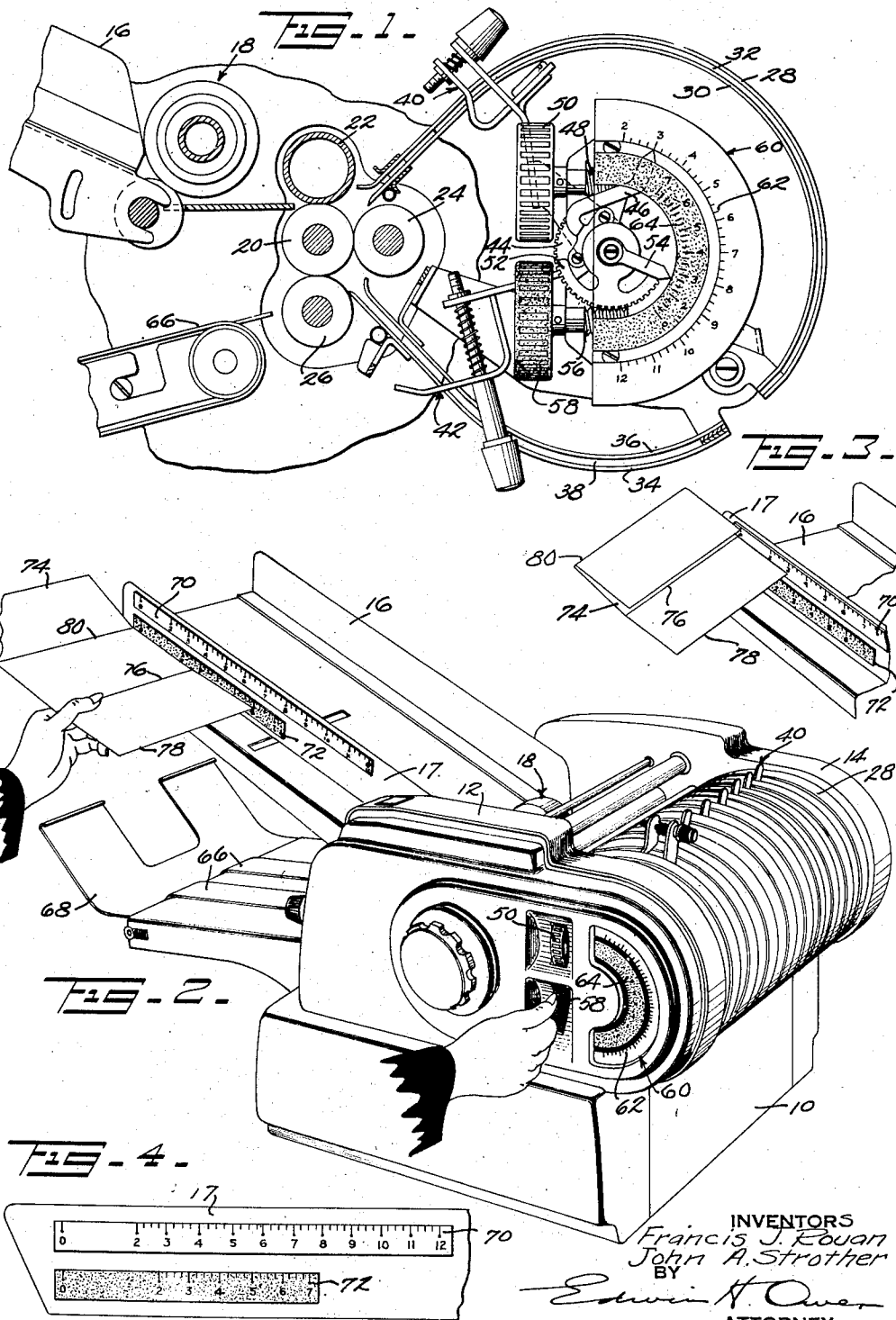


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STOP POSITIONING SCALES FOR BUCKLE
TYPE SHEET FOLDING MACHINES
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STOP POSITIONING SCALES FOR BUCKLE TYPE SHEET FOLDING MACHINES

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This invention relates to the art of folding sheets of paper, etc., by machine.

It has been known to provide sheet folders, particularly for folding letters, in which a sheet of paper is fed into the folding apparatus, and a transverse fold is made in the sheet, or two or more transverse folds are made in rapid succession. Since not all sheets require folding at the same place, it is customary to provide settable elements by means of which the machine can be adjusted to provide the fold lines at any desired location, sometimes in cooperation with indicators and scales for showing the extent of each fold length which will be produced.

Machines of the foregoing type usually have the disadvantage that a certain amount of skill and care are required in setting up the machine so that the appropriate fold lengths will occur in the proper order. A clerk who is unacquainted with the structure and operating sequence of the machine parts, will often find it a confusing problem to determine which fold length setting should be made on any particular indicating scale. Even though the scales may be denominated with legends relating them to a corresponding folding step, e. g. "first," "second," etc., the significance of such a designation is readily overlooked by the usual clerk, with the result that the machine is sometimes set up incorrectly. When this occurs there is likely to be a significant waste due to the production of a large number of improperly folded sheets before the incorrect setting is discovered, in addition to the time required by the operator to reconsider the problem and make a new setting of the machine.

It is an object of this invention to provide a folding machine having a plurality of setting indicators for indicating the fold lengths of successive folds, in which there is also provided means for ascertaining the proper fold length setting by comparison of a prefolded sample facsimile with a conveniently located test scale. It is a feature of the invention that the test scale is so located on the side of the sheet supply holder that it is within easy reach of the control means for adjusting the fold length whereby the test sample may be measured with one of the operator's hands while the setting of the machine is being simultaneously accomplished with the other.

Another object of the invention is the provision of a plurality of test scales arrayed in a particular relationship indicating their order of use so that the natural inclination of the operator will induce him to use the first scale first, the second scale second, etc., in measuring the succession of fold lengths on the test sample. These scales are provided with designating colors, preferably contrasting, and similar designating colors are applied to the scales which cooperate with the setting indicators. In this way, due to the graphic correspondence between the indicator scales and the test scales, a first fold length measurement will be taken using the first test scale, and transferred to the appropriate setting indicator due to their similarity in appearance, with a similar procedure being followed for each of the other fold lengths.

It is another object of the invention to provide a plurality of test scales arrayed in a natural relationship tending to indicate their order of use, and to provide an equal number of control members for making the settings for the various folds, the control members being positioned in an array corresponding to that of the test scales, so that a measurement, taken on the most promi-

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nent scale in the array, is set up by using the control member similarly disposed in its array, and, when similar corresponding tests and settings are made using the other test scales and control members, the machine will be properly set up to produce the desired folds in the desired order.

A further object of the invention is the provision of a folding machine so arranged that the advantages of each of the foregoing objects will be achieved in combination with the advantages to be derived from application of each or all of the other objects.

A machine constructed in accordance with the objects aforesaid will be so simple and direct to set up, that waste due to improper setting of the fold lengths will be largely avoided, even when operated by persons of limited experience.

A novel feature of this invention is the hereindescribed method of adjusting the machine according to a prefolded test sample or facsimile having fold lines indicated thereon.

Additional features and advantages will hereinafter appear.

A preferred embodiment of the invention is disclosed in the following drawings, wherein:

Fig. 1 is a fragmentary side elevation, partially in section of the folding machine of this invention, with housing removed, illustrating the means for adjusting the buckle stops;

Fig. 2 is a perspective view of the entire machine to a reduced scale and illustrating one step in the setting of the machine;

Fig. 3 is a fragmentary perspective view similar to a portion of Fig. 2 and illustrating another step in the setting of the machine; and

Fig. 4 is a fragmentary elevation of one wall of the sheet supply holder with the fold measuring scales thereon.

The invention is shown for convenience as applied to a buckle type folding machine, which includes a base 10 and end housings 12 and 14. A sheet supply holder 16, including an adjustable guide 17, is mounted between the end housings for holding a stack of unfolded sheets in position to present the same to a feed mechanism 18 of known construction, which feed mechanism removes one sheet at a time from the top of the supply and thrusts the leading edge of the sheet forward into the folding mechanism.

The folding mechanism includes a driven center roller 20, an upper roller 22, a rear roller 24, and a lower roller 26, the latter three all resiliently urged in a known manner towards the roller 20. A series of spaced guide strips 28 are opposed and slightly spaced from a similar series of spaced guide strips 30 to form an upper curved buckle chute 32. Similar series of guide strips 34 and 36 provide a lower curved buckle chute 38. As can be seen in Fig. 2, each pair of strips 28, 30 is horizontally spaced from the adjacent pairs of strips so that the buckle chute is in fact discontinuous across the machine. The structure of the lower buckle chute will, of course, be similarly discontinuous. The machine is arranged with upper and lower buckle stop arms designated generally at 40 and 42, which arms extend between said strip pairs 28, 30 and 34, 36. The upper buckle stop arms 40 lie between the adjacent strip pairs 28, 30 of the upper buckle chute 32, while the lower buckle stop arms 42 lie in a similar fashion between the adjacent strip pairs 34, 36 of the lower buckle chute 38.

All of the upper buckle stop arms 40 are suitably mounted for concurrent swinging movement about a common axis and move together with gear segment 44 and attached pointer 46 under the control of worm 48 operated by finger wheel 50. Similarly all of the lower buckle stop arms 42 are suitably mounted for concurrent swinging movement about the same axis and move together with gear segment 52 and attached pointer 54 under the control of worm 56 operated by finger wheel 58. A dial member 60 carries a pair of arcuate scales 62 and 64 for cooperation with the pointers 46 and 54 respectively to indicate, preferably by numbers, the fold lengths for which the buckle stops are set.

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Thus when an unfolded sheet is fed forward by the feed mechanism 18, it is grasped in the nip of the roller pair 20, 22, and the leading edge is carried into the upper buckle chute 32 until it strikes the stop arms 40. Thereupon, due to the continued feed by rollers 20, 22, the sheet buckles into the nip of roller pair 20, 24, which then feed the sheet, fold first, into the lower buckle chute 38 until the lower stop arms, positioned as represented by stop 42, Fig. 1, are encountered. Continued feeding of the sheet by roller pair 20, 24 results in the buckling of the sheet into the nip of roller pair 20, 26 where the sheet is again folded and fed outwardly to stacking belts 66 which transport the folded sheets to a collecting station 68, shown in Fig. 2, or to a location where some subsequent operation may be automatically performed thereon.

The fold lengths produced in the upper and lower buckling operations are determined by the settings of the upper stop arms 40, and the lower stop arms corresponding to arm 42 respectively. Upper stop arm settings are indicated on the scale 62, while the settings of the lower stop arms register on the scale 64. The graduations of these scales are not necessarily uniform, nor do they necessarily represent direct linear measurements, but need only be such as to indicate the length of fold, preferably by number, produced by the corresponding location of the related buckle stop.

Mounted on the operator's side of the sheet supply holder 16 is a scale 70. This scale is so arranged that the operator can take a sample sheet, for example, one folded by hand, and can measure the fold lengths against the scale with one hand while making an appropriate setting of the buckle stops with the other, using finger wheels 50 and 58, as illustrated generally in Fig. 2.

In the preferred form of the invention there are two scales 70, 72 mounted on the side of the sheet supply holder 16. These scales are of different and distinctive colors, preferably contrasting. As used in the present description and in the subjoined claims, the term "color" will be understood to mean any characteristic surface marking or designating system which makes one surface area distinguishable from another by visual perception of its quality. As shown in Figs. 2, 3 and 4, the upper scale is light in color and the lower dark. The scales accordingly have a natural order which an operator will normally use without mental effort, i. e. it will be found to be a natural operation to measure the first fold length of a sample sheet 74 against the upper light colored scale, as illustrated in Fig. 3, and, if a second fold is to be made, to measure the second fold length against the lower dark colored scale as shown in Fig. 2. The scales 62 and 64 are each colored to match the corresponding one of the scales 70, 72 so that while the measurement is being made with one hand, the setting will be made with the other hand, and will be made by using the wheel 50 or 58 which correspond in position to the scale being used. Said wheel setting also produces movement of an associated pointer adjacent the scale of the same color as the test scale against which the measurement is being taken. The wheels 50, 58, are also preferably colored to correspond with the test scales with which they coact. Thus, when the left hand of the operator makes the first fold measurement against the upper scale, as shown in Fig. 3, the right hand will gravitate naturally to the upper wheel 50, and the operator will visually and without conscious effort check the propriety of the setting operation by a subconscious and automatic comparison of the colors of scales 70 and 62, and of wheel 50. Similarly, when the lower scale 72 is being used to determine the second fold length as shown in Fig. 2, the operator's right hand will normally fall upon the lower control wheel 58 as shown, and the fact that the proper stops are being set will be automatically checked and confirmed by the subconscious visual comparison between the colors of scales 72 and 64, and of wheel 58.

In the foregoing manner, the operator's motions in setting up the machine can be made to follow a simple normal routine which will of itself induce proper set up of the machine and which offers automatic checks likely to make the operator discover any inadvertence on his part tending towards the making of an incorrect setting.

Correctness of the setting up of the machine by the operator is of importance by reason of the fact that an incorrectly folded sheet will often fail to show up through cursory visual inspection, and will be discovered only if

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the folded sheet is first opened up. For example, one ordinary letter folding procedure uses a first fold slightly shorter than the second fold to provide wrap-around room without buckling the inner or first fold length. If these lengths were to be inadvertently reversed, the final folded sheet would be defective, either due to a short fold at the head of the first length, or possibly due to a double crease between the first and second lengths. Many sheets could easily be folded before this defect was discovered causing serious waste of the circulars, letters or other printed matter or sheets being treated. By substantially forestalling such eventualities the present invention provides an important enhancement of the value and convenience of folding machines.

The method of adjusting the machine according to the present invention is both simple and convenient and involves merely preparing a test sheet 74 by creasing or marking the same to provide transverse fold lines at the desired points, placing such a test sheet against the scale 70, with the first fold line 76 against a predetermined datum or zero mark, as shown in Fig. 3, reading the indication on the scale opposite the leading edge 78 of the sheet, and setting this reading or indication on the scale 62 associated with stop means 40 for controlling the first folding step by operating the wheel 50. Similarly, the second fold line 80 is then placed on the predetermined datum or zero mark of the lower scale 72, the indication opposite the first fold line 76 is noted, and is then set on scale 64 using the wheel 58.

While in order to comply with the statute the invention is described in language which is rather specific as to structural features and arrangements, it is to be understood that the invention is not limited to the specific details shown, but that the means herein disclosed comprises the preferred of several modes of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the scope of the language employed in the appended claims.

Having described the invention, what is claimed is:

1. In a buckle-type chute folding machine having a casing, a feed-table at one end of the casing, buckle chutes at the other end of the casing, adjustable fold-controlling stops in the chutes, fingerpieces accessible through one side of the casing for adjusting said stops, there being a first fold fingerpiece and a second fold fingerpiece, and a scale and pointer unit coordinated with each of said fingerpieces and located adjacent thereto to be viewed together; a pair of fold-measuring scales, there being a first fold-measuring scale and a second fold-measuring scale, said scales being mounted adjacent the feed-table on the same side of the machine as said fingerpieces and scale and pointer units, and in such close proximity thereto that a sample folded sheet may be held by one hand of the operator against said fold-measuring scales while the fingers of the other hand of the operator are in position to operate said fingerpieces, said fold-measuring scales being located on the machine in such position that said measuring scales, the fingerpieces and the stop scales and pointer units will be in the range of the operator's vision simultaneously, the stop scales of the scale and pointer units each having individually designated division marks indicating fold-forming positions in said stops, and said fold-measuring scales each having corresponding individually designated division marks against which the sample folded sheet is placed to indicate the position to which the stop pointer and scale unit should be adjusted to produce desired folds in duplication of those in the sample sheet, the first fold-measuring scale, the first fold fingerpiece and the first fold pointer and scale unit having a common characteristic appearance distinguishably different from the common characteristic appearance of the second fold-measuring scale, the second fold fingerpiece and the second fold pointer and scale unit.

2. In a buckle-type chute folding machine having a casing, a feed-table at one end of the casing, buckle chutes at the other end of the casing, adjustable fold-controlling stops in the chutes, fingerpieces accessible through one side of the casing for adjusting said stops, there being a first fold fingerpiece and a second fold fingerpiece, and a scale and pointer unit coordinated with each of said fingerpieces and located adjacent thereto to be viewed together; a pair of fold-measuring scales, there being a first fold-measuring scale and a second fold-measuring scale, said scales being vertically mounted on

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the feed-table on the same side of the machine as said fingerpieces and scale and pointer units, and in such close proximity thereto that a sample folded sheet may be held by one hand of the operator against said fold-measuring scales while the fingers of the other hand of the operator are in position to operate said fingerpieces, said fold-measuring scales being located on the machine in such position that said measuring scales, the fingerpieces and the stop scales and pointer units will be in the range of the operator's vision simultaneously, the stop scales of the scale and pointer units each having individually designated division marks indicating fold-forming positions in said stops, and said fold-measuring scales each having corresponding individually designated division marks against which the sample folded sheet is placed to indicate the position to which the stop pointer and scale unit should be adjusted to produce desired folds

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in duplication of those in the sample sheet, the first fold-measuring scale, the first fold fingerpiece and the first fold pointer and scale unit having a common characteristic appearance distinguishably different from the common characteristic appearance of the second fold-measuring scale, the second fold fingerpiece and the second fold pointer and scale unit.

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