Sheet 1 - 3 - Sheets.

S. C. Durgin.

Folding and Measuring Cloth.

No. 3,469. Patented Mar. 9, 1844.

Fig. 1.

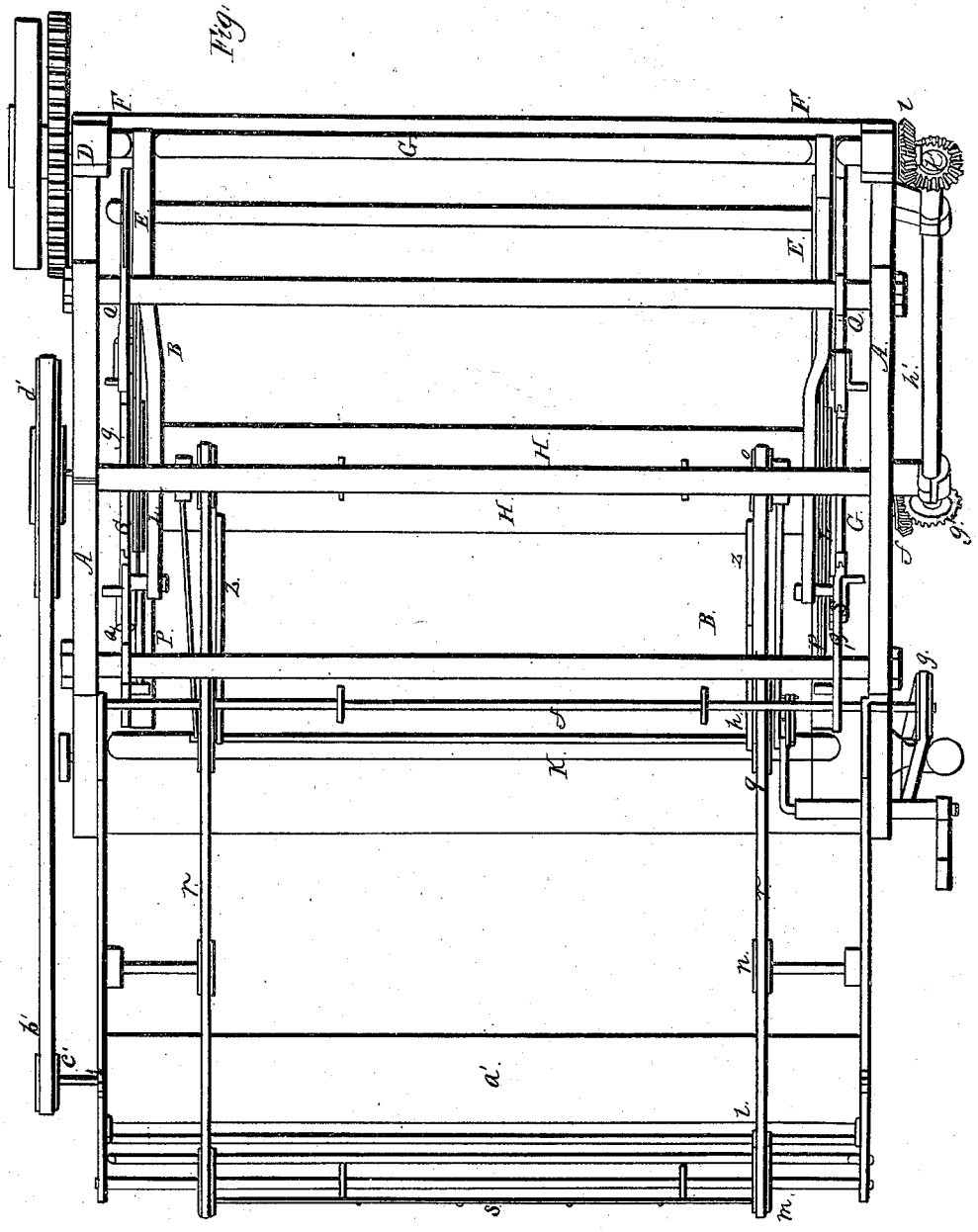

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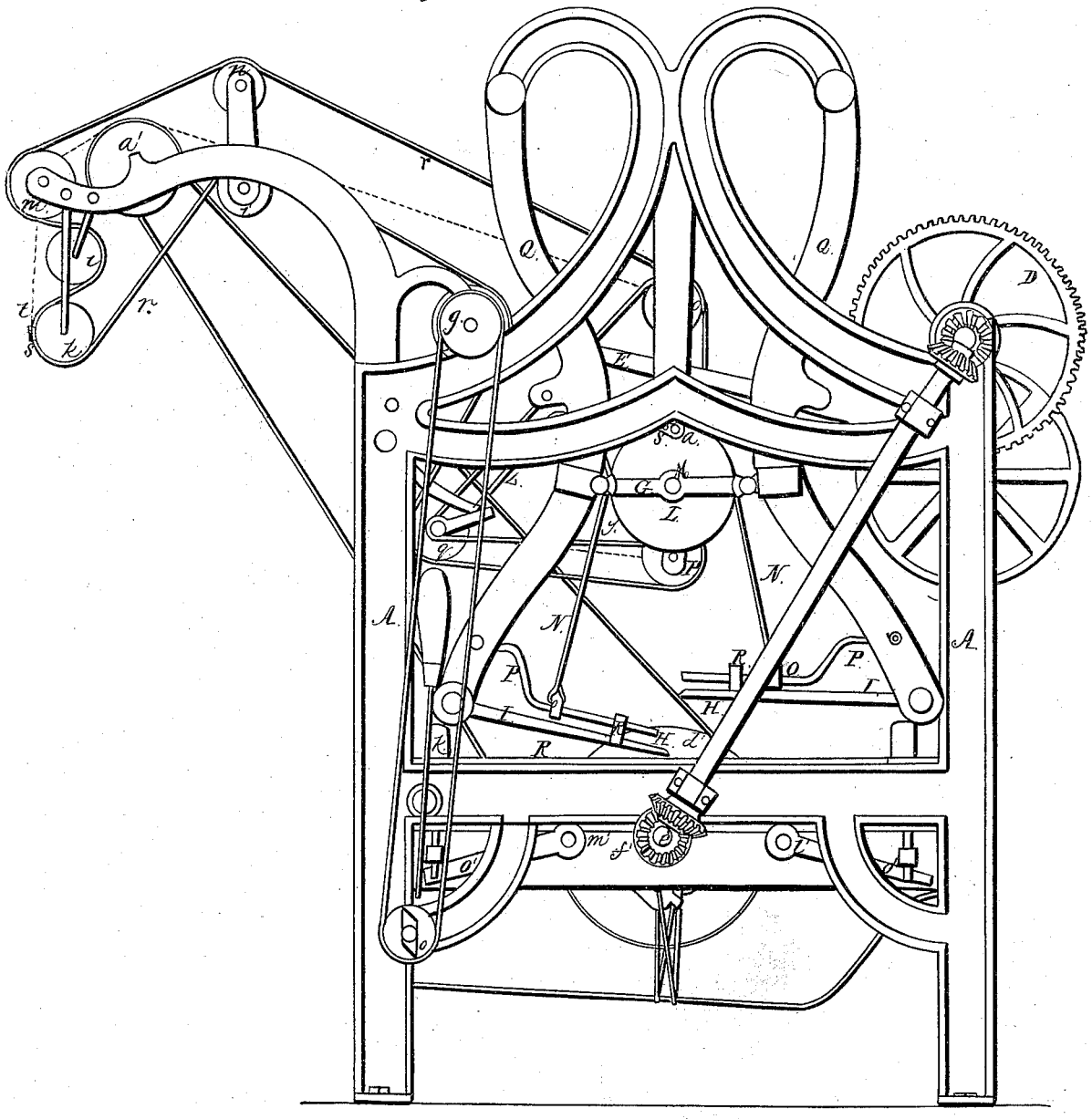
Fig. 2.



Sheet 3-3 Sheets.

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Fig. 3.

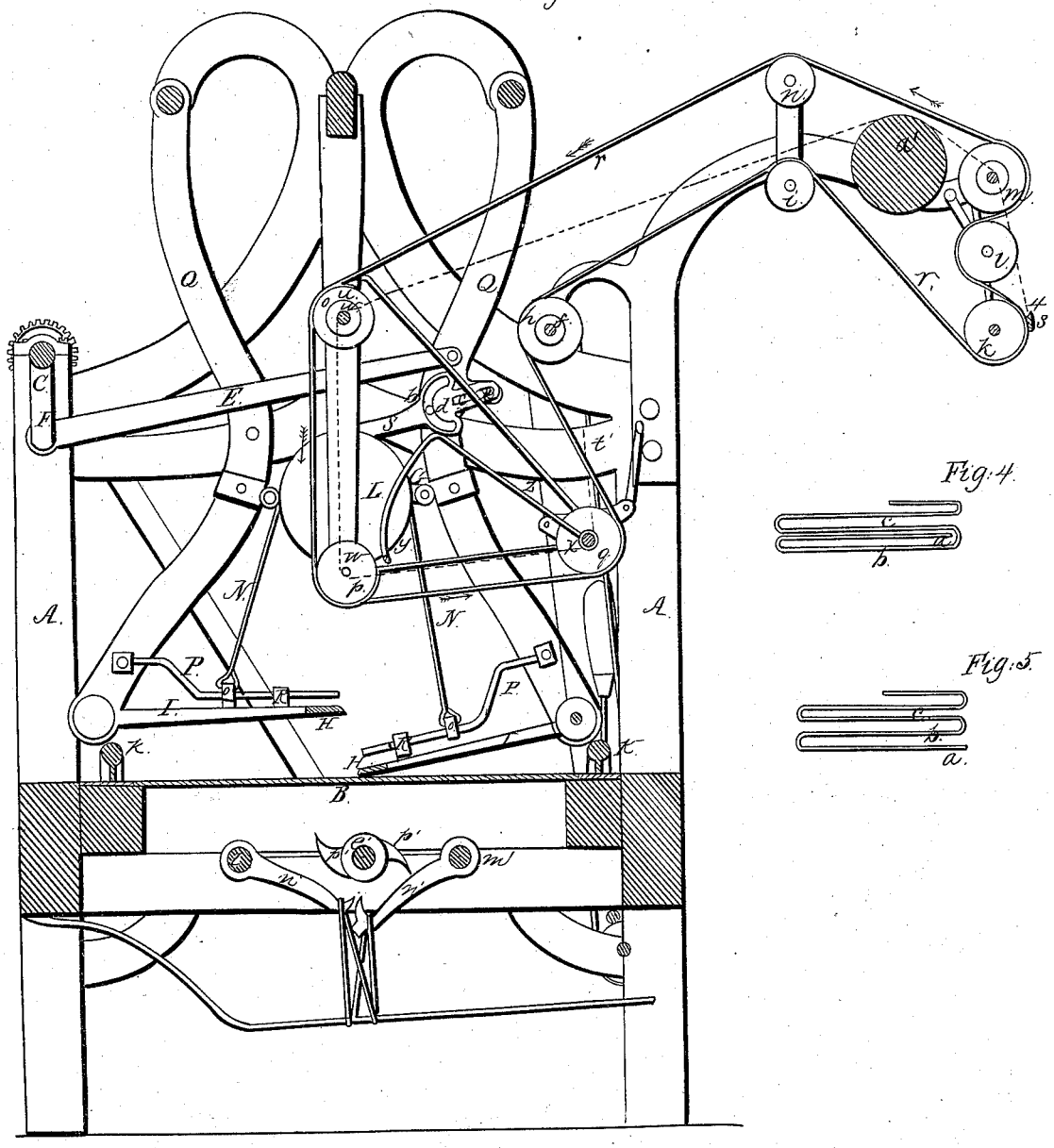

Fig. 4.

Fig. 5.

UNITED STATES PATENT OFFICE.

SILAS C. DURGIN, OF NORTH CHELMSFORD, MASSACHUSETTS.

IMPROVEMENT IN MACHINERY FOR FOLDING AND MEASURING CLOTH.

Specification forming part of Letters Patent No. **3,469**, dated March 9, 1844.

To all whom it may concern:

Be it known that I, SILAS C. DURGIN, of North Chelmsford, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Machinery for Folding and Measuring Pieces of Cloth; and I do hereby declare that the following description and accompanying drawings thereof taken in connection constitute a full and exact specification of the construction and operation of the same.

Figure 1 of the drawings above mentioned represents a plan or top view of a folding-machine constructed with my improvements. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical and central section.

The main or principal operative parts of the machine which I now proceed to describe are very similar to those of that patented by Joel Spalding, of Morristown, State of Vermont, on or about the 28th day of August, of the year 1841, my invention, or those parts of the former which I consider new, being certain improvements which render the operation of the machine of the said Spalding more certain and expeditious.

A, Figs. 1, 2, and 3, represents the main frame-work, which consists of two cast-iron sides or frames rising above and secured to the ends of a horizontal platform or table B, the whole of the same, together with the said table, being arranged as exhibited by the several drawings or in any other proper manner. The main driving or crank shaft C revolves in suitable bearings arranged at or near the upper part of one side of the machine, the said shaft being revolved by means of a spur-gear or cogged wheel D, fixed upon one end of the shaft, and actuated by a toothed pinion, which is arranged in any convenient manner and impelled by the driving power. Connecting-rods E E, proceeding from bell-cranks F F upon the shaft C, are jointed to two of the four upright sweeps Q Q Q Q, which carry the folders. These upright sweeps are suspended in a proper manner at their tops, so as to be easily and alternately vibrated backward and forward. The two sweeps at each end of the machine are connected together at or near the middle of each by a bar G, which is jointed at its ends to the sweeps. Consequently the movements of the sweeps that are connected to the crank-shaft cause corresponding motions of the other sweeps. The folders H H consist of two metallic plates or bars having arms I I extending backward and at right angles from them, which arms are so jointed to the lower ends of the sweeps as to permit the folders to rise up and down or to have a vertical movement with respect to the sweeps.

The latch or retaining bars which confine the folds or laps of the cloth down upon the platform B are seen at K K.

My first improvement consists in the mechanism by which the folders are alternately lifted from and depressed upon the cloth in order to lay it in successive folds upon the platform. At or near the center of the inner side of each bar G a pulley L is arranged upon a stud or pin M, projecting from the bar, the said pulley turning upon the said stud. Upon each of these pulleys a chain or band N passes, having its ends attached to collars O O of two bent rods P P, each of which is jointed at one end to one of the sweeps Q Q, or moves upon a pin inserted horizontally therein in the position as seen in Fig. 3, and passes and moves freely at its other end through a vertical stud R, rising upward from the arm of the folder. Each of the collars O O should be movable upon its rod and so arranged as to be confined upon any desirable part of the rod by a set-screw, so that by moving the collars into suitable positions on their respective rods the folders may be balanced when in the center of the machine. Each pulley has one end of a cam-lever S attached to its side and near its periphery by means of a pin or stud *a*, upon which the lever works or plays. The cam-lever has a semicircular groove or slot *b* and a straight groove or slot *c* formed in its opposite end, as seen in Fig. 3, and is connected to one of the sweeps Q by pins or studs *d e*, projecting from the inner side of the sweep and passing through the grooves *b c*. The two cam-levers extend from their respective pulleys in opposite directions to each other, being connected to the sweeps, as seen in Fig. 1.

Now, when the sweeps are moved to and fro by means of the crank-shaft, the slots *b* and *c* in each of the levers will permit the levers to accommodate themselves to the motion of the sweeps and to turn their pulleys L L around a short distance upon their axes

and thus gradually elevate one of the folders above the platform and the latch or retaining-bar, toward which the sweeps are moved, and at the same time depress the other folder toward the platform. During the elevation of either of the folders above the platform the rods P P of the folder pass or move longitudinally through the studs R R, and so as to cause the collars O O of the rods to approach toward the studs. So when either of the folders is depressed toward the platform the rods P P of it move in the opposite direction through the studs R R of it and carry the collars away from the studs. By this peculiar operation the balance of the folders is overcome, and that folder which is in immediate action upon the cloth or which is pressing the same toward one of the retaining-bars or latches is depressed upon the cloth and bears thereon with a slight force, and at the same time raises the other folder above the cloth and the retaining-bar toward which the depressed folder is proceeding.

My next improvement consists in the mechanism by which the cloth is introduced into the machine and the overlap of the first fold produced.

In order to explain what is here intended to be understood by the expression "overlap of the first fold," I would state that it is customary in folding piece goods by hand to turn the end of the piece between the folds *b* and *c*, as seen at *a* in Fig. 4. By the ordinary folding-machine the same has been arranged in the order as seen in Fig. 5. The placing the end *a* between the folds *b* and *c*, as in Fig. 4, is what I term the "overlap of the first fold."

A small horizontal shaft *f*, supported so as to revolve in suitable bearings, extends across the machine from one end of the frame to the other, in the position seen in Figs. 1 and 3. This shaft is put in revolution by a pulley *g*, arranged upon one end, which pulley is driven by a band proceeding from the driving power, and the power which operates the shaft *f* should be so applied thereto by any known mechanical contrivances for the purpose that it can be put in action and thrown out thereof at pleasure. There are two pulleys placed on the shaft *f* near its ends and at equal distances on each side of the center of the shaft, one of these pulleys being represented in Fig. 3 at *h*. A series *i k l m n o p q* of pulleys arranged in the positions with respect to each other and the pulley *i*, as seen in Fig. 3, and in the same vertical plane with one of the pulleys *h*, are disposed at each end of the machine, they being supported by suitable shafts extending across or projecting from the frame-work. Over each series of pulleys a band *r* passes, as seen in Figs. 1 and 3, and between the bands *r r* a metallic or wooden bar *s* extends, having its two ends attached to the bands, as represented in Fig. 1. Small hooks or pins *t t*, &c., are inserted in the upper edge of the bar, upon which hooks the end of the piece of cloth to be folded is to be hooked, so as to confine the said end to the bar. This being accomplished the shaft *f* is to be put in revolution so as to cause the bands *r r* and bar *s* to move in the direction denoted by the arrows in Fig. 3, and thereby draw the cloth into the machine, as represented by the red lines in Fig. 3, and until the bar *s* arrives at or near the point *t'*, when the revolution of the shaft *f* is to be stopped. The cloth thus drawn in will pass over the horizontal shafts *u v* and under the horizontal shafts *w x*. In its passage from the shaft *w* to the shaft *x* it passes beneath a horizontal rod or bar *y*, which is supported at its end by bent arms *z z*, extending from the horizontal shaft *x*. Therefore on turning the shaft *x* in its bearings it causes the bar *y* to descend in a curved direction toward one of the retaining-bars K, and to press or carry the cloth down with it and to deposit it in a lap or fold underneath the retaining-bar. On unhooking the end of the piece of cloth from the points of the bar *s* and putting the folders in operation the end of the cloth will be smoothed down upon the platform, and thus the overlap of the first fold will be produced.

In its passage into the machine the piece of cloth passes over a feeding-roller *a'*, which is arranged in the position denoted in the drawings, and moved by a belt or band *b'*, passing around a small pulley *c'*, (fixed on the axis or shaft of the feeding-roller,) and a large pulley *d'*, fixed upon one end of a horizontal shaft *e'*, (see Figs. 1, 2, and 3,) which extends centrally under the platform from one end of the machine to the other, and has a beveled pinion *f'* fixed upon its opposite end, which pinion works into another beveled gear-wheel *g*, fitted upon the lower end of an inclined shaft *h'*. A beveled gear *i'*, fixed on the end of the crank-shaft, imparts motion to the inclined shaft by engaging with another beveled gear *k'*, fixed on the upper end of the shaft *h'*. The central shaft *e'* has two other shafts *l' m'* arranged horizontally on opposite sides of it, as seen in Fig. 3, and extending from one end of the frame-work to the other. Each of the shafts *l' m'* has an arm *n'*, (projecting from its center in a direction toward the shaft *e'*,) and two arms projecting in an opposite direction from its ends, respectively, one of the latter arms being seen at *o'*, Fig. 3. Each of the retaining-bars rests upon two of the arms *o'* by means of suitable guides or pins of the retaining-bar projecting vertically through the platform and resting upon the arms *o' o'*. The central arms *n'* of the shafts *l' m'* are alternately depressed by cams or wipers *p' p'*, fixed upon the central shaft, the depression of the said arms elevating the retaining-bars.

The surface of the roller *a'* should move a very little faster than the cloth does, as it (the cloth) is drawn by the folders over the guide-shafts *u v*, in order that the portion of the cloth which is between the feeding-roller *a'*

and the shaft *u* may hang loosely between the two rollers and the feeding-roller do all the work of drawing the cloth toward itself, and thus freeing the folders from the strain in consequence thereof, thereby enabling them to perform their operations with certainty and ease.

Having thus described my improvements, I shall claim—

1. The mechanism by which the folders are elevated and depressed, the same consisting of the pulley L, cam-lever S, bent rods P P, chain or band N, and parts, as before described, as combined with each other and applied to the folders and sweeps and operating substantially as hereinbefore set forth.

2. The mechanism by which the cloth is introduced into the machine and the overlap of the first fold produced, the same consisting of the endless bands *r r*, with their pulleys and shafts arranged substantially as described, and cross-bar *s*, or machinery of similar character, in combination with the depressing-bar *y*, the whole being for the object and purpose as hereinbefore defined.

3. My peculiar method of feeding the cloth into the machine so as to present it to the action of the folders as required by them and with little or no strain upon them—viz., by supporting the cloth on one or more horizontal rods or shafts *u v*, placed above the folders—in combination with giving to the surface of the feed-roller *a'* a motion sufficiently increased beyond that of the folders to cause that part of the cloth which is between the supporting rod or rods and the feed-roller to be loose or hang down in proper quantity to readily yield to the irregular motion of the folders over the platform caused by the cranks of the shaft which operate the sweeps of the said folders.

In testimony that the above is a correct specification of my aforesaid improvements I have hereto set my signature this 30th day of November, A. D. 1843.

SILAS C. DURGIN.

Witnesses:

HORATIO G. F. CORLISS,

WM. W. CALVERT.