

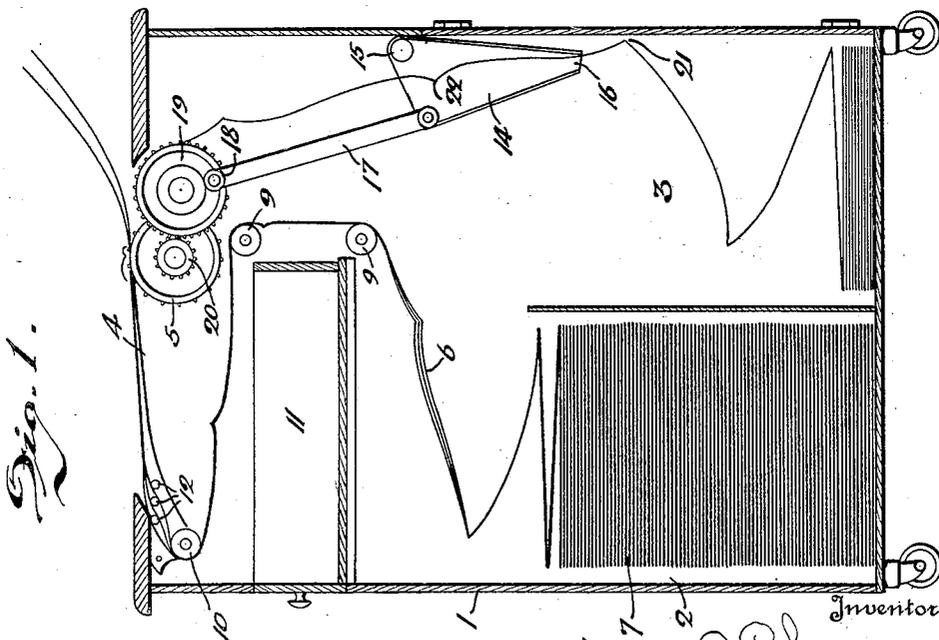
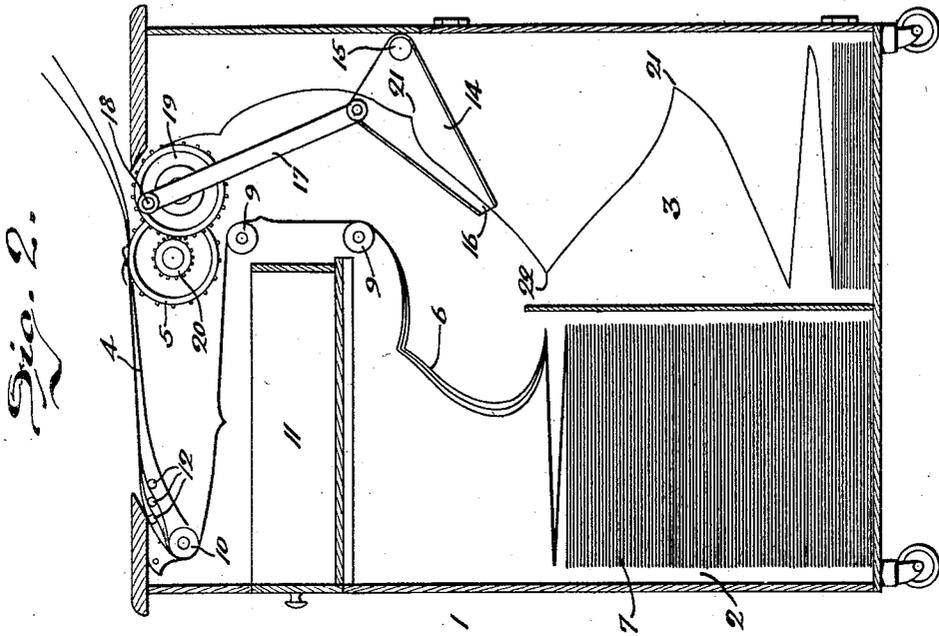
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PAPER FOLDING MACHINE

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PAPER FOLDING MACHINE

Application filed February 25, 1929. Serial No. 342,546.

This invention relates to paper folding apparatus, and particularly to means for automatically refolding a paper web upon performed, spaced, fold lines in alternate direction. This operation is somewhat analogous to the operation described in our prior Patent No. 1,699,165, but is effected subsequently to the operation therein described.

In the manifolding art, there are employed superposed paper strips or webs which are reversely flat folded in multiple at spaced intervals into a stock supply unit known in the trade as "a superfolded bundle". The plurality of continuous paper webs are withdrawn from the stock bundle in unison, and fed in superimposed and collated relation through a writing or imprinting machine or apparatus, whereupon the several strips bearing writing or data, after having passed through the machine or apparatus, are separated from each other for independent disposal. In the event that one or more of such strips are to be retained without separation into leaves or slips, it is desirable to refold such strips or webs of paper into a compact bundle upon the original fold lines.

To this end there is provided in the present construction, in combination with a writing or imprinting machine through which the superimposed webs or strips of paper are fed, an oscillating carrier operated in unison with the strip feeding mechanism through which one or more of the record strips may be guided into a receiving compartment. Such strips will retain their original folds or creases. Such oscillating carrier being timed in unison with the feeding apparatus for advancing the strips, will alternate its position as each succeeding fold passes beyond such carrier, thereby carrying the strip alternately from side to side of the receiving compartment and causing it to fall thereinto in folded form.

The object of the invention is to simplify the structure as well as the means and mode of operation of paper folding devices, whereby they will not only be cheapened in construction, but will be more efficient in use, positive in operation, uniform in action, automatically operated, and unlikely to get out of repair.

A further object of the invention is to provide a refolding apparatus for strip or web feeding mechanism whereby such strips or webs may be folded to compact form.

A further object of the invention is to provide a simple, compact but efficient attachment for autographic registers, writing or tabulating machines and the like, for retrieving and controlling the disposition of the strip or strips operated upon after passing beyond such register or apparatus.

With the above primary and other incidental objects in view, as will more fully appear in the specification, the invention consists of the features of construction, the parts and combinations thereof, and the mode of operation or their equivalents, as hereinafter described and set forth in the claims.

Referring to the accompanying drawings wherein is shown the preferred but obviously not necessarily the only form of embodiment of the invention, Fig. 1 is a vertical sectional view of a cabinet having in its top, an autographic register including paper feeding means for advancing superposed record strips or webs, and in its bottom portion, storage compartments for a supply of superfolded manifold strips and for receiving the record strips advanced through the register. Fig. 2 is a similar view showing the refolding device in a reversed position.

Like parts are indicated by similar characters of reference throughout the several views.

In the drawings, 1 is a cabinet having in its lower portion a compartment 2 for a stock of paper supply and a second compartment 3 in which the returned strip is received and folded to compact form. In the top of the cabinet is the usual autographic register structure including a writing tablet 4 over which the multiple superposed strips or webs of paper withdrawn from the compartment 2 are passed. Such superposed webs or record strips are intermittently advanced by the rotation of a pinwheel feed device 5 which may be crank or motor operated. The particular structure of the register apparatus, and the strip feeding mechanism is immaterial, and forms no part per se of the present inven-

tion. The multiple strips or webs 6 withdrawn from the compartment 2 may, and in fact usually do, bear successions of registering printed forms. The superposed strips 6 are reversely folded in multiple at spaced intervals intermediate succeeding forms. Thus folded, the strips form a supply stack 7 within the compartment 2, known as a superfolded bundle.

From the supply pack 7 the superfolded webs or strips 6 are led together over guide rollers 9 and 10 common to the several strips. Such superfolded strips or webs may be led directly from the supply compartment 2 to the guide roller 10. The guide rollers 9 are interposed, however, to carry these strips around a drawer 11 which is ordinarily provided within the cabinet 1. Beyond the roller 10, there is located a group of individual rollers 12 for the respective strips or webs 6. These strips or webs are initially separated at this point, each being guided over its corresponding guide roller 12. This serves to disengage the folds of the superposed strips, one from the other preparatory to passing the strips over the writing tablet in the top of the cabinet. The strips are advanced intermittently by the action of the pinwheel feed device immediately beyond which the strips are separated one from the other. In ordinary practice, the uppermost strip or strips are severed into short lengths for sales slips, bills or forms as they pass beyond the autographic register mechanism, while the underlying strip or strips are returned to the cabinet to be refolded within the receiving compartment 3. Such returned strip forms a continuous consecutive record of transactions entered upon the sales slips, bills or forms which have been detached at the completion of succeeding recording operations.

If such record strip or web was merely discharged into the receiving compartment 3 without guidance, it would soon fill the compartment and become an irregular, crumpled and mussed bundle. In order to dispose of the returned strip or web systematically, and orderly within the receiving compartment 3, there is pivotally mounted upon the side of the cabinet 1, an oscillatory guide chute 14 pivoted at 15. This oscillatory chute 14 is somewhat hopper shaped, converging downwardly to a comparatively narrow outlet slot 16. The record strip or web, the folds of which have been distended in its passage over the writing tablet, is discharged as at 6' downwardly from the strip feeding apparatus to such oscillatory chute 14 passing thence through the outlet slot 16, in the lower end thereof, into the receiving compartment 3. The chute 14 is interconnected by a link 17 with a wrist-pin 18 upon a gear member 19 meshing with a gear pinion 20 connected with the paper feeding mechanism and rotating in unison with the pinwheel 5.

The gears 19 and 20 are so proportioned that for each predetermined length of strip or web 6 fed through the register or writing apparatus, the chute 14 will be given an oscillatory motion first in one direction, and then in the other. The usual practice is to make the pinwheel 5 of such dimension that one complete rotation is required to feed the desired length of strip or web. In such case the gear 19 will make one complete rotation for each two rotations of the pinion 20. This proportion, however, is not essential, and may be varied as required by the length of the bills or forms to be discharged and the character of the actuating mechanism. The dominating factor is that of giving to the guide chute 14 an oscillatory motion in one direction during the passage therethrough of a portion of the web intermediate succeeding folds, and in the opposite direction during the succeeding folded portion of the strip. The strip being reversely folded at spaced intervals, for proper and uniform operation of the device, it is desirable that the direction of oscillation of the chute 14 be in agreement with the direction of the succeeding folds of such strip to pass through the outlet slot 16 of such chute. Thus referring to Fig. 1, the oscillatory chute 14 having carried the fold 21 of the strip 6' toward the right into proximity to the side wall of the cabinet, reverses its movement from the position shown, swinging toward the left in order that the succeeding reverse fold 22 of the strip may be carried toward the opposite side of the receiving compartment 3 into proximity with the intermediate partition between the compartments 2 and 3. Likewise, in Fig. 2, the swinging chute 14 having directed the fold 22 toward the opposite wall of the receiving compartment 3, reverses its direction of oscillation in order that the succeeding reverse fold 21 passing through the chute 14 may be guided to a position in proximity to the side wall of the cabinet. Thus the succeeding folds of the strip will fall in reverse sequence and properly positioned in the bottom of the compartment 3, reforming the bundle into the original folds, as in the supply bundle 7, except that the strip is refolded singly or a lesser number of strips may be thus interfolded after their withdrawal from the supply bundle 7, the remaining strip or strips being removed by separation into individual sales slips, bills or forms, or otherwise discharged outside the cabinet. It is important that the feeding of the strip be so timed with the oscillation of the guide chute 14 that the direction of the succeeding reverse folds of such strip shall properly agree with the direction of swinging motion of the chute.

While the device has been especially designed for refolding a prefolded strip or

strips separated from a stack or bundle comprising multiple strips interfolded upon themselves, it is to be understood that the apparatus may be employed for distributing a strip, tape or other material within a compartment in uniform layers or strata, even though such strip or tape may not have been previously creased or folded. That is to say, such strip or web may be distributed in reversed folds without creasing, and such stack or bundle within the compartment subsequently subjected to pressure to compact and crease the collected strip.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute, the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific details shown, but that the means and construction herein disclosed comprise the preferred form of several modes of putting the invention into effect and the invention is, therefore, claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

Having thus described our invention, we claim:

1. Means for separating multiple interfolded strips and refolding one or more thereof, including a strip feeding mechanism common to a plurality of interfolded strips, and a guide member in relation with which one or more of said strips are advanced by the strip feeding means, and actuating means for transmitting to the guide member a to and fro motion, reversing said motion in accordance with the direction of succeeding folds of the strip.

2. Means for separating multiple strips interfolded reversely upon themselves, including means for progressively advancing one or more of the strips subsequent to separation, a guide member for such strip having an alternating motion, actuating means therefor and said motion being timed to agree with the advance movement of successive folds of the strip, whereby the strip is relaid in its original folds.

3. In an apparatus of the character described for separating and refolding interfolded multiple strips, a group of separating guide members over which the strips are separately passed, strip feeding means common to the multiple strips, an alternating guide for a separated strip, actuating means for alternating the strip guide in unison with the

passing of succeeding folded sections of the strip.

4. The combination with a cabinet having in its bottom, supply and receiving compartments, one of said compartments adapted to contain a supply stack of multiple record strips interfolded reversely upon themselves, the other compartment being to receive one or more of said strips in refolded form after passing through an autographic register, a swinging chute for said last mentioned strip or strips positioned above said receiving compartment, a group of guide rollers through which the multiple strips separately pass on their way from the supply stack to the register to effect the separation of their fold creases, the selected strip or strips passing through said swinging chute after leaving the register, an actuating means for reversing the oscillation of the chute at predetermined intervals.

5. The combination with a strip feeding mechanism including a pinwheel feed device adapted to advance the strip a predetermined extent at each operation, of a swinging guide chute for the advanced strip, a crank member operated in unison with the pinwheel feed device through a half rotation for each rotation of the pinwheel, and a link connecting the crank member with the swinging chute to effect swinging movement of the chute in alternate directions in unison with succeeding rotations of the pinwheel.

6. The combination with a feeding device for simultaneously feeding reversely folded superposed strips of material, of guide means by which the strips are separated one from another including an oscillatory guide member for one of the strips, and actuating means therefor for oscillating the guide in synchronism with the feeding movement of the strips, to effect refolding of at least one of the strips upon its original fold lines simultaneously with the discharge of the separated strip from the feeding means.

7. The combination with a feeding device for progressively feeding a series of collectively folded strips of material, a separator for separating certain of the folded strips from each other, and a refolder operating in synchronism with the feeding device for automatically refolding each separator strip upon its original fold lines.

8. The combination with a feeding device for simultaneously feeding superposed reversely folded strips of material, means for separating the strips one from another, and a refolder for refolding a part of the separated strips upon the original fold lines.

9. A cabinet, a compartment therein for a supply of collectively folded strip material, and a receiving compartment for such material when refolded, a strip feeding device having operative engagement with the collectively folded strip material in its passage

- from the supply compartment to the receiving compartment, said strip material being unfolded by the action of the feeding device, said strip feeding device operating further to separate the unfolded strips from each other, and a refolder operating in synchronism with the strip feeding device for refolding a certain portion of the strip material upon its original fold lines as it enters the receiving compartment.
- 10 10. In an apparatus of the character described, a device for unfolding a series of collectively prefolded continuous strips of material and for progressively advancing the unfolded strips, and a refolder operating in synchronism therewith for simultaneously refolding a portion of the strip of material upon its original fold lines.
- 15 11. In a manifolding apparatus having strip feeding means for multiple strips, a supply holder for superfolded multiple strips from which the strips are simultaneously withdrawn and fed in unison through the strip feeding means, a separator for separating one of said strips from the said multiple folded strips, a refolding means for the separated strips actuated by the operation of the said strip feeding means and guiding such strip to and fro in reverse direction when discharged from the manifolding apparatus.
- 20 12. The combination of a cabinet having in its bottom a supply compartment for multiple interfolded record strips, strip feeding means common to the multiple prefolded strips through which the strips are passed in their travel from the supply compartment, a portion of said strips being discharged from the apparatus by the said strip feeding means, and a receiving compartment to which the remaining strip or strips are returned by said strip feeding means, a guide contiguous to the receiving compartment having to and fro motion, through which the strip is advanced, and means for automatically reversing the movement of said guide in accordance with the advance of predetermined lengths of successive sections of the multiple strips.
- 25 13. In an apparatus of the character described, the combination with a strip feeding mechanism adapted to progressively advance a continuous reversely folded strip, of an alternating guide member for said strip movable to and fro in unison with the advance of the strip, and means for reversing the movement of the guide in synchronism with the advance of successive reverse folds of the strip to effect refolding of the strip upon its original fold lines.
- 30 14. The combination with an intermittently operated strip feeding mechanism adapted to advance superfolded continuous strips past a point of separation at each operation, of a swinging guide operative upon one of the advanced strips independently of the other strip, and actuating means for swinging the chute in one direction upon one operation of the strip feeding mechanism, and in the reverse direction upon the succeeding operation of the strip feeding mechanism to effect reverse folding of one of the strips while the other strip is simultaneously discharged from the feeding mechanism without being folded.
- 35 15. The combination with an autographic register mechanism including an intermittently operated strip feeding mechanism for simultaneously advancing a plurality of superposed continuous strips of manifolding material, each comprising successive defined sections of predetermined length, over a writing tablet a predetermined distance at each operation equal to the length of succeeding sections of the strips, guide means by which the strips are separated after passing over the writing tablet, including an alternating guide member for the advance strips, and actuating means for the guide member operatively connected with the strip feeding means, said actuating connection being proportioned and arranged to effect a movement of the guide member in one direction during the advance of the strip a predetermined distance and to effect a reverse movement of the guide during the further advance of the strip through a succeeding like distance to effect reverse folding of the strip coincident with succeeding sections.
- 40 In testimony whereof, we have hereunto set our hands this 6th day of February, A. D. 1929.
- 45 JOHN Q. SHERMAN.
ALBERT W. METZNER.
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