

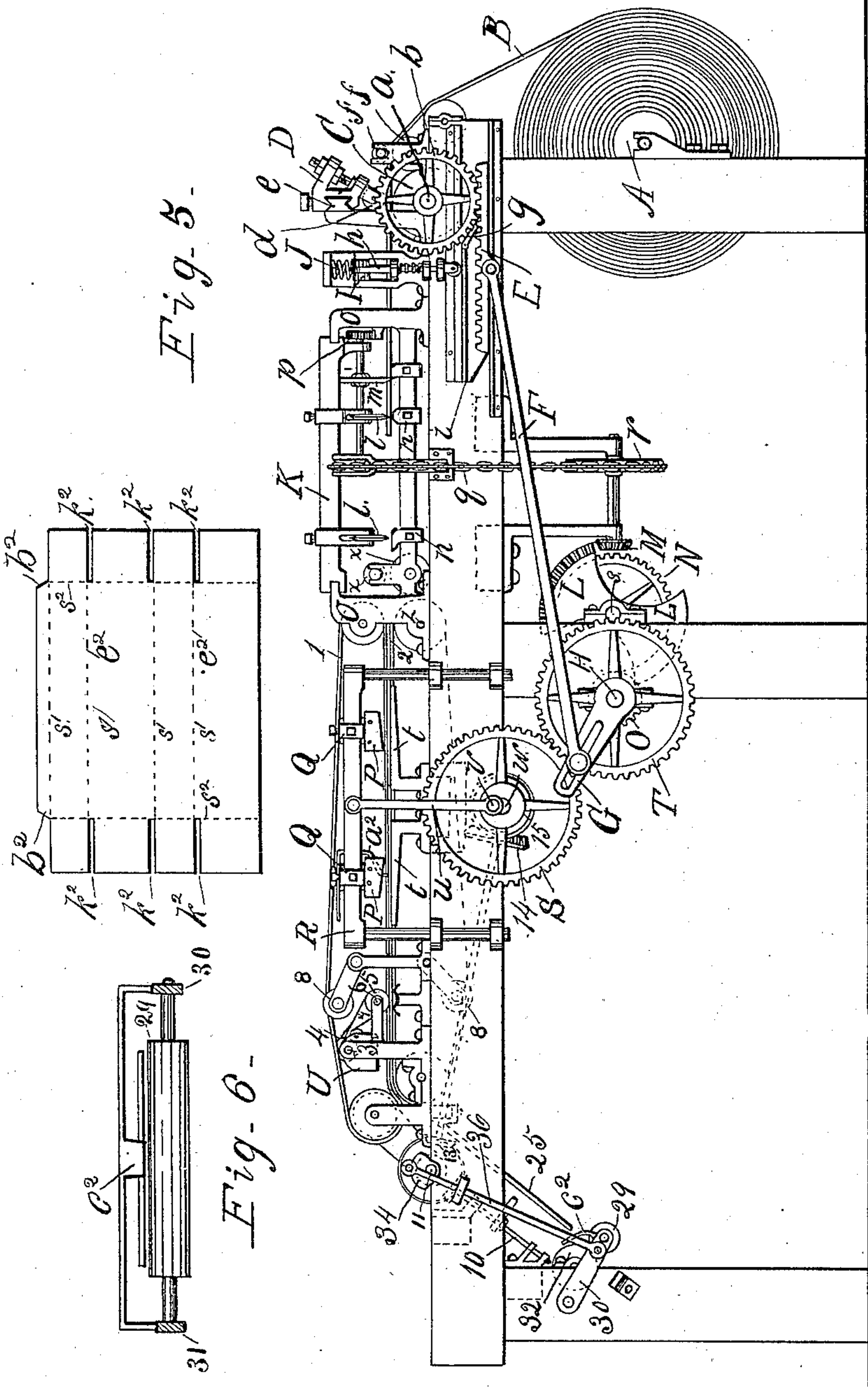
(No Model.)

3 Sheets—Sheet 1.

I. T. BROWN.
PAPER BOX MACHINE.

No. 307,430.

Patented Nov. 4, 1884.



WITNESSES:
H. P. Hood.
E. E. Sickler.

INVENTOR:

I. T. Brown.

(No Model.)

3 Sheets—Sheet 2.

I. T. BROWN.
PAPER BOX MACHINE.

No. 307,430.

Patented Nov. 4, 1884.

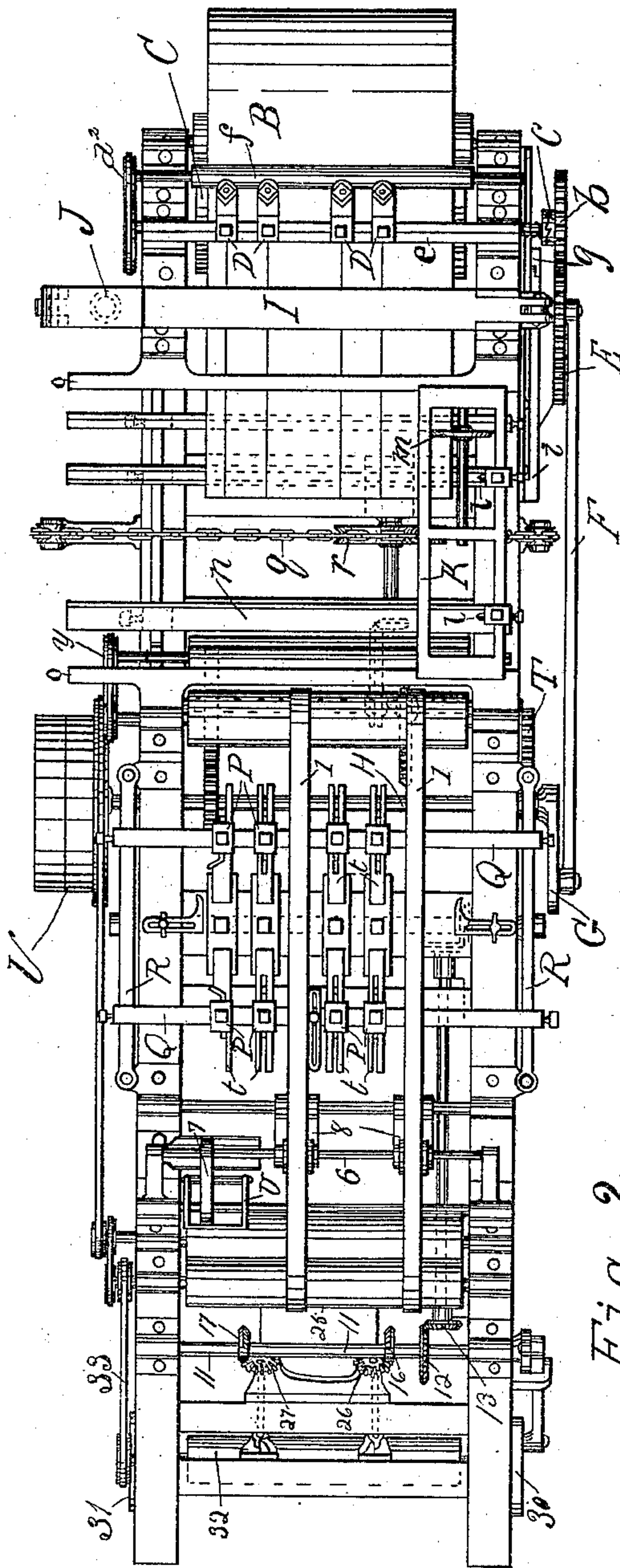


Fig. 2 -

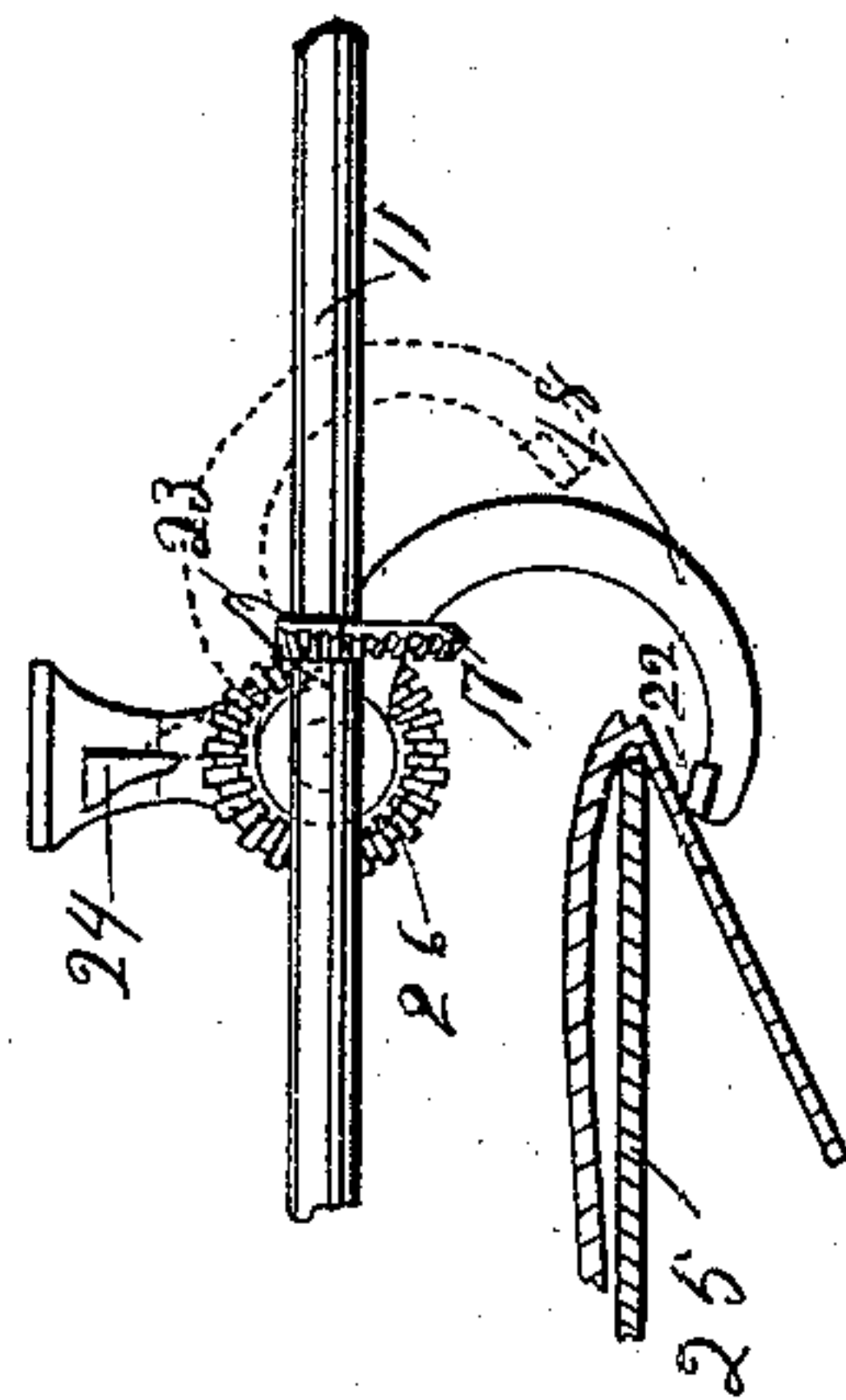


Fig. 3 -

WITNESSES:

H. P. Hood.
E. E. Sickler.

INVENTOR:

Isaac T. Brown.

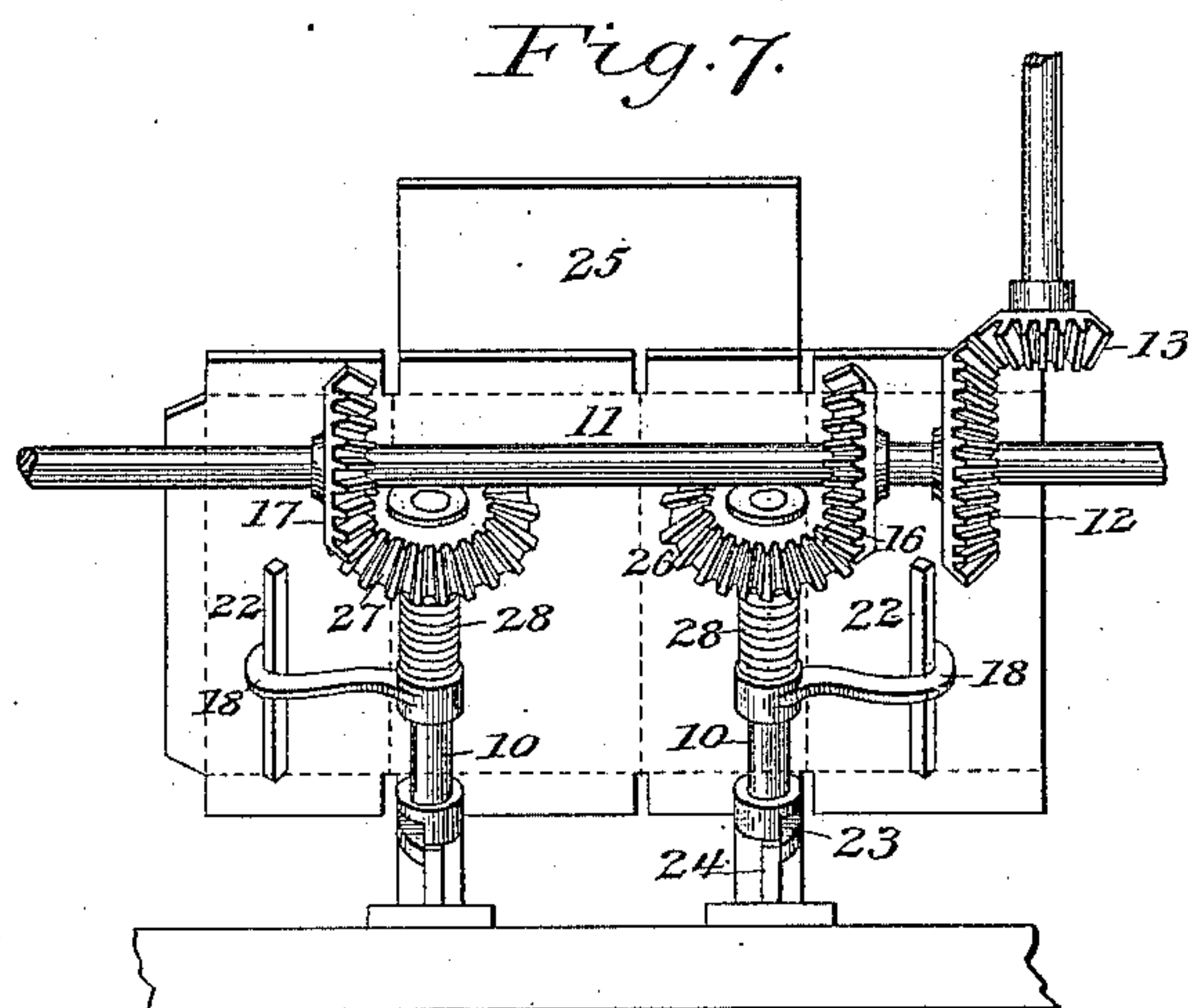
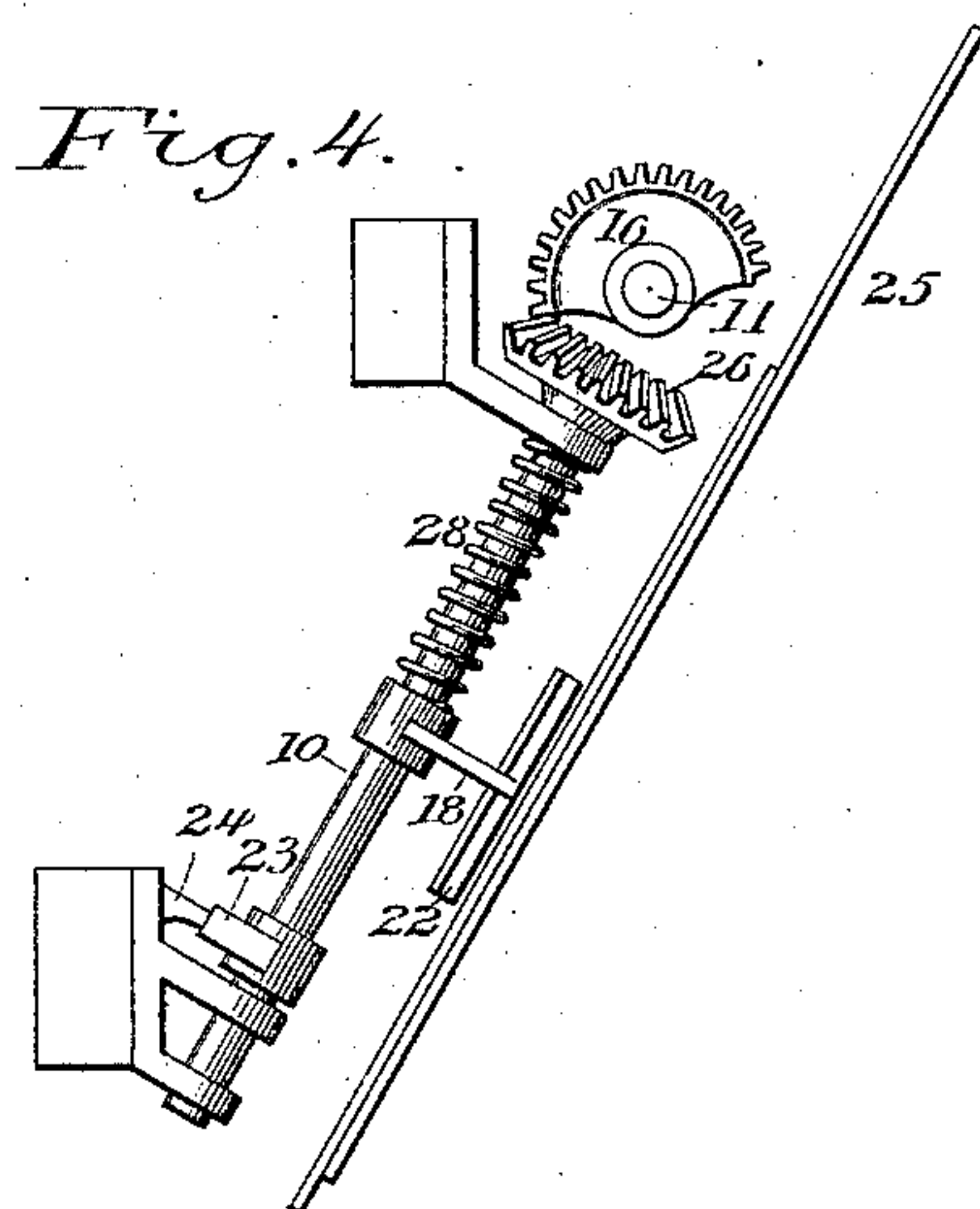
(No Model.)

3 Sheets—Sheet 3.

I. T. BROWN.
PAPER BOX MACHINE.

No. 307,430.

Patented Nov. 4, 1884.



Witnesses:

M. Carsten.
W. H. Neff.

Inventor.

Isaac J. Brown
By H. P. Hood.
Atty

UNITED STATES PATENT OFFICE.

ISAAC T. BROWN, OF COLUMBUS, INDIANA.

PAPER-BOX MACHINE.

SPECIFICATION forming part of Letters Patent No. 307,430, dated November 4, 1884.

Application filed July 9, 1883. (No model.)

To all whom it may concern:

Be it known that I, ISAAC T. BROWN, a citizen of the United States, residing at Columbus, in the county of Bartholomew and State of Indiana, have invented a new and useful Improved Machine for Making Paper Boxes, of which the following is a specification.

The purpose of my invention is to combine in one machine improved devices for severing a continuous sheet of pasteboard into smaller pieces adapted to form a paper box, score the said pieces in two directions at right angles to each other, cut the necessary kerfs at the corners of the pieces which form the ends of the box, apply paste to the overlapping edges, fold the piece so scored and cut upon itself, and press the overlapping edges together, these successive operations going on continuously as the pasteboard is conducted by suitable mechanism from a continuous roll through the machine, and is discharged in a flat compact form, which is well adapted for packing and storing, and which may be quickly formed into a box by bending at the scored places.

The accompanying drawings illustrate my invention.

Figure 1 is a side elevation of the complete machine. Fig. 2 is a plan of the same, having a portion of the folding mechanism broken away. Fig. 3 is an end elevation of one end of the folding mechanism. Fig. 4 is a side elevation of the same. Fig. 5 is a plan of a box-blank made on my machine. Fig. 6 is an elevation of a friction-roll and a gage. Fig. 7 is a plan of the folding mechanism.

Like letters refer to the same parts in all views.

A is a roller mounted in suitable bearings in the main frame, and carrying a continuous sheet of pasteboard, B.

C is a smooth cylinder, mounted on a shaft, *a*, having bearings in the main frame, on which shaft gear-wheel *b* is mounted, turning loosely thereon in one direction, but when turned in the opposite direction engaging the shaft and turning it by means of a clutch, *c*, Fig. 2.

D is a well-known device for cutting or scoring paper, consisting of one or more sharp-edged wheels, *d*, mounted in an adjustable support on a transverse bar, *e*, and revolved by

contact with the pasteboard as it passes over cylinder C.

f f are feed-rolls, the lower one of which is driven by a belt from a pulley, *b*², on shaft *a*. An intermittent movement is given cylinder C and rolls *f f* by a rack, E, sliding in ways on the main frame, and a connecting-rod, F, attached to a wrist-pin on crank G, secured to the main shaft H.

I is a clamping-bar held down by a spring, J, and raised by a hinged inclined plane, *g*, passing under a rod, *h*, attached to the end of bar I. Said inclined plane and a continuation thereof, *i*, is attached to and moves with rack E.

K is a frame carrying scoring-wheels *l l* and a cutting-wheel, *m*. Said scoring-wheels are adjustable along the side of frame K and revolve by contact with the pasteboard, which is supported under the wheels by bars *n n*, also adjustable along the main frame. Frame K is adapted to slide across the main frame in ways *o o*. Cutting-wheel *m* is revolved by means of a pinion, *p*, engaging a rack on one of the ways *o*. Frame K is moved intermittently across the main frame by a chain, *q*, attached to each side thereof, and passing around a pulley, *r*, which is driven alternately in opposite directions by a pair of segmental bevel-gears, L L, which have teeth on opposite sides, which alternately engage a pinion, M, on the same shaft with pulley *r*. Said segmental gears are secured to a shaft, *s*, on which is also a gear-wheel, N, which intermeshes with a pinion, O, secured on the main shaft. The relative size of pinion O and gear N is such that pinion O makes two revolutions to one of gear N.

P P are thick knives working through corresponding slots in movable bed-plates *t t*, for the purpose of cutting out narrow sections or kerfs at each end of the box-blank. Said knives are adjustably secured along two transverse bars, Q Q, which bars are in turn adjustably secured to two vertically-sliding frames, R R—one on each side of the machine. Said frames are given a vertically-reciprocating movement by means of a connecting-rod, *u*, and crank *v*, there being one of each to each frame. Said cranks are secured to each end of a shaft, *w*, which is driven by a pair of gear-wheels, S T.

$x x$ are a pair of feed-rollers, driven by a belt from a pulley, y , on a shaft, z .

1 and 2 are belts running with their surfaces together for the purpose of conveying the box-blank, as hereinafter described.

U is a dish for holding glue or paste. Said dish is suspended from shaft 3, on which is a pulley, 4. A pulley, 5, on shaft 6 is set opposite pulley 4, and a tape belt, 7, passes from pulley 4 to pulley 5 over an idler set in the edge of dish U. Pulley 4 dips into the paste in dish U, and the paste is applied in a narrow line along the box-blank by belt 7, which is driven by frictional contact with the box-blank as it is carried forward. Paste-dish U and pulleys 4 and 5 are adjustable along their respective shafts.

8 8 are tension-pulleys used to tighten belts 1 and 2.

A folding device (indicated in Fig. 1, and shown enlarged in Figs. 3, 4, and 7,) is for the purpose of folding the cut and scored blank upon itself for convenience in packing. Said folding device consists of a pair of arms, 18 18, secured to a pair of parallel inclined shafts, 10 10, Figs. 4 and 7, mounted above a thin fixed plate, 25. Said arms are actuated by a pair of cogged segments, 16 and 17, secured to shaft 11, which also carries a cog-wheel, 12. Said shaft 11 is driven continuously by a train of gears, 13, 14, and 15, and said cogged segments 16 and 17 intermesh at intervals with cogged pinions 26 and 27, secured to the upper ends of shafts 10 10. The normal position of arms 18 is above the top line of plate 25, in which position they are sustained by springs 28, coiled on their respective shafts, and stops 24, which engage projections 23 on the shafts 10. When segments 16 and 17 engage pinions 26 and 27, arms 18 are simultaneously moved downward and inward, thus folding the blank upon itself and around the fixed plate 25. 29 is a feed-roll journaled in swinging arms 30 31 to the main frame. Said roll is drawn at intervals toward roll 32, which is driven continuously by a belt, 33, by a cam, 34, secured to shaft 11, and engaging a projection from rod 36, which is attached to arm 30.

The operation of my machine is as follows:
The roll of pasteboard B is introduced between feed-rolls $f f$ and under the scorers D and clamp I, and carried forward to cutter m . Power is now applied to driving-pulley V on the main shaft H. With the first half-revolution of said shaft, rack E is carried forward, gear b engaging shaft a through clutch c , clamping-bar J being raised by incline g , passing under the friction-wheel on the lower end of rod h , and the end of the pasteboard is carried forward to feed-rolls x , the scorers D cutting the scores s' , Fig. 5, to form the longitudinal corners of the box. At the same time shaft s has turned one-fourth of a revolution and brought one of the segmental gears L to engage pinion M, and as rack E completes its forward movement the friction-wheel on the

lower end of rod h drops off of ledge i , and clamping-bar I comes firmly down on the pasteboard, holding it from moving. Gear L, engaging pinion M, winds chain q on pulley r , and frame K is drawn from one side of the main frame to the other, the cutter m cutting off a piece from roll B of sufficient length to form the box, and the scorers $l l$ forming the scores s'' , Fig. 5, to form the transverse corners of the box. The completion of the revolution of the main shaft retracts rack E, the roller on rod h passing under ledge i , and passing out under the hinged incline g , and the gear b turning loosely on shaft a . As soon as the piece of pasteboard forming a box-blank is cut off it is seized and carried forward by rolls $x x$ and thrust between belts 1 2, on which it is carried forward. A gage, a'' , is adjustably secured to bar Q, so that as frame R starts on its downward movement said gage is brought into the path of the advancing blank and stops it, while the further downward movement of frame R carries the edges of the knives P through the blank, cutting the kerfs k'' and shoulders b'' , Fig. 5. As the frames R rise, gage a'' is raised out of the path of the box-blank, and it is again carried forward by belts 1 2 under pulley 5 and belt 7, which applies a line of paste along the blank k between the shoulders b'' . When the now complete blank passes out from between belts 1 2, it falls upon the thin sheet-metal inclined table 25, but is prevented from sliding off by a gage, c'' . (Shown clearly in Fig. 6.) Table 25 is just the width of the box-blank between scores $c'' c''$, Fig. 5, and as soon as the blank is stopped by gage c'' the folders 18 engage the unsupported edges of the blank and fold them under the table, as shown in Fig. 3, the blank being brought close up against the under side of the table, the paste-strip between shoulders $b'' b''$ being overlapped by the opposite edge of the blank. As soon as the movement is completed, arms 18 are released and cam 34 draws roll 29 up toward roll 32. As roll 29 begins to rise, gage c'' is raised, and the box-blank, being released, slips downward and is caught between rolls 29 and 32, and in passing through is rolled flat and the pasted edges firmly pressed together.

I claim as my invention—

1. In a machine for making paper boxes, the combination of the following elements, namely: a pair of feed-rolls, a cylinder, a series of scoring-disks arranged to cut against said cylinder, means, substantially as described, for giving an intermittent rotary motion to said feed-rolls and cylinder, a frame adapted to move transversely across the line of movement of said scoring-disks, and carrying a cutting-disk having a positive rotary movement, and scoring-disks rotated by frictional contact with the box material, and means, substantially as described, for moving said frame intermittently, all acting in co-operative relation to each other, substantially in the manner specified.

2. In a paper-box machine, the combination

of the following elements, namely: a vertically-reciprocating frame, a series of thick knives adjustably secured to said frame, a series of adjustable bed-plates having slots 5 corresponding in width to the thickness of said knives, and a gage, all acting in co-operative relation to each other, substantially in the manner specified.

3. In a paper-box machine, the combination of shaft 11, means, substantially as described, for revolving said shaft, mutilated gears 16 and 17, a thin table, 25, and two folding devices, each consisting of a shaft, 10, arm 18, pinion 26, spring 28, arm 23, and stop 24, all 15 substantially as and for the purpose specified.

4. In a paper-box machine, the combination of rolls 32 and 29, gage c^2 , arms 30 31, rod 36, and cam 34, substantially as and for the purpose specified.

5. In a paper-box machine, the combination, with two sets of scoring-knives adapted to form two sets of cuts or scores in lines at right angles upon a sheet of pasteboard, a pair of feed-rolls, and means, substantially as described, for turning said rolls, and thereby 25 moving said sheet of pasteboard intermittently, of a clamp located between said two sets of knives and adapted to hold said sheet of pasteboard, and means, substantially as described, for opening and closing said clamp at 30 regular intervals, substantially as shown and described.

ISAAC T. BROWN.

Witnesses:

J. A. SIBLEY,

EVERETT STILLINGER.