

No. 612,957.

Patented Oct. 25, 1898.

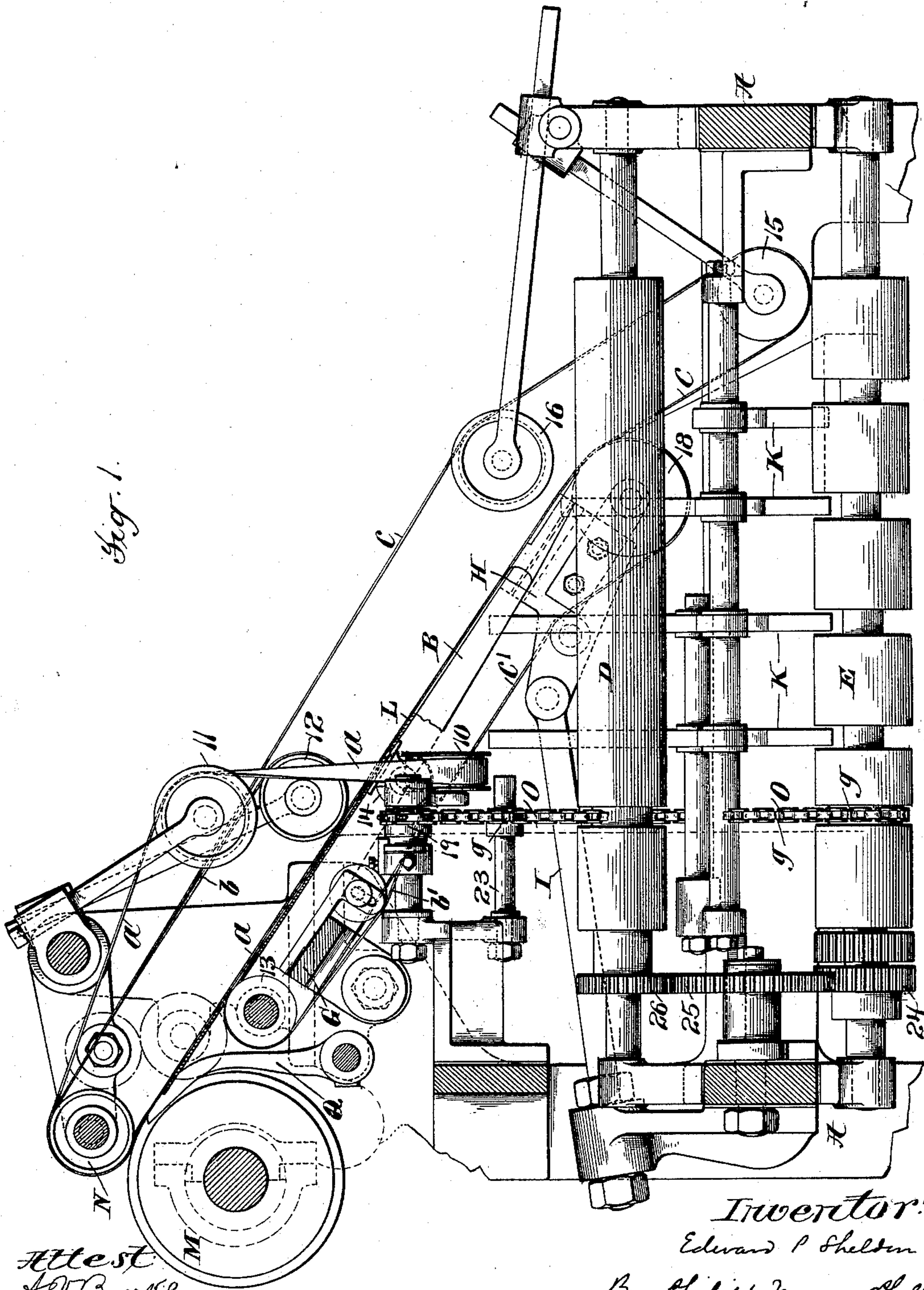
E. P. SHELDON.

PAPER FEEDING AND FOLDING MACHINE.

(Application filed Nov. 18, 1895.)

(No Model.)

3 Sheets—Sheet '1.



Attest
A. V. Bourke
Jm. Bourke

Inventor:
Edward P. Sheldon
By *Philippe Munnich Phelps*
Atty's

No. 612,957.

Patented Oct. 25, 1898.

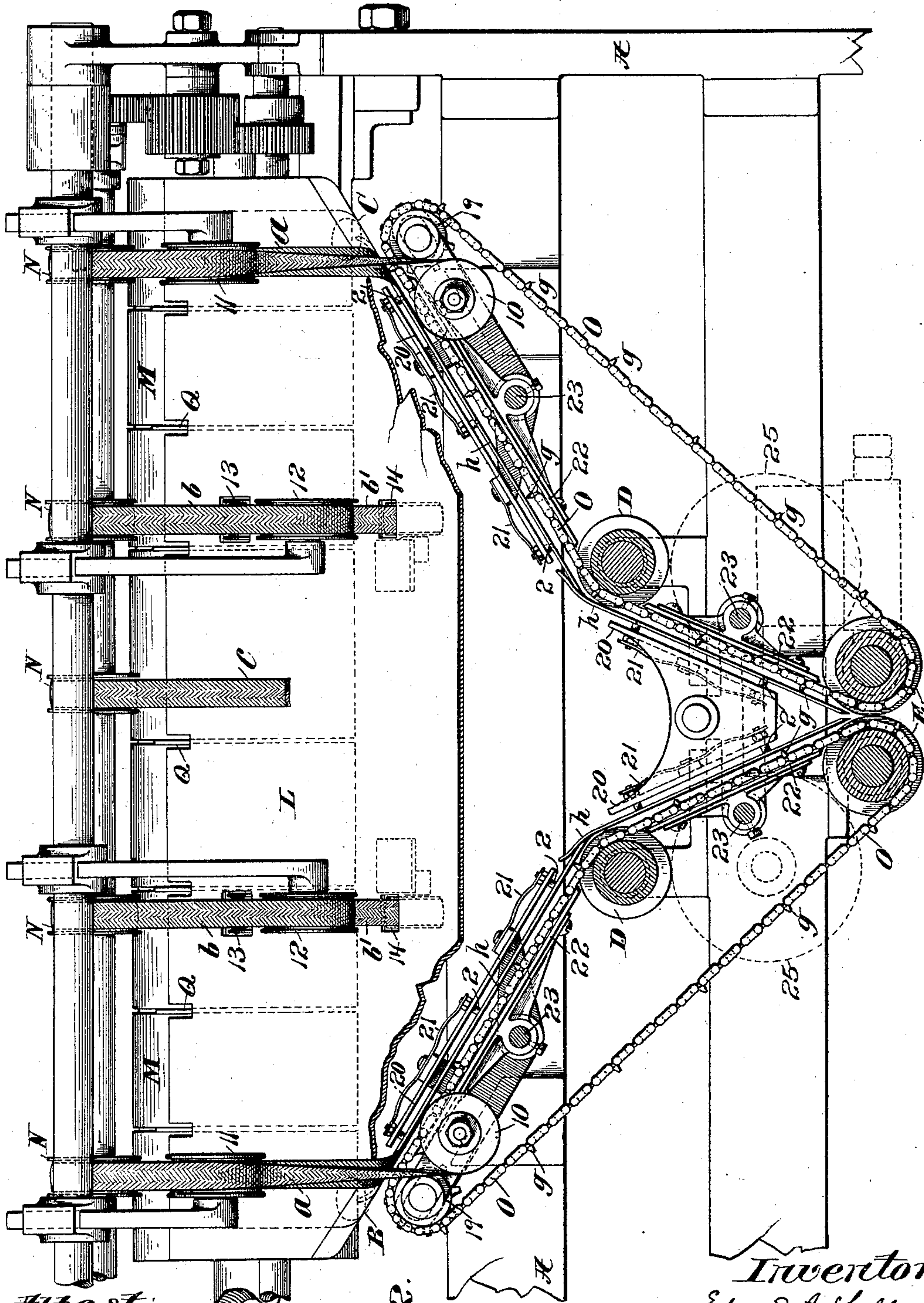
E. P. SHELDON.

PAPER FEEDING AND FOLDING MACHINE.

(Application filed Nov. 18, 1895.)

(No Model.)

3 Sheets—Sheet 2.



Attest:
A. V. Bourke
J. W. Borst

Fig. 2.

Inventor:
Edward P. Sheldon
By Philip Munn Phelps
Attys

No. 612,957.

Patented Oct. 25, 1898.

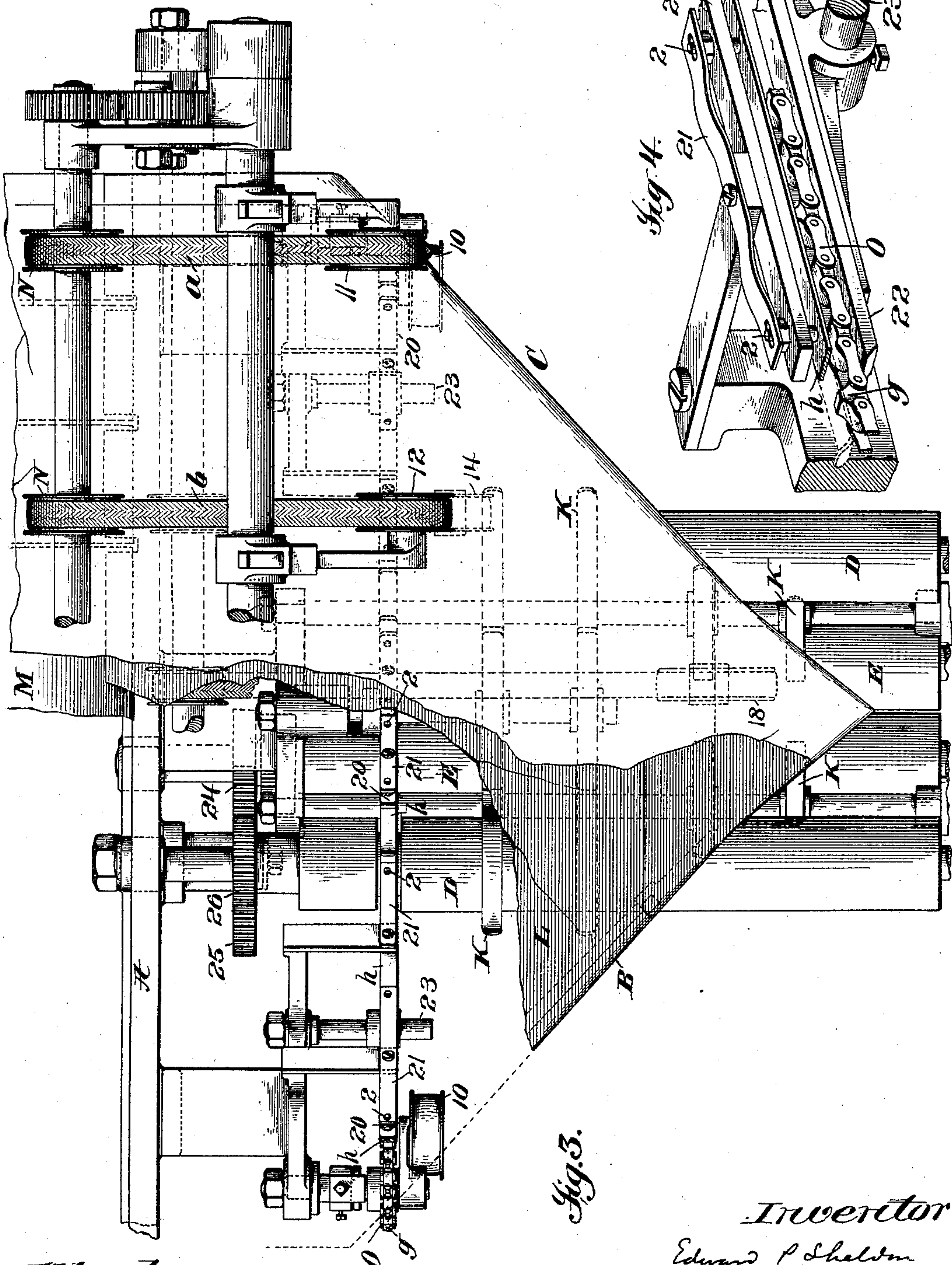
E. P. SHELDON.

PAPER FEEDING AND FOLDING MACHINE.

(Application filed Nov. 18, 1895.)

(No Model.)

3 Sheets—Sheet 3.



Attest:
J. V. Bourke
J. M. Borch

Inventor
Edward P. Sheldon
By Philip Munson Phelps
Attys

UNITED STATES PATENT OFFICE.

EDWARD P. SHELDON, OF NEW YORK, N. Y., ASSIGNOR TO ROBERT HOE,
THEODORE H. MEAD, AND CHARLES W. CARPENTER, OF SAME PLACE.

PAPER FEEDING AND FOLDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 612,957, dated October 25, 1898.

Application filed November 18, 1895. Serial No. 569,298. (No model.)

To all whom it may concern:

Be it known that I, EDWARD P. SHELDON, a citizen of the United States, residing at New York, (Brooklyn,) county of Kings, and State of New York, have invented certain new and useful Improvements in Paper Feeding and Folding Mechanisms, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The object of the present invention is to provide improved feeding devices for advancing sheets of paper or similar material, and especially to provide a simple, cheap, and efficient construction which will always be in position to take a sheet, so as to act independently of and require no special timing of feeding devices in advancing sheets thereto.

While the feeding devices embodying certain features of the invention are applicable to many other uses, the invention has been designed especially for use in that class of folding mechanisms generally known as "longitudinal folders," and the invention consists, chiefly, of features of construction in such folders.

The class of folding mechanisms referred to are those which operate to impart a longitudinal fold to material passing over or through them on the run, and more particularly such as are provided with a pair of converging internal folding-guides or formers, in passing over which the material has its sides carried toward each other, so as to be doubled or folded longitudinally. In such longitudinal folders adapted to fold sheets tapes have usually been employed for advancing the sheets over the folder, two series of tapes being used, or a series of external tapes coacting with internal plates. Such tape-folders are shown in Patents Nos. 276,672, 281,619, and 331,280. Such constructions, however, have not been entirely satisfactory in operation, as it is difficult to secure and maintain by tapes the proper tension at all points of the sheet to assure its proper feed and accurate folding. The construction requires careful attention to secure the best results, and there is danger of offsetting, as it is found in practice that several series of tapes engaging different parts of the sheets are required for

efficient action, and various feeding means have been used to avoid these objections to tape-folders, such as feeding-rollers and traveling grippers.

One of the especial objects of the present invention is to provide an improved longitudinal folder by which the sheet may be fed positively and with certainty and the requisite tension at all points of the sheet secured and maintained at high rates of speed throughout its movement over the folder, while the sheets need not be accurately timed in their delivery to the folder, as is necessary when traveling grippers are used. I attain this object by the use of traveling feeding-fingers, which feed the sheet by pressure against stationary abutments, such as metal plates, which are preferably spring-mounted, and I preferably employ endless chains to carry the feeding-fingers, which chains are preferably driven by sprocket-wheels, as usual in sprocket-chain constructions, so as to secure a positive movement without possibility of slip.

For a full understanding of the invention a detailed description of a construction embodying all the features of the same in their preferred form will now be given in connection with the accompanying drawings, in which—

Figure 1 is a sectional side elevation of a longitudinal folder of the preferred form embodying the invention. Fig. 2 is a front view with the point of the top plate broken away. Fig. 3 is a plan view with the top plate broken away on one side. Fig. 4 is a detail view of a portion of a chain and coacting spring-plate or abutment.

Referring to said drawings, it will be understood that the frame A may be of any suitable form, as common in web-printing and other machines employing longitudinal folders of this class.

B C are the internal guides over which the sides of the sheet are bent to form the fold, these internal guides B C being shown as consisting of bars converging between a pair of external guides or rollers D and having a nose or point bent downward and continuing the guides to and between a pair of fold-laying rolls E. The internal guides B C are sup-

ported at their upper ends by a bar G, extending across the top of the folder, and at their lower ends by a cross-bar H, pivotally mounted so as to be vertically adjustable on a bar I, extending rearward under the folder and mounted in a bracket on frame A, so as to be adjustable longitudinally, thus securing the proper positioning of the guides B C. The folder may be left open at the top and only the internal side guides B C be used; but a top plate L, extending between the internal guides, will preferably be added to aid in supporting the middle of the sheet, and this plate is extended rearward of the ends of the guides B C to a feed-roller M, which coacts with pulleys N and tapes thereon in feeding the sheets to the folder. This roller M is preferably formed of a series of disks or grooved, as in the construction shown, and a series of fingers Q are used to guide the sheet from the roll M onto the plate L, these fingers entering grooves in the roll M and slots in the upper rear edge of the plate L. In the construction shown side tapes *a* are used at the opposite side edges of the folder, these tapes passing from pulleys N over the plate L to the internal guides B C and around the latter, returning around pulleys 10, mounted just below the internal guides B C, and tightening-pulleys 11. Between the tapes *a* are two sets of tapes *b*, running from pulleys N forward above the plate L and returning to the pulley N around pulleys 12, mounted above the folder. These tapes *b* coact with corresponding sets of tapes *b'*, running upon the top plate L through openings provided therein and carried by pulleys 13 14 below the plate and opposite said openings. A central tape *c* runs from one of the pulleys N over the plate L, following the nose or point downward between the rollers D to a point just above the rolls E, and thence returns around the pulley 15 and tightening-pulley 16. This tape coacts with a tape *c'*, running on the top plate L and carried by pulleys 17 18 below the plate.

The construction thus far described is common in longitudinal folders, and it will be understood that the features forming the invention are applicable also to other forms of such folders.

Referring now to the novel features, on each side of the folder and converging from the upper ends of the internal guides B C between the rollers D and to the fold-laying rolls E are endless sprocket-chains O, which are carried by and driven from the shafts of rolls E and run in grooves in rolls D, their upper ends passing around sprocket-wheels 19. These chains are formed of open and closed links, as usual in such chain constructions, and the closed links at suitable intervals carry feeding-fingers *g*, which are preferably formed integral with the links, as shown, and are flat pieces of metal forming blunt fingers which operate to feed the sheet by pressure against stationary abutments

formed by plates *h*, which are mounted opposite the chains and converge with the chains between the rolls D to the rolls E. These plates *h* are preferably constructed to form elastic abutments by which feeding contact of all the fingers is assured independently of wear thereon, and in the construction shown these plates are of thin flexible metal, carried by pins 2, which pass through openings in bars 20 and are elastically mounted on flat springs 21, pressing them toward the chains. It will be understood, however, that any other suitable construction may be used for this purpose. The chains are preferably supported between the rolls 19, D, and E, so as to be rigidly held in proper position for feeding the sheets by pressure of the fingers *g* against the plates *h*, plates 22, mounted on studs 23, being shown for this purpose. Guides K also are preferably used, arranged on opposite sides of the sheet and extending from the internal guides B C to the rolls E, these guides acting to control the leading edge of the sheet and secure its proper advance by the feeding-fingers.

Any suitable driving means may be used. As shown, the rolls D are driven from the rolls E through gears 24 on the shafts of rolls E, intermediates 25, and gears 26 on the shafts of the rolls D, the rolls E driving the chains O, as previously stated.

It will be found that the invention provides a very efficient feeding means, avoiding the necessity for accurately timing the receipt of sheets, and a very simple, efficient, and durable longitudinal folder capable of folding sheets with certainty at a very high rate of speed, the proper tension upon the sheet or sheets at every point being readily secured and all danger of offsetting being avoided, as the feeding-fingers and plates *h* need engage only the unprinted margin of the sheet. While the construction has been described as applied to folding sheets, it will be understood that it is applicable also to associating two or more sheets or webs led over the opposite sides of the folder, the improved construction being admirably adapted for this use. It will be understood also that a slitter and other devices in use with present longitudinal folders are equally applicable to folders embodying the invention.

By the term "stationary" applied in the claims to the abutment or plate I mean that the abutment or plate does not travel with the fingers, as in the case of moving grippers; but the abutment or plate may have movement transversely to the fingers.

What is claimed is—

1. In a paper-feeding mechanism, the combination with a series of traveling feeding-fingers arranged at a distance apart less than the length of the sheet to be fed, of a stationary elastic abutment coacting with the fingers in feeding the sheet, substantially as described.

2. In a paper-feeding mechanism, the com-

5 combination with a series of traveling feeding-fingers, of a stationary elastic abutment co-acting with the fingers in feeding the sheet and consisting of a spring-mounted plate, substantially as described.

10 3. In a paper-feeding mechanism, the combination with a series of traveling feeding-fingers, of a stationary elastic abutment co-acting with the fingers in feeding the sheet and consisting of a spring-mounted flexible plate, substantially as described.

15 4. In a paper-feeding mechanism, the combination with sprocket-wheels and endless chains carrying a series of feeding-fingers, of a spring-mounted plate arranged to support the pressure of the fingers in feeding a sheet, substantially as described.

20 5. In a paper-feeding mechanism, the combination with sprocket-wheels and endless chains thereon carrying a series of feeding-fingers, of an elastic abutment, and supports for the chains holding the fingers against the abutment, substantially as described.

25 6. In a paper-feeding mechanism, the combination with sprocket-wheels and endless chains thereon carrying a series of feeding-fingers, of a stationary elastic abutment, and supports for the chains holding the fingers against the abutment, substantially as described.

30 7. In a paper-feeding mechanism, the combination with sprocket-wheels and endless chains thereon carrying a series of feeding-fingers, of a stationary abutment consisting of a spring-mounted flexible plate, and supports for the chains holding the fingers against the abutment, substantially as described.

35 8. In a paper-feeding mechanism, the combination with sprocket-wheels and endless chains thereon carrying a series of feeding-fingers, of a stationary abutment consisting of a spring-mounted flexible plate, substantially as described.

40 9. In a longitudinal folder, the combination with converging internal guides, of endless carriers on opposite sides of the folder converging from the internal guides and having series of feeding-fingers, and stationary elastic converging abutments for said fingers, substantially as described.

45 10. In a longitudinal folder, the combination with converging internal guides, of endless carriers on opposite sides of the folder converging from the internal guides and having feeding-fingers, and stationary converging abutments for said fingers consisting of spring-mounted plates, substantially as described.

50 11. In a longitudinal folder, the combination with converging internal guides, of endless carriers on opposite sides of the folder converging from the internal guides and having feeding-fingers, and abutments for said

fingers consisting of spring-mounted flexible plates, substantially as described.

65 12. In a longitudinal folder, the combination with converging internal guides, of endless carriers on opposite sides of the folder converging from the internal guides, and having feeding-fingers, stationary converging abutments for said fingers, and supports for said carriers holding the fingers against the abutments, substantially as described.

70 13. In a longitudinal folder, the combination with converging internal guides, of endless carriers on opposite sides of the folder converging from the internal guides and having feeding-fingers, abutments for said fingers consisting of spring-mounted flexible plates, and supports for said carriers holding the fingers against the abutments, substantially as described.

75 14. The combination with a series of traveling feeding-fingers arranged at a distance apart less than the length of the sheet to be fed, of a stationary elastic abutment coacting with the fingers in feeding the sheet, and means for feeding single sheets to the feeding-fingers, substantially as described.

80 15. The combination with sprocket-wheels and endless chains thereon carrying a series of feeding-fingers arranged at a distance apart less than the length of the sheet to be fed, of a stationary elastic abutment coacting with the fingers in feeding the sheet, and means for feeding single sheets to the feeding-fingers, substantially as described.

85 16. The combination with the converging internal guides of a longitudinal folder, of endless carriers on opposite sides of the folder converging from the internal guides and having feeding-fingers arranged at a distance apart less than the length of the sheet to be fed, stationary converging elastic abutments coacting with said fingers in feeding the sheet, and means for feeding single sheets to said fingers, substantially as described.

90 17. The combination with the internal guides B C, and fold-laying rolls E, of converging chains O having feeding-fingers *g*, and spring-mounted converging plates *h*, substantially as described.

95 18. The combination with internal guides B C, external guides or rolls D, and fold-laying rolls E, of chains O converging from the guides B C to the rolls E and having feeding-fingers *g*, and spring-mounted converging plates *h*, substantially as described.

100 In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

EDWARD P. SHELDON.

Witnesses:

F. W. H. CRANE,
E. L. SPEIR.