

Oct. 8, 1957

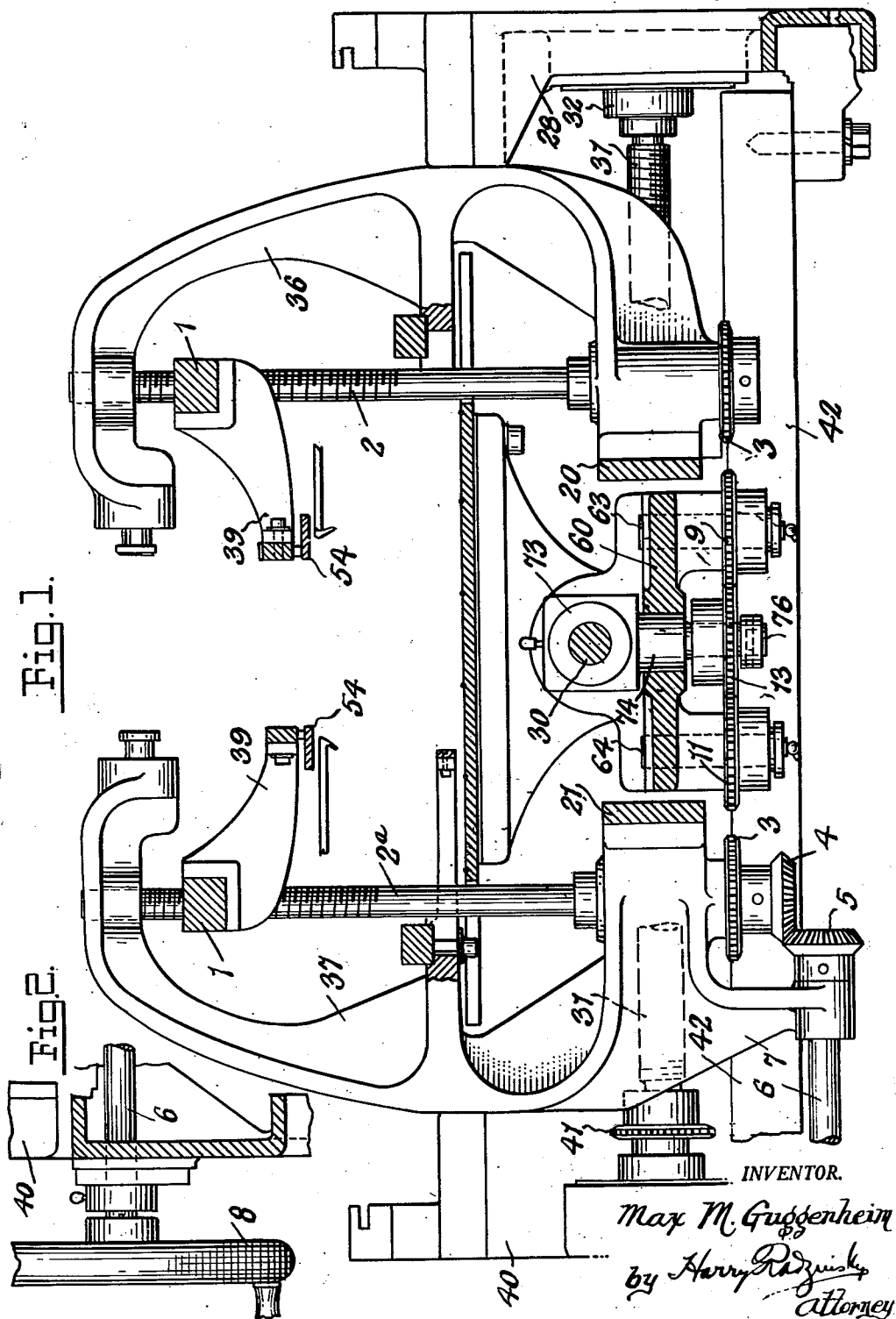
M. M. GUGGENHEIM

2,808,693

FOLDING BOX ADJUSTING MEANS FOR WRAPPING MACHINES

Filed May 19, 1955

4 Sheets-Sheet 1



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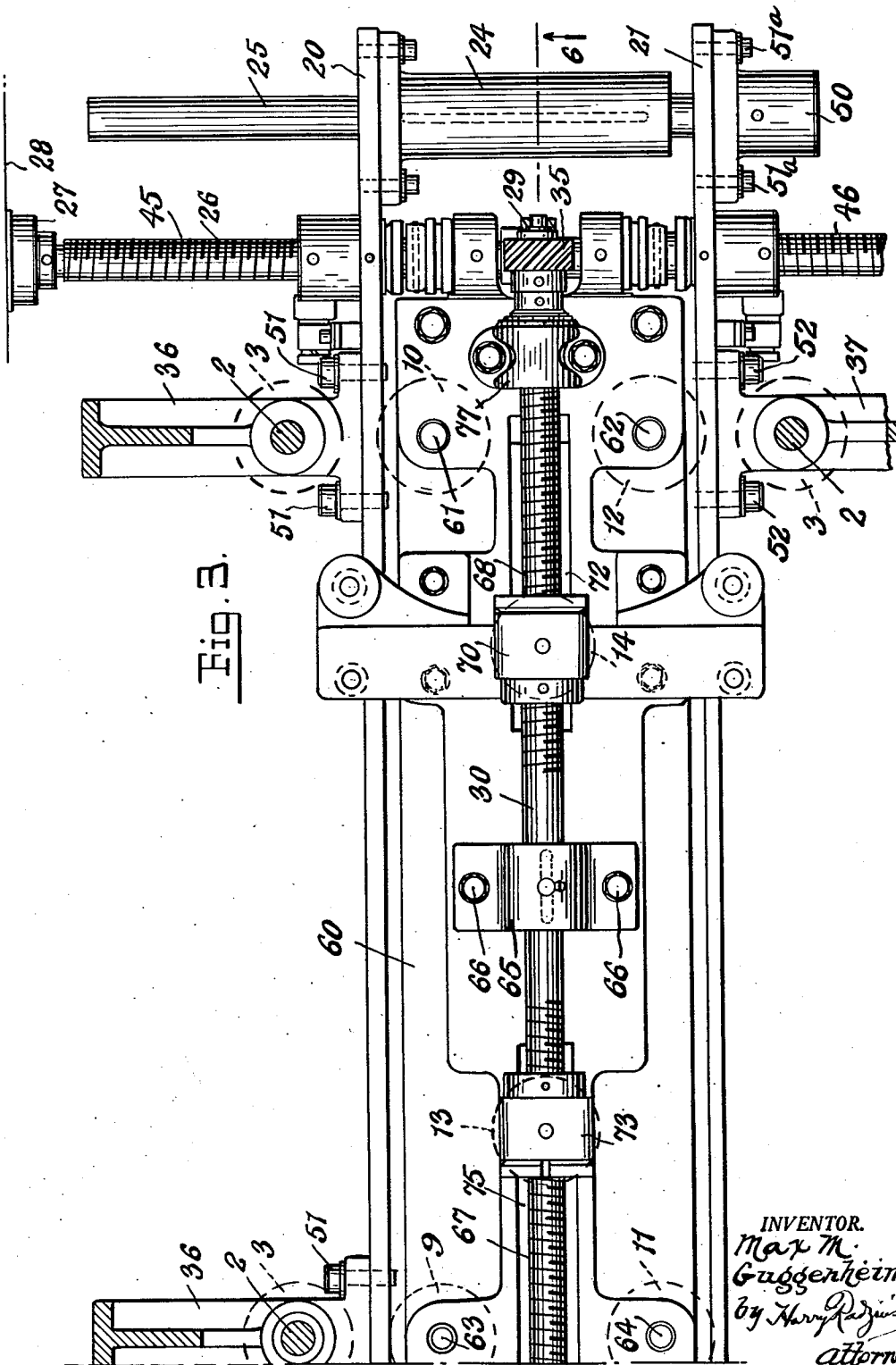
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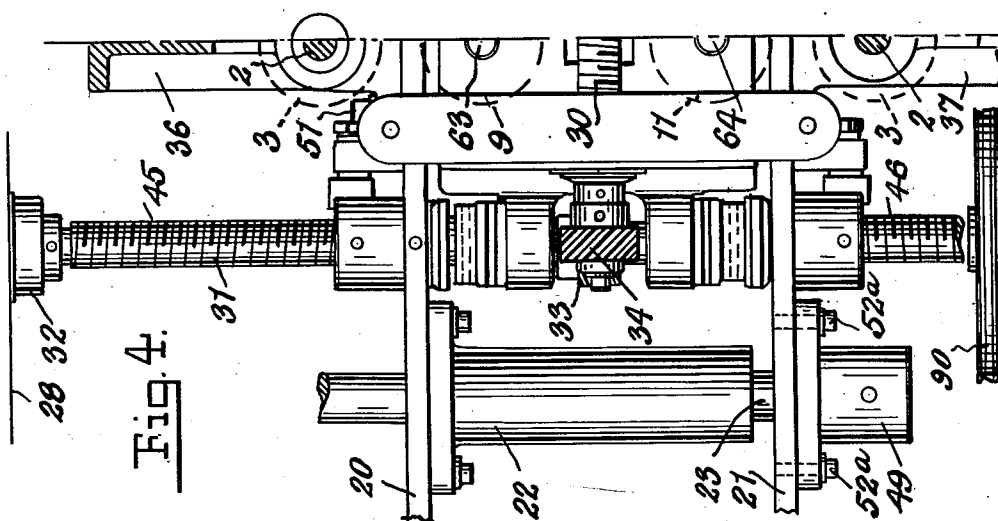
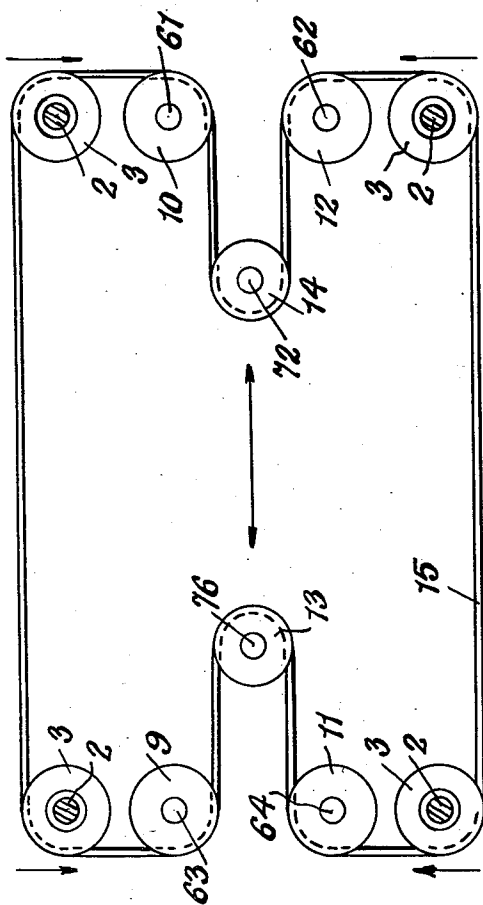


Fig. 4:



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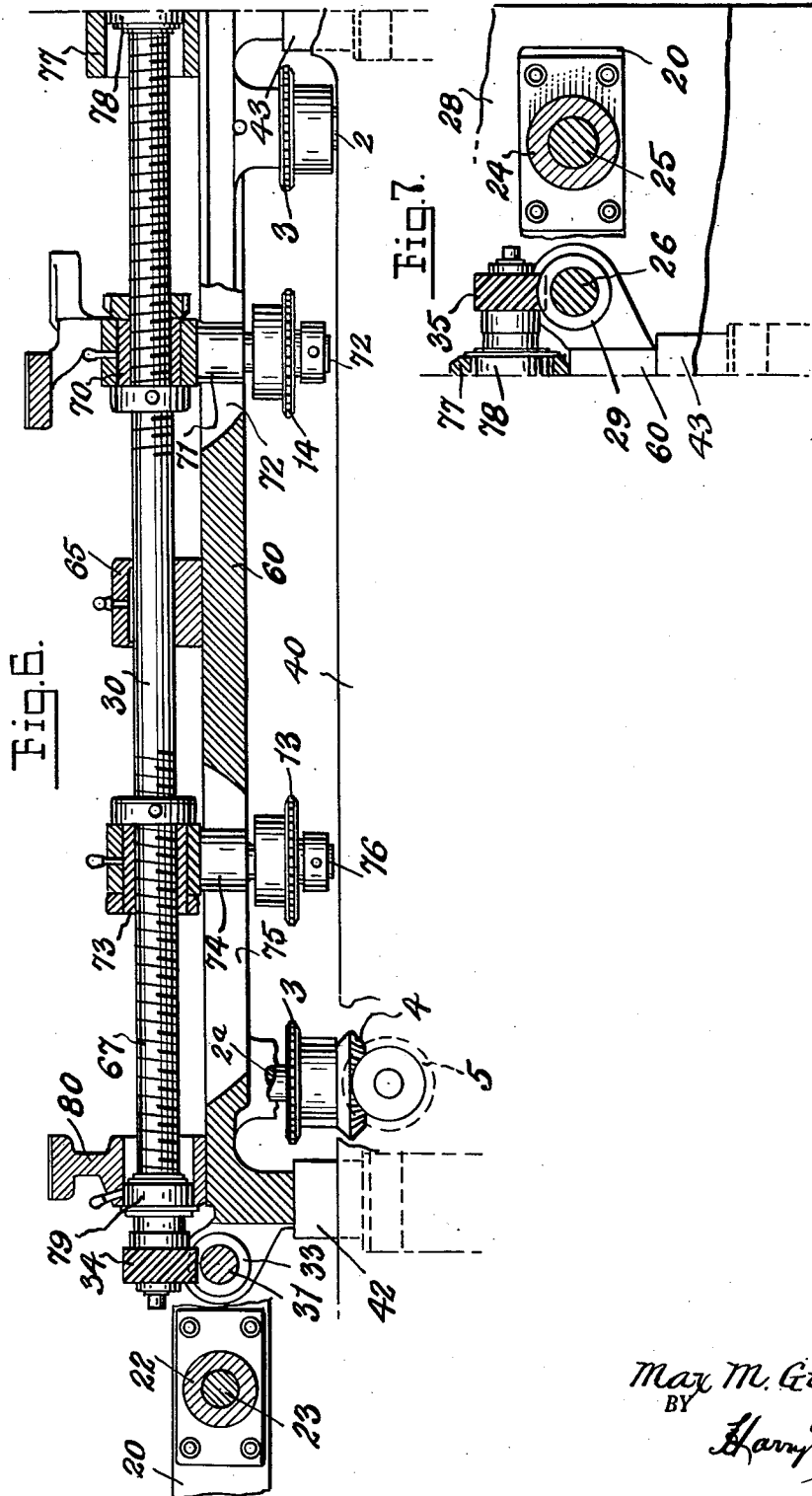
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4 Sheets-Sheet 4



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2,808,693

FOLDING BOX ADJUSTING MEANS FOR WRAPPING MACHINES

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Application May 19, 1955, Serial No. 509,479

12 Claims. (Cl. 53—393)

This invention relates to wrapping machines, and more particularly to that type of machine which is adapted for the wrapping of boxes or other similarly-shaped articles in thin sheet material such as cellophane. An example of the type of machine to which the present invention relates will be found in the co-pending application of Philip G. Schlemmer, Serial No. 412,721, filed February 26, 1954.

Most machines adapted for the wrapping of boxes and like articles are primarily designed for the wrapping of boxes or like articles of a given size, and although provision is sometimes made in the machines by which such machines can be altered or modified to accommodate boxes of different sizes, the transition from boxes of one size to others of different sizes is usually one which requires the services of an expert mechanic, the substitution or interchange of parts or different mechanisms, or else requires time-consuming and expensive alterations which involve delay and often result in periods of idleness for the machine.

It is one of the objects of the present invention to provide, in a wrapping machine of this character, a simplified means by which the wrapping mechanism, or that part of the machine which is generally known in this art as the "folding box," can be adjusted speedily, easily and accurately by the manipulation of handwheels to thus enable the folding box to be accommodated to boxes of various sizes to be wrapped.

It is an object of the invention to provide adjustment means as above described, which will be operative solely by hand operation and without requiring the adjustment by tools or exchange of machine parts, and which will not materially delay the operation of the machine when changing from one box size to another.

In the accompanying drawings, wherein an illustrative embodiment of the invention is disclosed,

Fig. 1 is a cross sectional view through a machine constructed in accordance with the invention, with numerous parts omitted to more clearly disclose those features which form the subject matter of the present invention;

Fig. 2 is a continuation of the lower left-hand end of Fig. 1;

Fig. 3 is a top plan view of the apparatus, with certain parts thereof shown in section;

Fig. 4 is a continuation of the left end of Fig. 3;

Fig. 5 is a diagrammatic view showing the arrangement of the sprockets and the continuous chain in engagement with the same;

Fig. 6 is a sectional view, taken substantially on the line 6—6 of Figs. 3 and 4, looking in the direction of the arrows, and

Fig. 7 is a continuation of the right-hand end of Fig. 6.

In a machine of the character to which the present invention relates, the wrapping material, which may be cellophane or other suitable sheet material, is generally severed into proper lengths, or cut into separate sheets from a supply roll, and the severed sheets are then conveyed to a position above the boxes to be wrapped. The boxes are successively elevated by suitable elevating

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mechanism and each box is brought up against one of the sheets of wrapping material, which is partially wrapped about the box by the elevating movement of the same. The wrapping of the sheet around the box continues as the box and its wrapper are moved through a folding mechanism, or so-called "folding box," and near the outlet end, heat is applied to the overlapped end parts of the wrapper to seal the same. The wrapped box then emerges from the apparatus and is received upon a travelling belt or other conveying device which carries it to a point of removal. The present invention relates to the means by which the folding box is regulated in effective size to thereby enable boxes of different lengths and heights to be wrapped, and which changes in the folding box are effected with a minimum of effort and without the use of tools.

Referring to the drawings, 40 generally indicates one of the side frames of the machine, and 28 indicates generally the opposite side frame thereof, the side frames being suitably spaced apart and braced in proper relation, one of the brace or cross members therefor being seen at 42 in Figs. 1 and 6, and another similar brace being seen at 43 in Fig. 6. Mounted on the side frame 28 are bearings respectively indicated at 27 and 32. One end of a threaded shaft 26 is rotative in the bearing 27 and an end of a similar threaded shaft 31 (Fig. 4) is rotative in the bearing 32. The opposite end of the threaded shaft 31 is mounted in a bearing, not shown, but similar to that seen at 32 and located on the frame member 40, and said end of shaft 31 is manually rotated by a hand wheel 90 (Fig. 4) through a chain-engaging sprocket 41 on shaft 31 and by which the shaft 31 is manually rotated to cause the sides of the folding box to be moved either toward or away from one another as required, by means to be described.

The threaded shaft 26 has its second end rotative in a bearing, not shown, on the frame member 40, and said shafts 26 and 31 are rotated in unison when the shaft 31 is manually rotated by turning the handwheel 90 coupled to it. Each of the threaded shafts 26 and 31 has oppositely-threaded portions as indicated respectively at 45 and 46. Threadable on the threads 45 of these shafts is a longitudinally-extending bar 20. Threadably mounted on the threads 46 is a similar longitudinally-extending bar 21. These two bars are arranged parallel to one another and by the simultaneous rotation of the two threaded shafts 26 and 31, the two bars 20 and 21 will be moved either to or from one another to thereby bring the sides of the folding box toward or away from one another to compensate for boxes of the various sizes to be wrapped by the machine.

To aid in maintaining parallelism between the two bars 20 and 21, and the parts carried thereby, the bar 20 carries bosses indicated respectively at 22 and 24 through which guide rods, indicated respectively at 23 and 25, are slidable, the rods being secured at one end in the bosses indicated respectively at 49 and 50 which are attached to the bar 21 by the screws 51a. This telescopic arrangement of the parts 22 and 23 and 24 and 25 acts to guide the two bars 20 and 21 to or from one another while maintaining said bars in parallelism.

The arrangement just described is such that by manipulation of the handwheel 90 coupled to the shaft 31, said shaft will be rotated and through means to be described and by which its rotation is transmitted to shaft 26, the latter shaft will be similarly rotated and hence the bars 20 and 21 will be caused to be adjusted to or from one another. Thus the parts attached to these bars and carrying folding instrumentalities and forming the sides of the folding box, can be suitably adjusted.

Secured by bolts 51 to the bar 20 is a pair of substantially C-shaped brackets 36, and a pair of similar brackets

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37 are secured by the bolts 52 to the bar 21. Each of the brackets 36 and 37 carries a rotatable vertical threaded shaft 2, and these shafts 2 threadably carry bars 1 which carry arms 39, on which elements 54, forming part of the folding box, are supported. It will be apparent that by raising and lowering of the bars 1 with the arms 39 and folding box elements carried thereby, the folding box will become adjusted for the height of the boxes to be wrapped. The four threaded vertical shafts 2 are rotated in unison by the turning of a handwheel 8 secured on a shaft 6 rotatively mounted in the arm 7 of one of the brackets 37 and carrying bevel gear 5 that is maintained in mesh with a bevel gear 4 secured at the lower end of the vertical shaft designated at 2a in Fig. 1.

Secured on the shaft 2a is a sprocket 3, and similar sprockets 3 are also secured on the remaining three shafts 2. An endless chain 15, not shown in any of the figures of the drawings, except in Fig. 5, where it is diagrammatically shown, extends around the four sprockets 3. It is therefore obvious that when the shaft 6 is rotated by manual manipulation of the handwheel 8, the four shafts 2 and 2a, will be rotated and the elements 1, 39 and 54 will be raised or lowered as required to regulate the effective height of the folding box.

In order to avoid the formation of slack in the chain 15, means is provided to compensate for changes in the distance between the two bars 20 and 21 as they are adjusted to or from one another. Secured to the cross bars 42 and 43 is a bed plate 60, and adjacent to one end of said plate is a pair of vertical spindles 61 and 62 carrying the idler sprockets indicated at 10 and 12. Toward the opposite end of the bed plate 60 are located the spindles 63 and 64 which respectively carry the idler sprockets 9 and 11. At 30 is shown a lengthy horizontally-extending shaft, which is guided at a central point through a guide bracket 65 secured by the bolts 66 to the upper face of the bed plate 60. Adjacent to its opposite ends, the shaft 30 is oppositely-threaded as indicated respectively at 67 and 68. The threaded part 68 of the shaft 30 threadably engages with an internally-threaded bracket 70 provided with adjustable nuts. Thus, when the shaft 30 is rotated, the bracket 70 will be moved right or left as required to take up slack in the chain 15. Extending downwardly from the bracket 70 is a cylindrical portion 71 which travels back and forth in a slot 72 formed in the bed plate 60. A stud shaft 72, extending downwardly from the portion 71 of the bracket 70, carries a take-up sprocket 14 around which the chain 15 extends as clearly shown in Fig. 5.

At 73 is shown another slidably-mounted bracket, similar in many respects to that shown at 70, and having the downwardly-extended cylindrical part 74 movable in the slot 75 formed in the bed plate and also provided with the stud shaft 76 on which the sprocket 13 is carried. The chain 15 also extends around the sprocket 13 as clearly indicated in Fig. 5. At one end of the bed plate 60 is mounted a bearing bracket 77 containing the bearing 78 in which an end of the shaft 30 is mounted. The opposite end of the shaft 30 is supported in a bearing 79 mounted in the bearing bracket 80 mounted on the bed plate 60. Mounted on that end of the shaft 30 which is situated adjacent to the bearing bracket 77 in a spiral gear 35 in mesh with a co-operating gear 29 secured on the cross shaft 26. At the opposite end of the shaft 30 is secured a spiral gear 34 in mesh with a co-operating gear 33 secured on the cross shaft 31.

From the foregoing, the operation of the disclosed apparatus will be readily understood. When it is desired to adjust the spacing between the sides of the folding box, or in other words, to bring the supporting brackets which carry the side elements of the folding box either toward or away from one another, the handwheel 90 is rotated in the required direction. This will rotate shaft 31 and through the rotation of gear 33 and the engagement of gear 34 thereby, the shaft 30 will be rotated and said shaft will accordingly rotate shaft 26 through meshed

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gears 35 and 29, so that both the shafts 26 and 31 will be uniformly rotated and the bars 20 and 21, carrying the brackets 36 and 37 will be moved toward or away from one another. When the shaft 30 is rotated it will accordingly move the brackets 70 and 73 toward or away from one another, thus maintaining the tautness of the chain 15 under all conditions. That is to say, when the bars 20 and 21 are moved toward one another, the two sprockets 14 and 13 carried respectively by the brackets 70 and 73, will move toward one another. On the other hand, when the bars 20 and 21 are moved away from one another, the two sprockets 13 and 14 will move away from one another, thus constantly maintaining the tautness of the chain 15.

When it is desired to raise or lower the bars 1, carrying the instrumentalities which comprise the top of the folding box, the handwheel 8 is rotated and this will cause rotation of shaft 2a, which, through the chain connection 15 between the four sprockets 3, will cause rotative movement of the four shafts 2 and 2a and result in a raising or lowering of the bars 1 and parts carried thereby.

By means of the apparatus herein described, it will be apparent that the folding box will be readily adjustable to accommodate it for various box sizes and which adjustment is attained solely by hand-wheel operation, and accordingly, the machine can be readily adapted to boxes of various sizes without delay required by a change of parts.

Having described a single embodiment of the invention, it is obvious that the same is not to be restricted thereto, but is broad enough to cover all structures coming within the scope of the annexed claims.

What I claim is:

1. In an apparatus of the character described, a folding box in which the sides of said box are defined by elements carried by brackets movable toward or away from one another to thereby regulate the width of the box, a threaded rotatable shaft for causing movement of the brackets toward or away from one another, a threaded shaft rotative in each bracket for regulating the height of the folding box, a driving connection between the several bracket-supported shafts, said driving connection including a chain, and means by which said chain is maintained in a predetermined tensioned condition regardless of the position of the brackets relative to one another.

2. In an apparatus of the character described, a plurality of supports for the side elements of a folding box, means on said supports for regulating the position of top elements of the folding box, said means including a vertical, rotated threaded shaft in each support, each of said shafts carrying a sprocket, a chain extending between the sprockets whereby the rotation of one of said shafts will cause a similar rotation of the remaining shafts, means for adjustably moving some of the supports toward or away from the other supports, and means for maintaining the chain under a predetermined tension regardless of the adjustment of the supports toward or away from one another.

3. In an apparatus of the character described, a folding box in which the sides of said box are defined by elements carried by brackets movable toward or away from one another to thereby regulate the width of the box, a plurality of threaded rotatable shafts for causing movement of the brackets toward or away from one another, manually-operated means for simultaneously rotating said shafts, a threaded vertical shaft rotative in each bracket for regulating the effective height of the folding box, a driving connection between the several vertical shafts, said driving connection including a sprocket on each shaft and a chain extending between the sprockets, and means by which some of the sprockets are movable when the brackets are moved to thereby maintain the chain in a predetermined tensioned condition regardless of the position of the brackets relative to one another.

4. In an apparatus of the character described, a plurality of supports for the side elements of a folding box,

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means on said supports for regulating the position of top elements of the folding box, said means including a vertical, rotated threaded shaft in each bracket, each of said shafts carrying a sprocket below the bracket, a continuous chain extending between the sprockets whereby the manual rotation of one of said shafts will cause a similar rotation of the remaining shafts, means for adjustably moving some of the brackets toward or away from the other brackets, a pair of movable sprockets engaging the chain and caused to move toward one another when the supports are moved toward one another, said movable sprockets being moved away from one another when the supports are moved away from one another, and means for moving the sprockets to maintain the chain under a predetermined tension regardless of the adjustment of the brackets toward or away from one another.

5. An adjusting means for the folding box of a wrapping machine comprising two pairs of spaced brackets for supporting the side elements of the folding box, means for adjusting the pairs of brackets either toward or away from one another, means on the brackets for supporting the top elements of the folding box, said means including vertical shafts adapted for rotative movement in the brackets, each of said shafts carrying a sprocket, a chain extended around the several sprockets and causing a rotative movement of all of the vertical shafts when one is rotated, and means operative to maintain the chain in a taut condition in all positions of adjustment of the pairs of brackets relative to one another.

6. In an apparatus of the character described, spaced supports for the side elements of a folding box, means by which the supports are adjusted toward or away from one another, means on said supports for raising or lowering the top elements of the folding box, said means including rotative elements in the supports, a chain connection establishing a drive between the rotative elements to thereby rotate the same, and means operative on the chain connection to take up slack therein when the supports are adjustably moved toward one another.

7. In apparatus as provided for in claim 6, wherein the supports consist of substantially C-shaped brackets, the rotative elements in said brackets consisting of threaded shafts on which the top elements of the folding box are threadably adjustable by rotative movement of said threaded shafts within the brackets, sprockets on said threaded shafts, the chain extending continuously between said sprockets, the slack-adjusting means including movable take-up sprockets, and means operative to move said take-up sprockets toward or away from one another to take up slack in the chain, which sprocket-moving means is operated by means which adjusts the supports toward or away from one another.

8. In an apparatus for adjusting the folding box of a wrapping machine, supports for the side elements of the folding box, means on said supports for holding and adjusting the top elements of the folding box, said means including vertically-disposed, rotative, threaded shafts, sprockets carried by said shafts, one of the shafts being manually rotative, a chain extending between the sprockets whereby all of the shafts will be rotated together when one of the same is manually rotated, adjusting

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means by which the supports can be brought toward or moved away from one another, said adjusting means including rotative shafts having a driving connection between them whereby the manual rotation of one of said shafts will rotate the other, and means driven from the last-mentioned rotative shafts for taking up slack in the chain as the supports are moved in a direction toward one another.

9. An adjusting means for the folding box of a wrapping machine comprising two pairs of spaced brackets for supporting the side elements of the folding box, means for adjusting the pairs of brackets either toward or away from one another, means on the brackets for supporting the top elements of the folding box, said means including a vertical shaft adapted for rotative movement in each of the brackets, each of said shafts carrying a sprocket below the bracket, a continuous chain extended around the several sprockets and causing a similar simultaneous rotative movement of all of the vertical shafts when one of them is rotated, and a pair of movable sprockets operative to maintain the chain in a taut condition in all positions of adjustment of the pairs of brackets relative to one another, said sprockets being movable by movement of the adjusting means for the brackets.

10. In an apparatus of the character described, supports for the side elements of a folding box, a screw feed by which said supports are moved toward or away from one another to thereby regulate the width of the folding box, rotative elements carried by the supports for regulating the effective height of the folding box, a single drive chain extending between the rotative elements to enable the same to be simultaneously rotated upon manual rotation of one of such elements, and means controlled by the screw feed and by which the drive chain is maintained against slackening while the supports are moved toward or away from one another.

11. In an apparatus as provided for in claim 10 wherein the chain slack-prevention means consists of a pair of movable sprockets engaging with the chain, and means by which the pivots of the sprockets are moved toward or away from one another as the supports are moved toward or away from one another.

12. In an apparatus of the character described, a pair of spaced bars, screw shafts having oppositely-threaded sections in respective threadable engagement with the bars, means for manually rotating one of the screw shafts, means for communicating the rotation of the first screw shaft to the second screw shaft, each of said screw shafts carrying a gear, a shaft disposed at right angles to the screw shafts and carrying gears in mesh with those on the screw shafts, a pair of sprockets having mountings in threadable engagement with the shaft and caused to be moved toward or away from each other by rotation of said shaft, brackets carried by the bars, screw-threaded posts carried by the brackets for raising and lowering upper folding box elements, sprockets on said posts, and a chain extended around said sprockets and around those borne by the mountings.

No references cited.