

(No Model.)

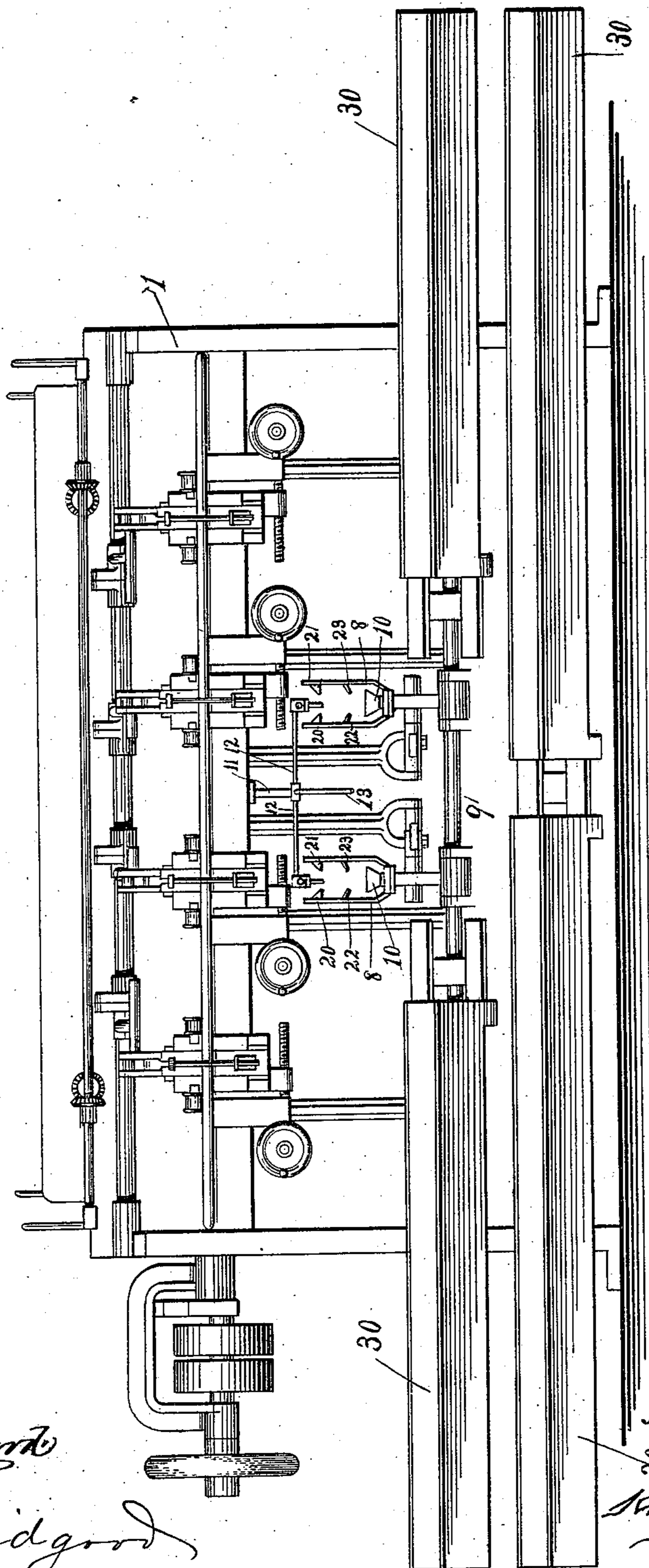
3 Sheets—Sheet 1.

T. C. DEXTER.
FOLDING MACHINE.

No. 564,556.

Patented July 21, 1896.

Fig. 1.



WITNESSES:

W. H. Hayward
M. V. Bidgood

INVENTOR

Talbot C. Dexter

By
Sturges & Wm. H. H. H. H.
ATTORNEYS

(No Model.)

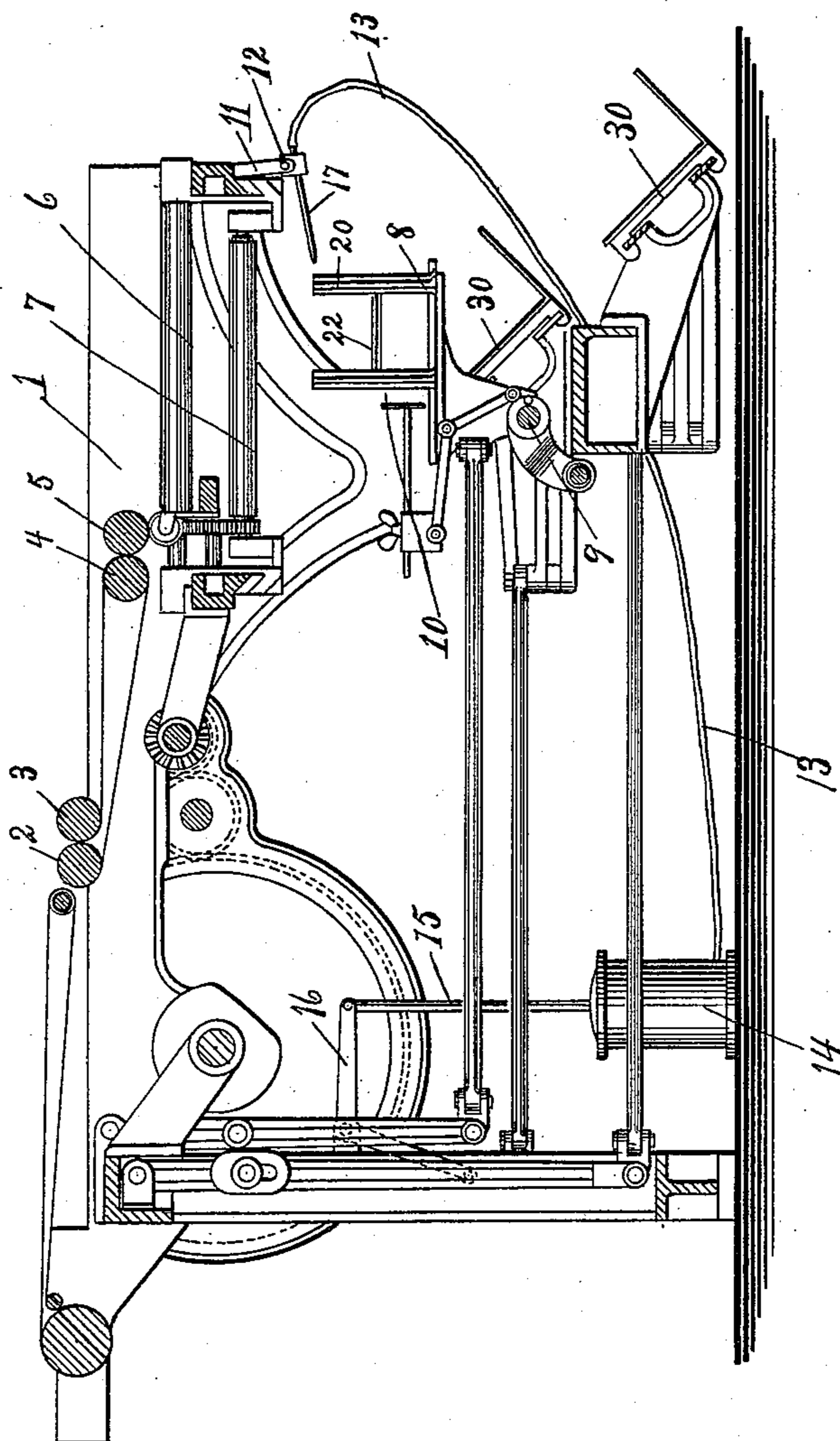
3 Sheets—Sheet 2.

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Fig. 2.



WITNESSES:

D. H. Haywood

M. V. Tidgood

INVENTOR

Talbot C. Dexter

BY

Smith & Wadsworth

ATTORNEYS

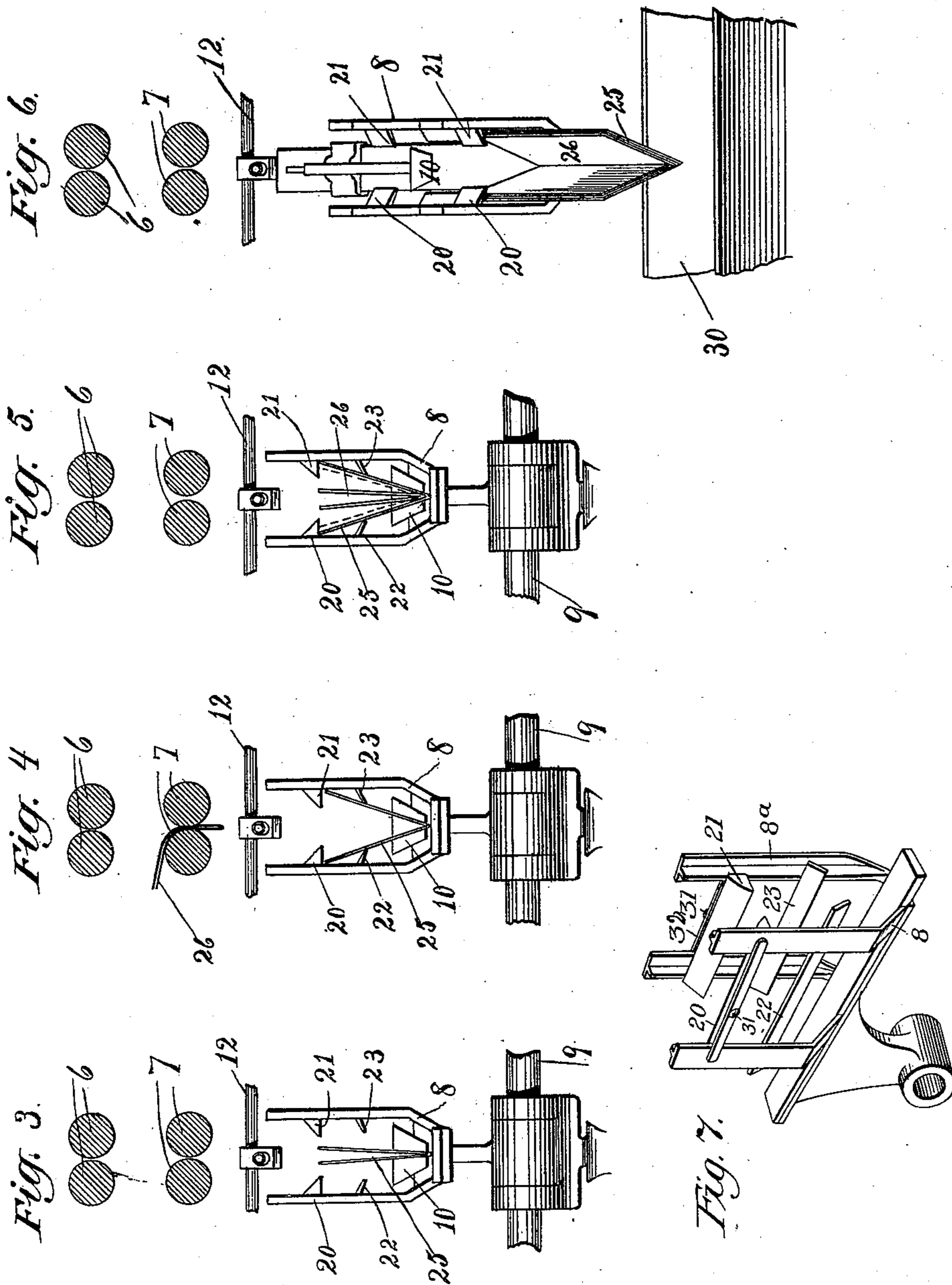
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3 Sheets—Sheet 3.

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D. H. Hayward
W. V. Bidgood

INVENTOR

Talbot C. Dexter

BY

Strickland & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

TALBOT C. DEXTER, OF PEARL RIVER, NEW YORK, ASSIGNOR TO THE
DEXTER FOLDER COMPANY, OF SAME PLACE.

FOLDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 564,556, dated July 21, 1896.

Application filed December 31, 1895. Serial No. 573,880. (No model.)

To all whom it may concern:

Be it known that I, TALBOT C. DEXTER, a citizen of the United States, residing at Pearl River, in the county of Rockland and State of New York, have invented certain new and useful Improvements in Folding-Machines, of which the following is a specification.

In my application, Serial No. 559,104, filed August 12, 1895, I have described and claimed a mechanism for inserting one completely-folded sheet or signature within another for producing signatures of thirty-two pages, said mechanism comprising, preferably, suitable folding devices and a pivoted hopper into which the successive folded sheets or signatures are dropped from the folding devices, one within another, and from which the inserted pairs of signatures are ejected by the movement of the hopper upon its pivot.

In inserting signatures or folded sheets of very thin paper it has sometimes proven difficult to arrange the device so that the first signature dropped into the pivoted hopper will open quickly and sufficiently wide to receive the next succeeding signature which immediately follows to be inserted therein. Some trouble has also been experienced by reason of the folded signatures turning over more or less in being thrown from the hopper into the packing-box by the movement of the hopper on its pivot, and thereby becoming irregularly arranged in the packing-box.

The object of my present invention is to obviate these two defects, and thereby render the method of inserting one completely-folded signature within another more perfect in operation, this method of inserting being proven far superior in speed and accuracy to the old method of folding two sheets or signatures simultaneously one within the other.

To obviate the first difficulty above mentioned and cause the first folded signature that drops into the hopper to immediately open to receive the succeeding insert signature, I provide means for directing a stream or jet of air to a point directly below the line of fold of the final-fold rollers so as to strike between the two folded parts or halves of the first folded sheet or signature, and separate the leaves or halves to receive the succeeding

folded signature which is dropped into the first from the folding-rollers. The air jet or stream is preferably intermittent and timed to strike the first of the pair of folded signatures just as it leaves the last folding-rollers. The air-jets may be supplied from any suitable air compressing or blowing mechanism geared to any suitable part of the machine or operated by independent mechanism.

To overcome the second difficulty mentioned, I provide the pivoted receiving-hoppers with inwardly-projecting ribs or strips which are adapted to engage the upper edges of the folded signatures after they have been dropped into the hoppers and cause them to slide longitudinally out of the hoppers as the latter are moved on their pivots, and thereby prevent the folded signatures from turning over while being delivered to the packing-box. I also prefer to provide the hoppers with a second pair of longitudinal ribs or strips below the first pair just referred to, for the purpose of holding the folded signature centrally in the hopper while it is being acted upon by the air-blast. The upper ribs or strips also assist the action of the air-blast in opening the signatures for inserting by guiding the signatures centrally into the hopper and preventing them from falling to either side of the hopper.

In order that my invention may be fully understood, I will first describe the same with reference to the accompanying drawings, and afterward point out the novelty with more particularity in the annexed claims.

In said drawings, Figure 1 is a rear end elevation of a folding-machine, showing the packing-boxes and the improved mechanism for receiving and inserting the folded signatures and delivering them to the packing-boxes. Fig. 2 is a longitudinal sectional elevation of the machine. Figs. 3, 4, 5, and 6 are detail views representing the operation of my improved mechanism for receiving and inserting folded signatures and delivering them to the packing-boxes. Fig. 7 is a detail perspective view of the hopper, showing means for adjusting the ribs.

The machine to which my improvements are applied may be any approved form of folding-

machine; but I prefer and have shown the form of machine covered by my application, Serial No. 559,104, above referred to.

I will not undertake to describe all of the essential parts of a folding-machine, but will refer to only so much of the mechanism as will be necessary for a proper understanding of my present improvements by those skilled in the art to which they apply.

In the form of machine shown in my said application the sheet to be folded is passed into the machine by suitable feeding devices and carried by suitable tapes to the correct position above the first pair of folding-rollers, where it is given its first fold in the center, and passed by other tapes into position over the second pair of rollers, at which point it is laterally adjusted by an improved electrically-operating registering device and given its second fold parallel to the first. As the paper passes from the second-folding rollers it is severed into four folded strips and conveyed into position above four pairs of third-folding rollers, which impart the final folding at right angles to the first and second folds, and delivers the four-folded signatures of sixteen pages each to four pairs of calendering-rollers, from which the signatures drop into the packing devices.

If it is desired to produce two signatures of thirty-two pages instead of four of sixteen pages, the signatures from two pairs of the third-fold rollers are conveyed to the calendering-rollers below the other two pairs of third-fold rollers and follow and drop into the preceding signatures folded by said latter pairs of third-fold rollers and form signatures of thirty-two pages.

1 is the machine-frame.

2 and 3 are the first-fold rollers.

4 and 5 are the second-fold rollers, and 6 6 are the third-fold rollers.

7 represents the calendering-rollers journaled directly beneath the third-fold rollers and adapted to give the folded signatures a final impression as they are passed from the third-fold rollers.

As above explained, difficulty is sometimes experienced in inserting by reason of the failure of the first folded sheet or signature to open quickly and sufficiently wide as it is dropped from the calendering-roller 7 into the pivoted hopper to receive the second or insert signature. I obviate this objection by the mechanism now to be described.

8 is the pivoted hopper journaled upon the rod 9 and oscillated upon said rod by suitable mechanism, not here described, but fully explained in my above-named application. The pivoted hopper is preferably provided with a sliding kicker or ejector 10, described in my above-named case, but this is not an essential part of the improvements which I intend to cover by the present application.

11 is a bracket secured to the machine-frame, and 12 is an air-pipe supported in said bracket and communicating through a flexi-

ble or other air-pipe 13 with an air-compressor or blower or fan or other equivalent device 14, which is designed to supply said pipe 12 intermittently with jets or streams of compressed air.

In the drawings, Fig. 2, I have shown the air-compressor in the form of a simple cylindrical air-pump, from which the tube 13 leads, and provided with a reciprocating piston-rod 15, provided with a piston (not shown) within the pump-cylinder. The piston-rod 15 is pivoted to the end of the lever 16, which is adapted to be intermittently rocked by suitable operative connection with any part of the machine. Projecting inwardly from the ends of the tube 12 are inclined jet-pipes 17, which are supported so as to direct the jets or streams of air to a point in a line directly below the bight of the calendering-rollers 7, in order that a folded signature dropping from the calendering-rollers will receive the jet of air directly between its folded halves or leaves and cause it to open just as it drops into the hopper.

To guide the folded signatures centrally into the hopper and prevent the signatures from turning over while they are being ejected from the hopper, I provide longitudinal ribs or slats 20 21, projecting inwardly from the sides of the hopper. These ribs 20 and 21 are arranged in pairs a sufficient distance from the bottom of the hopper to allow room for the folded signature to open under the action of the air-jets. Below the ribs 20 and 21 I provide a second pair of ribs 22 and 23, which serve to support the folded signature centrally within the hopper while it is being opened by the action of the air-jet to receive the second folded signature. The upper ribs 20 and 21 are preferably formed adjustable in any suitable manner, and for this purpose may be adjustably secured to the side walls or arms of the hopper in any of the well-known and convenient ways.

In Fig. 7 I show a simple device which can be employed for adjustably mounting the ribs 20 and 21 in the hopper. 8^a are the arms or upright side pieces forming the skeleton side walls of the hopper 8. 20 and 21 are the ribs, and 32 is a flat piece of spring-steel. The ribs and steel piece engage opposite faces of arms 8^a, and are held in place by a screw 31, which passes loosely through piece 32 and is tapped into the rib 20 or 21. By loosening screws 31 the ribs can be adjusted up or down. 30 are the packing boxes or troughs into which the signatures are delivered by the pivoted hoppers.

The operation of my improvement is clearly demonstrated in Figs. 3, 4, 5, and 6. In Fig. 3 the first folded signature 25 is represented as having just dropped into the hopper from the calendering-rollers 7, the upper ribs 20 and 21 having guided the signature centrally into the hopper. In Fig. 4 the action of the air-blast has opened up the first signature 25, the ribs 22 and 23 supporting said

signature in central position in the hopper, while the upper edges of the signature project beneath the upper ribs 20 and 21. In this figure the second signature 26, which is 5 to be inserted within the first, is represented as passing through the calendering-rollers in readiness to drop into the first opened signature. The signature 26 is carried from the pair of folding-rollers to one side of and adjacent to the folding-rollers above the calendering-rollers, which are shown supporting it in a manner fully explained in my above-named application. In Fig. 5 the second signature 26 has been dropped or inserted by 10 the calendering-rollers 7 into the open signature 25, supported in the hopper, the ribs 20 and 21 having guided it into position and the ribs 22 and 23 supporting them centrally within the hopper. In Fig. 6 the hopper is 20 represented in dumped position, (the air-blast having opened the inner signature 26 to cause its upper edges to project under the ribs 20 21,) the ribs 20 and 21 in this position engaging the upper edges of both folded signatures and holding them in longitudinal position while they are sliding from the hopper 25 into the packing-box.

I have shown my improvements applied to a machine adapted to produce two thirty-two- 30 page signatures simultaneously, two air-jets being supplied from a single compressor to operate upon the folded signatures dropped into the two hoppers; but it will be clear that my improvements apply equally as well to a machine which produces only one signature at a 35 time of whatever number of pages. The compressor or blower is preferably timed to supply a jet of air to the signatures just as they drop into the hopper. The means for preventing the signature from turning over while 40 being thrown from the hopper is not limited in application to machines which insert, but will be found valuable in all machines employing a pivoted hopper.

45 Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a folding-machine, the combination of suitable mechanism for completely folding 50 two signatures, a hopper adapted to receive said signatures from the folding mechanism, and means for opening a signature within the hopper to receive a succeeding signature that is to be inserted in the first signature, as set 55 forth.

2. In a folding-machine, the combination of suitable mechanism for completely folding two signatures, a hopper adapted to receive said signatures successively one within the 60 other, and means for directing a jet or current of air against the first signature to open it in readiness to receive the second signature, substantially as set forth.

3. In a folding-machine, the combination of 65 suitable mechanism for completely folding two signatures, a hopper adapted to receive

the folded signatures successively one within the other, an air-pipe supported in position to direct a current or jet of air against the first signature to open it for the reception of 70 the second signature, and means for supplying air to said air-pipe, substantially as set forth.

4. In a folding-machine, the combination of suitable mechanism for completely folding 75 two signatures, a hopper adapted to receive two signatures successively, an air-pipe provided with a jet-pipe directed toward the line of entry of the signatures to the hopper, and a suitable air compressor or blower communicating with the air-pipe and operated by the 80 folding-machine, substantially as set forth.

5. In a folding-machine, the combination of means for folding a signature, a pivoted hopper adapted to receive the folded signature, 85 means for ejecting the signature from the hopper, and suitable devices attached to the hopper and adapted to engage the signature and prevent the turning over of the signature while it is being ejected from the hopper, sub- 90 stantially as set forth.

6. In a folding-machine, the combination of means for folding a signature, a pivoted hopper adapted to receive the folded signature and eject it therefrom by its movement, and 95 ribs in the hopper adapted to engage the signature and prevent its turning over as it is ejected, as set forth.

7. In a folding-machine, the combination of means for folding a signature, a pivoted open- 100 ended hopper adapted to receive the folded signatures, and longitudinally-extending ribs in the hopper adapted to engage the edges of the signature and hold it longitudinally as it slides from the hopper, as set forth. 105

8. In a folding-machine the combination of means for folding a signature, a hopper adapted to receive the folded signature, means for ejecting the signature from the hopper, and ribs in the hopper adapted to guide the sig- 110 nature centrally into the hopper and engage the edges of the signature for holding it longitudinally in the hopper as it slides therefrom, substantially as set forth.

9. In a folding-machine, the combination of 115 mechanism for folding a signature, a pivoted hopper adapted to receive a folded signature, and two pairs of ribs formed in the hopper, substantially as set forth.

10. In a folding-machine, the combination 120 of mechanism for folding a signature, a hopper adapted to receive the folded signature, ribs in the hopper for engaging the edges of a signature, and a device for directing an air jet or current against a signature for opening 125 its leaves or halves into engagement with the ribs, substantially as set forth.

TALBOT C. DEXTER.

Witnesses:

WM. E. KNIGHT,
M. V. BIDGOOD.