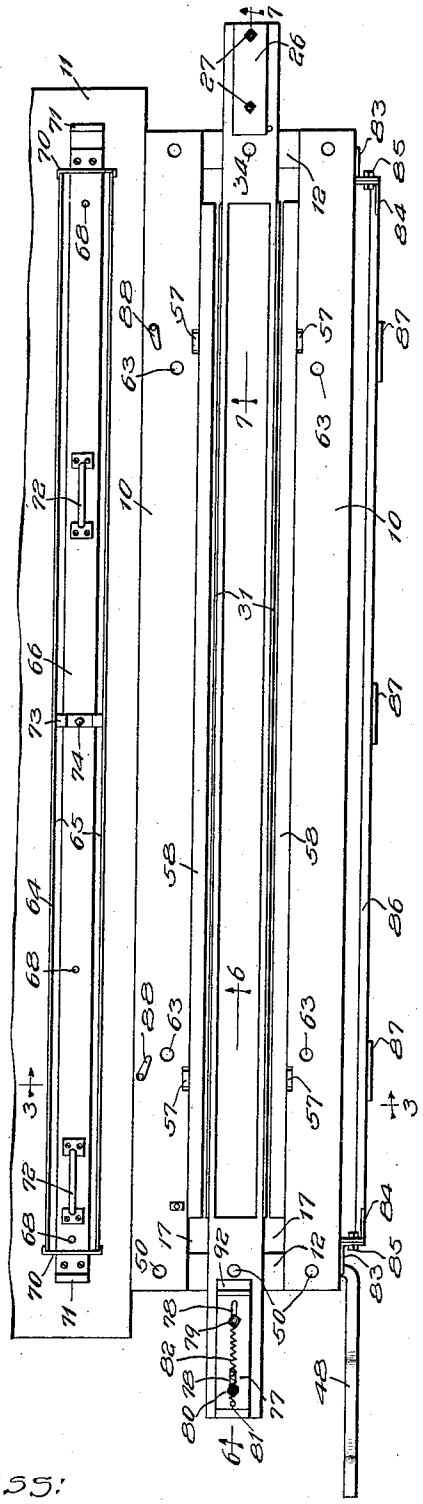


Fig. 1.

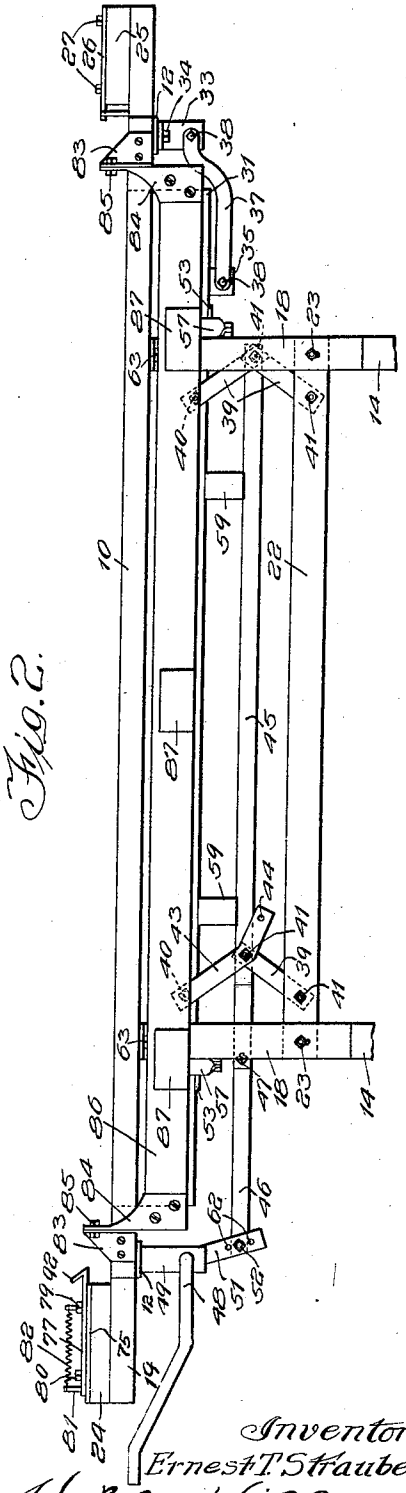


Fig. 2.

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Fig. 3.

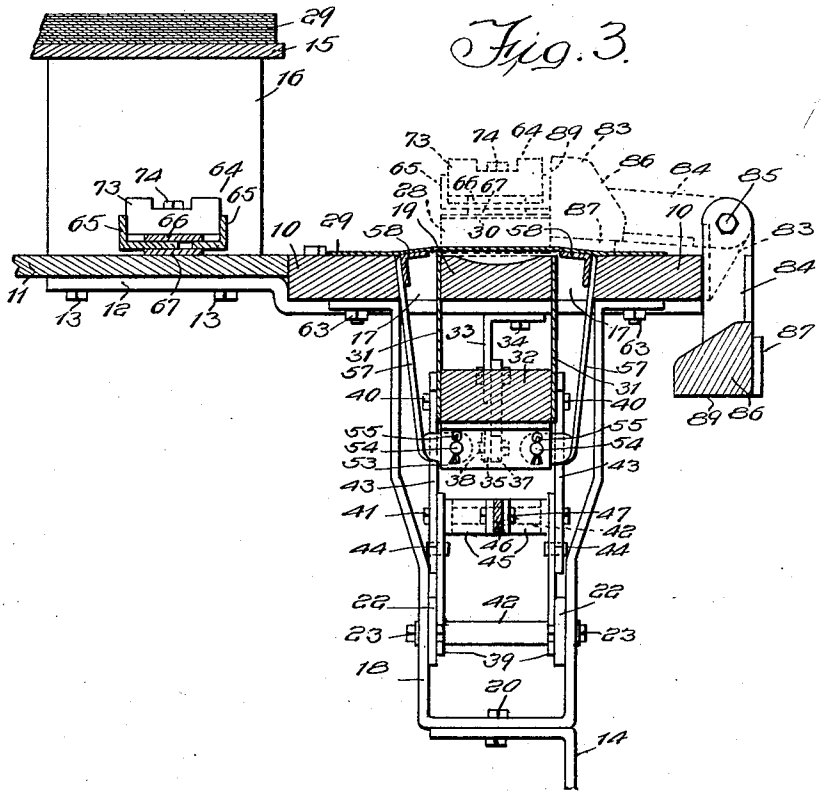
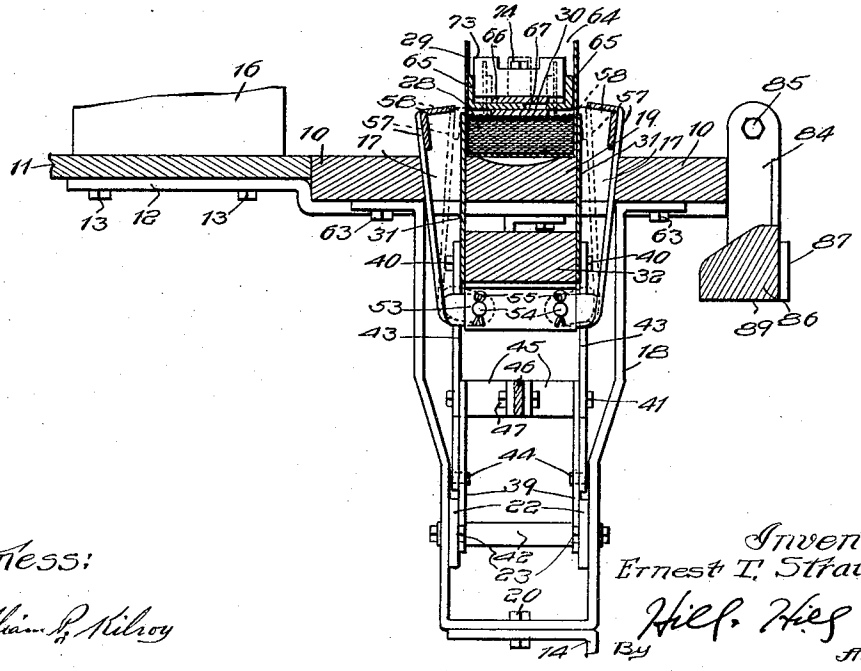


Fig. 4.



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BUNDLE WRAPPING DEVICE

Filed April 18, 1931 4 Sheets-Sheet 3

Fig. 7.

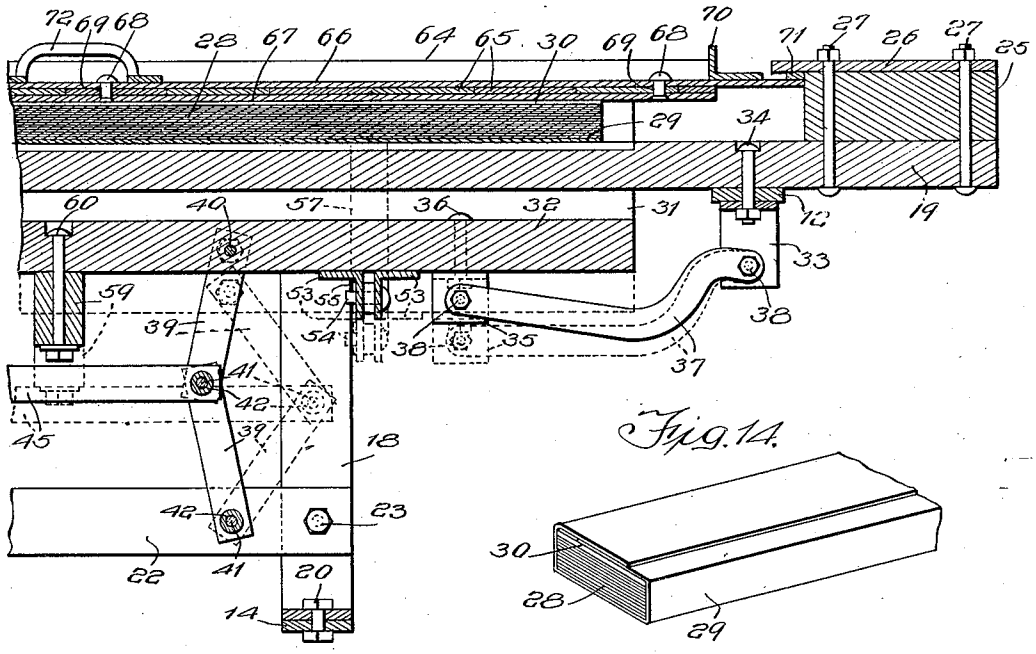


Fig. 14.

Fig. 8.

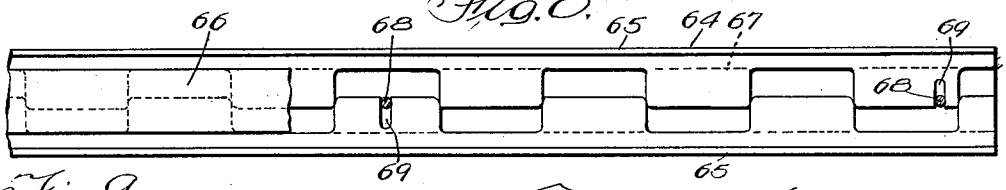


Fig. 9.

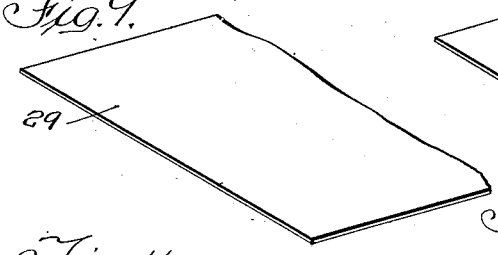


Fig. 10.

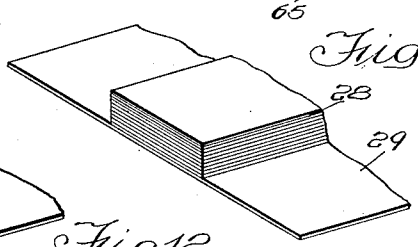


Fig. 13.

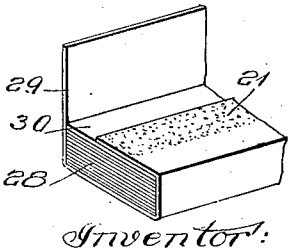


Fig. 12.

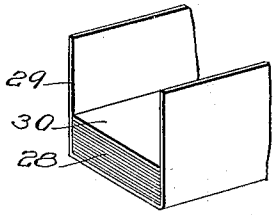
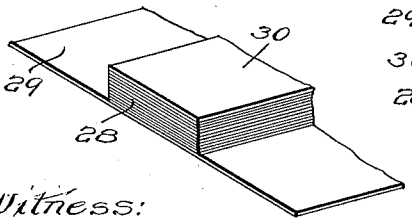


Fig. 11.



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Fig. 5.

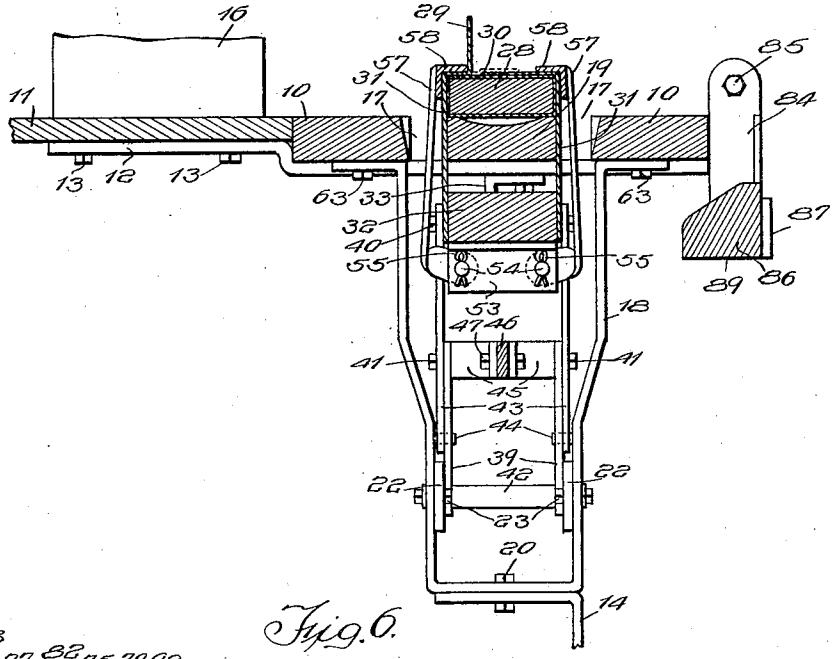
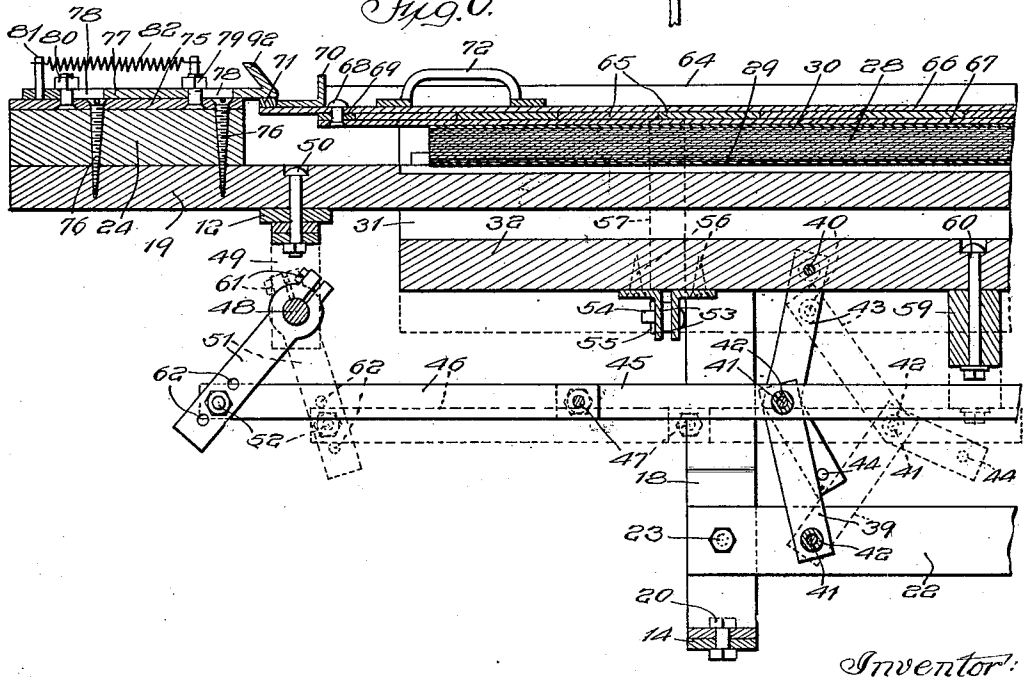


Fig. 6.



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Patented June 28, 1932 1,864,775

UNITED STATES PATENT OFFICE

ERNEST T. STRAUBEL, OF GREEN BAY, WISCONSIN

BUNDLE WRAPPING DEVICE

Application filed April 18, 1931. Serial No. 531,242.

The invention relates to a bundle wrapping device and more particularly it relates to a device suitable for wrapping bundles of yielding flimsy material such for example as sheets or strips of paper of the quality or weight generally used in paper napkins, towels or the like. Sheets of thin flimsy paper are frequently used in the manufacture of such articles, the sheets in some cases being several feet long and generally folded or interfolded and arranged to form a stack. The difficulty of wrapping such a bundle and sealing the cover to provide a neat appearing package is obvious and this difficulty is increased if the wrapper bears labels. A neat appearing wrapped package or bundle of such papers requires that the wrapper when sealed about the package be smooth and close fitting and that the labels be positioned symmetrically or in regular predetermined position relative to the border of the package.

An object of the invention is the provision of a device suitable for use in wrapping bundles of the character described by means of which the wrapping process is performed quickly and easily and the labels on the wrapper, if there be any such, are located uniformly and in regular order in any desired position on the bundle with the result that the completed packages have a smooth, regular, uniform and attractive appearance.

Another object of the invention is the provision of a device by means of which different portions of the bundle to be wrapped are successively subjected to and released from pressure as the bundle wrapping operation proceeds. The pressure is provided in order that the stack of articles may be held against relative movement while the wrapper sheet is being positioned in closely fitting and predetermined position about the stack.

A further object of the invention is the provision of a device affording means for enclosing the bundle with a smooth and closely fitting wrapper and for holding the wrapper with its opposite edges in overlapping position while the overlapped portions are being sealed or otherwise fastened together.

A still further object of the invention is the provision of a novel method of wrapping a bundle in a wrapper sheet of selected material and of predetermined size whereby the bundle when wrapped has a neat appearance regardless of the flimsiness or lack of rigidity of the material of which the bundle is composed.

Still another object of the invention is the production of a device of the kind described which is simple, compact, durable, reliable, efficient and satisfactory for its intended purpose.

Many other objects and advantages of the construction herein shown and described will be obvious to those skilled in the art from the disclosure herein given.

To this end my invention consists in the novel construction, arrangement and combination of parts herein shown and described, and more particularly pointed out in the claims.

In the drawings, wherein like reference characters indicate like or corresponding parts,

Fig. 1 is a plan view of a structure embodying the invention;

Fig. 2 is a side elevational view of the structure shown in Fig. 1;

Fig. 3 is a sectional view along the line 3—3 of Fig. 1 drawn to a larger scale;

Fig. 4 is a view identical in part with that shown in Fig. 3 showing a portion of the device moved to a different position;

Fig. 5 is a sectional view substantially identical with that of Figs. 3 and 4, showing the device with certain parts shifted as the operation of wrapping proceeds;

Fig. 6 is a sectional view along the line 6—6 of Fig. 1 drawn to a larger scale;

Fig. 7 is a view along the line 7—7 of Fig. 1 drawn to a larger scale;

Fig. 8 is a fragmentary view of a member forming a portion of the device;

Fig. 9 is a perspective view of a portion of a wrapper sheet;

Fig. 10 is a fragmentary perspective view of a portion of a wrapper sheet with a bundle comprising a stack of substantially long sheets of material such as flimsy paper or the like positioned thereon; and

Figs. 11, 12, 13 and 14 show the wrapper sheet and the bundle in successively advancing stages of the wrapping process as practiced by the method embodied in utilizing the device.

Referring now more particularly to the drawings, the device is shown as comprising a support made up of a pair of outer longitudinally extending members 10 and an inner member 19. The members 10 and the member 19 are spaced apart to provide longitudinally extending apertures 17. The members 10 and 19 are supported in spaced apart relation by transversely extending straps or cross bars 12. The device may be conveniently located adjacent a paper folding machine and in Fig. 5 the supporting straps 12 are shown as fastened by means of bolts 13 to a member 11. The member 11 may be a portion of the discharge table of a paper folding machine not otherwise illustrated or it may be any other suitable support. The support comprising the members 10 and 19 is also carried by a pair of legs 14 only the upper ends of which are shown and which extend downwardly to the floor.

A stack or bundle 28 comprising a plurality of sheets of paper to be wrapped are shown on a shelf 15 adjacent the device. The shelf 15 is positioned above and is supported on the member 11 by standards 16.

The invention is embodied in a device which not only provides means capable of being utilized in the various steps of wrapping the bundle, but which also has gauge means whereby a wrapper sheet 29 may be accurately located in predetermined relation to the device and to the bundle or stack 28 to be placed thereon. The gauge means comprises a pair of levers 88 rotatably mounted on one of the members 10 with which the adjacent edge of a wrapper sheet 29 may be aligned. The position of the wrapper sheet 29 can be shifted laterally to secure its exact longitudinal alignment with the device.

In Fig. 3 the stack of sheets or bundle 28 and the wrapper 29 are shown in position on top of the device with a pressure bar 64 positioned on top of the bundle. In order that the longitudinal edges of the wrapper sheet 29 may be movably folded upwardly along the edges of the bundle 28, a vertically movable device operable for that purpose is mounted underneath the support. The vertically movable device comprises a pair of side bars 31 connected at their lower edges by a longitudinally extending member 32. The bars 31 and the member 32 extend substantially the full length of the support, the bars normally projecting through the apertures 17 in engagement with the lateral edges of the member 19. The upper edges of the bars 31 are slightly below and in substantial alignment with the top surface of the members 10 and 19. The plates 31 and their connecting member 32 are supported by a pair of U-shaped members 18 fastened to the underface of the members 10 by means of bolts 63. A pair of longitudinally extending bars 22 connect the corresponding portions of the U-shaped member 18 by means of bolts 23. The supporting legs 14 are fastened to the members 18 by means of bolts 20.

The wrapper sheet 29 is shown in perspective in Fig. 9 and in Fig. 10 the bundle 28 is shown positioned along the middle portion of the sheet with the ends of the bundle in alignment with the ends of the sheet. In practice a sheet of cardboard 30 may, if desired, be positioned on top of the bundle 28 as shown in Fig. 11 in which position the material is arranged in the device as shown in Fig. 3. In Fig. 12 the sheet 29 is shown as folded along the longitudinal edges of the bundle 28, this position corresponding to the position of the material in the device as shown in Fig. 4.

The folding of the wrapper sheet 29 up along the longitudinal edges of the bundle 28 is accomplished by moving the bars 31 from the position shown in Fig. 3 to that shown in Fig. 4. In the latter position the edges of the sheet 29 project upwardly a substantial amount beyond the sides of the bundle 28 and take the position shown in full lines in Fig. 4. A manually operable lever 48, best shown in Figs. 1, 2 and 6, is provided to move the bars 31 and their connecting member 32 from the position shown in Fig. 3 to that shown in Fig. 4 and vice versa. The members 31 are supported and actuated by a plurality of arms 39 and 43. At one end of the device a plurality of upper arms 43 are connected by pivots 41 with corresponding adjacent arms 39 and at the other end of the device the bars 31 are carried by a plurality of upper and lower arms 39 also connected by pivots 41 as best shown in Fig. 7. The arms 43 and the corresponding upper arms 39 are connected to the member 32 by pivots 40. The bars 22 connecting the members 18 also provide supports with which the arms 39 are connected by pivots 41.

The arms 39 and 43 are swung or oscillated from their full line positions to their dotted line positions of Figs. 6 and 7 and vice versa by the manual manipulation of the lever 48. The oscillatory movement of the arms 39 and 43 causes the side bars 31 to be reciprocated vertically with the upper edges of the bars constantly parallel to the upper surface of the supporting members 10 and 19. The arms 39 and 43 are all operatively connected and caused to oscillate in unison by a pair of longitudinally extending bars 45 forming links connecting the pivots 41. Sleeve members 42 are mounted on the pivots 41 to hold the links 45 in predetermined spaced apart relation. The forward end of the links 45 converge as best shown in Fig. 5 and are fastened

by bolts 47 to one end of a link 46. The opposite end of the link 46 is connected with one end of an arm 51 by a pivot 52 and the other end of the arm 51 is clamped to a horizontal portion of the lever 48 by means of a bolt 61. A plurality of holes 62 provide means for adjusting the sweep of the device by shifting the pivot 52 from one to the other of the holes. The horizontally extending portion of the lever 48 is journalled in a plurality of angle irons 49 suspended from underneath the members 10 and 19 by a plurality of bolts 50.

The lower end of the arms 43 have an inclined portion projecting beyond the pivot 41 to provide a mounting for a pin 44. The pins 44 act as stop members contacting with the edge of the adjacent arms 39 and thereby limiting the upward movement of the side bars 31 and the connecting member 32 to that corresponding to their full line position shown in Fig. 6. A pair of transversely extending blocks 59, suspended from the member 32 by bolts 60, also serve as stops for the bars 31 by contacting with the links 45 and thereby limiting the downward movement of the bars.

Movement of the bars 31 and the connecting member 32, in any other than a vertical direction is prevented by a rod 37. An angle member 35, suspended from the member 32 by means of a bolt 36, and an angle member 33 suspended from the member 19 by a bolt 34 provide mountings for pivots 38 with which the rod 37 is connected at opposite ends. The rod 37 effectively prevents longitudinal movement of the side bars 31 and swings from its full line to its dotted line position of Fig. 7 and vice versa as the bars 31 are respectively raised and lowered by manipulation of the lever 48.

The wrapper sheet 29 having been positioned on the support as shown in Fig. 3, a gauge block 86 is moved from its full line position to its dotted line position. The block 86 has a pair of angles 84 mounted on each end by means of which the block is pivoted about bolts 85 carried by angles 83. In the dotted line position of the block 86 a plurality of pads 87 contact with and hold the wrapper sheet 29 against movement on the support. The face 89 is vertical in its dotted line position and provides a gauge against which the bundle 28 is positioned in order that the stack of sheets may be in effective longitudinal and vertical alignment. A pressure bar, generally designated by the numeral 64 is then positioned on top of the stack 28 in direct contact with the cardboard sheet 30 and with one longitudinal edge in contact with the face 89 of the gauge block 86. The block 86 is thereby utilized as a gauge both for the stack 28 and for the pressure bar 64.

The pressure bar 64 is collapsible laterally and, in its uncollapsed position, is preferably of a width substantially the same as that of the bundle 28. The bar 64 comprises a pair of angle irons 65 having a portion of their horizontal legs alternately cut away. The uncut portion of one leg of each angle iron 65 registers with a corresponding cut away portion of the other leg so that the angles may be moved together or apart with the uncut and cut portions in telescoping or interlocking relation. An upper bar 66 and a lower bar 67 are fastened together by a plurality of pins 68 positioned in slots 69 to permit the relative lateral movement of the angles 65. In Figs. 3 and 4 the pressure bar 64 is shown in uncollapsed position with the angle irons 65 held in maximum spaced apart relation by means of a block 73. The block 73 is rotatable about a pivot 74 and in order that the angle irons may be moved together to accomplish the lateral collapse of the pressure bar, the block 73 is rotated from its full line position wherein it contacts with the vertical legs of the angle irons, to its dotted line position as best shown in Fig. 4.

The pressure bar 64 is provided with a pair of handles 72 and has a transversely extending angle 70 at each end to give rigidity to the projecting end portions of the upper bar 66. The end of the device opposite to the lever 48 is provided with a plate 26 which is fastened to the member 19 by a plurality of bolts 27. A plate 26 is mounted on the top of the block 25 and projects inwardly to provide a bearing surface against which a pad 71, on the end of the bar 66, presses when the pressure bar is in operative position on top of the bundle or stack 28.

A latch is provided on the end of the device adjacent to the lever 48 to permit the pressure bar 64 to be operatively engaged with and released from the device. The latch device comprises a block 24 mounted on the member 19 with an overlying plate 75 secured to the block by means of screws 76. A latch plate 77, slidably mounted on the plate 75, is held in position by bolts 79 and 80. A pair of slots 78 are provided in the plate 77 through which the bolts 79 and 80 project and permit limited longitudinal movement of the latch plate 77. A tensile spring 82 has one end fastened to the projecting portion of the bolt 79 and its other end is fastened to a pin 81 positioned on the outer end of the plate 77 the connection being such as to hold the plate in the position shown in Fig. 6. The pressure bar 64 is positioned on the bundle 28 by first inserting one end of the bar 66 underneath the projecting portion of the plate 26 and with the other end of the bar resting on the forwardly inclined portion 92 of the latch plate 77. By pushing down on the pressure bar 64, the plate 77 is moved from under the bar 66 sufficiently to permit the pressure bar to take the position shown in Fig.

6, after which the plate 77 snaps back to its normal holding position. The release of the pressure bar 64 is accomplished by manually pushing the latch plate 77 back sufficiently to clear the end of the bar 66. The gauge block 86 provides means whereby the pressure bar 64 is positioned in exact alignment with the device. The gauge block 86 is then rotated back to its full line position where it clears the side bars 31 and permits their movement from the position of Fig. 3 upwardly to the position shown in Figs. 4 and 5. This upward movement of the bars 31 is accomplished by actuating the lever 48 in the manner already described after the gauge block 86 has been rotated to inoperative position.

The side bars 31 having been elevated to the position shown in Fig. 4, the pressure bar 64 is then collapsed laterally while in its operative position. The lower bar 67 remains in compressive contact with the cardboard 30 forming the top of the bundle 28 during the collapsing operation. This collapse or narrowing of the pressure bar 64 is accomplished by first rotating the spreader block 73 in the manner already described to the dotted line position shown in Fig. 4. The lateral collapse of the pressure bar 64 is for the purpose of providing a clear space on each side of the top surface of the bundle 28 over which the wrapper sheet 29 may be folded or tucked. A pair of tucking members comprising oppositely positioned angle irons 58 are pressed inwardly from their full line position to their dotted line position of Fig. 4. The angle irons 58 have their top leg portions projecting towards the bundle and in moving inwardly the tucking members press against and serve to tuck the adjacent opposite longitudinal portions of the wrapper sheet 29 into contact with the adjacent edges of the top surface of the bundle 28.

A plurality of standards 57 provide pivotal mountings for the angles 58 and for this purpose the standards have their lower ends turned inwardly and are positioned between one of a plurality of pairs of angle irons 53. The standards 57 are journalled upon and have a limited rotation about bolts 54 which extend through and are fastened to the angle irons by cotter pins 55. The described mounting of the angles 58 causes them to be raised and lowered through the apertures 17 simultaneously with the raising and the lowering of the side bars 31. When the angle irons 58 and the side bars 31 are in their elevated or full line position of Fig. 4, the angle irons are easily moved manually to their dotted line position. The angle irons 58, in moving to their dotted line positions fold or tuck the wrapper sheet 29 in contact with the upper portion of the bundle 28 on each side of the collapsing pressure bar 64 as already described. The laterally collapsed pressure bar 64 is then removed from the device by manipulating the latch plate 77, and its removal releases the middle portion of the bundle 28 from the pressure to which it was subjected by the pressure bar 64. Immediately following the release of the bundle 28 from pressure along its middle portion, the stack of compressed sheets forming the bundle tend to expand and press those portions of the wrapper sheet 29, overlying the longitudinal edges of the top surface of the bundle 28, into contact with the horizontal legs of the angle irons 58. The angle irons 58 are in a position to limit the expansion of the sheets of paper comprising the bundle and thereby exert substantial pressure along the longitudinal edges of the top surface of the bundle. The pressure, thus exerted by the angles 58, is sufficient to retain the angles in the position shown in Fig. 5. In this position of the angles, the opposite longitudinal edges of the wrapper sheet 29 may be successively folded from the position shown in Fig. 12 to the partially overlapping position of Fig. 13 and then to the position wherein the longitudinal edges of the sheet are overlapped and sealed as shown in Fig. 14.

The bars 31 closely fit the sides of the stack or bundle 28 and as the bars are raised the wrapper sheet 29 is moved along and is spread smoothly over the side faces of the bundle or stack. Similarly the angle irons 58 are so positioned that their movement inwardly serves to fold or tuck the upper sheet 29 smoothly over and in close contact with the top surface of the bundle adjacent its longitudinal edges. The device is so constructed that in each of the various steps described, the upper sheet is spread smoothly over the corresponding portions of the bundle and those portions of the sheet which engage the top surface of the bundle 28 are successively held under pressure sufficient to prevent any release of the wrapper sheet while the longitudinal edges are overlapped and sealed.

It is frequently the practice to wrap sheets of paper of several feet in length after the same have been folded or interfolded and arranged in stacks as shown. The bundles after wrapping are fed into a cutting machine to sever the same into a plurality of sections of convenient length. It is obviously impossible or extremely difficult to manually wrap a stack of several hundred sheets of flimsy material several feet in length so that the resulting bundle will present a smooth appearance. The device herein shown and described enables a single operator to handle the output from an interfolding or similar machine and to wrap the same into smooth neat appearing bundles with the wrapped sheets effectively sealed in predetermined relation to the bundle and the labels if any on the wrapper sheet positioned in accordance with a predetermined plan.

Thus it will be seen that the device provides

means whereby a stack of thin tissue or similar paper comprising sheets of substantial length can have a wrapper sheet folded smoothly about the bundle and sealed without wrinkling with the resultant package presenting a neat appearance. If the wrapper sheet has labels pasted or printed on its outside surface as is sometimes the case, the device provides means for accurately locating the wrapper sheet relative to the bundle with the labels located uniformly and acurately on the wrapped bundle in accordance with a predetermined plan.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention; hence, I do not wish to be understood as limiting myself to the exact form, construction, arrangement and combination of parts herein shown and described or uses mentioned.

What I claim as new and desire to secure by Letters Patent is:

1. In a device of the kind described, a supporting member for receiving a wrapper sheet and a bundle positioned on said sheet, gauge means for locating the wrapper sheet in exact predetermined position on the supporting member, a movable gauge member for locating the bundle in predetermined position on said wrapper sheet, a laterally collapsible bar, means operable to clamp said bar into compressive contact with the bundle, means positioned under said supporting member and operable to fold said wrapper sheet up along the sides of said bundle, and means operable upon the collapse of said bar to tuck said wrapper sheet inwardly over the top of the bundle on each side of said bar, said tucking means being also operable to hold said sheet in contact with said bundle when said bar is removed.

2. In a device of the kind described, a supporting member for receiving a wrapper sheet and a bundle positioned on said sheet, gauge means for locating the wrapper sheet in exact predetermined position on the supporting member, a movable gauge member for locating the bundle in predetermined position on said wrapper sheet, a longitudinally extending bar, means operable to clamp said bar into compressive contact with the bundle, means positioned under said supporting member and operable to fold said wrapper sheet up along the sides of said bundle, and means operable to tuck said wrapper sheet inwardly over the top of the bundle on each side of said bar and to hold said sheet in contact with said bundle when said bar is removed.

3. In a device of the kind described, a supporting member for receiving a wrapper sheet and a bundle positioned on said sheet, gauge means for locating the wrapper sheet in exact predetermined position on the supporting member, a longitudinally extending bar, means operable to clamp said bar in compressive contact with said bundle, said gauge means being also adapted for locating said bar on the bundle in accordance with a predetermined plan, a pair of side bars normally positioned underneath said supporting member at opposite sides of and parallel to the longitudinal edges of said bundle, said side bars operable to fold said wrapper sheet up along the sides of said bundle, a pair of tucking members on opposite sides of said bundle movable inwardly to fold the adjacent portions of said wrapper sheet in close contact with the top surface of the bundle and means operable to release said first mentioned bar from compressive contact with the bundle.

4. In a device of the kind described, a supporting member for receiving a wrapper sheet and a bundle positioned on said sheet, gauge means for locating the wrapper sheet in exact predetermined position on the supporting member, a longitudinally extending bar of substantially the same width as the bundle, means operable to collapse said bar laterally, means operable to clamp said bar in compressive contact with said bundle, said gauge means being also adapted for locating said bar on the bundle in accordance with a predetermined plan, a pair of side bars normally positioned underneath said supporting member at opposite sides of and parallel to the longitudinal edges of said bundle, said side bars operable to fold said wrapper sheet up along the sides of said bundle, a pair of tucking members on opposite sides of said bundle, said tucking members being movable inwardly to fold the adjacent portions of said wrapper sheet in close contact with the top surface of the bundle upon collapse of said bar, and means operable to release said first mentioned bar from compressive contact with the bundle.

In witness whereof, I hereunto subscribe my name this 14th day of April, A. D. 1931.

ERNEST T. STRAUBEL.