

No. 672,761.

Patented Apr. 23, 1901.

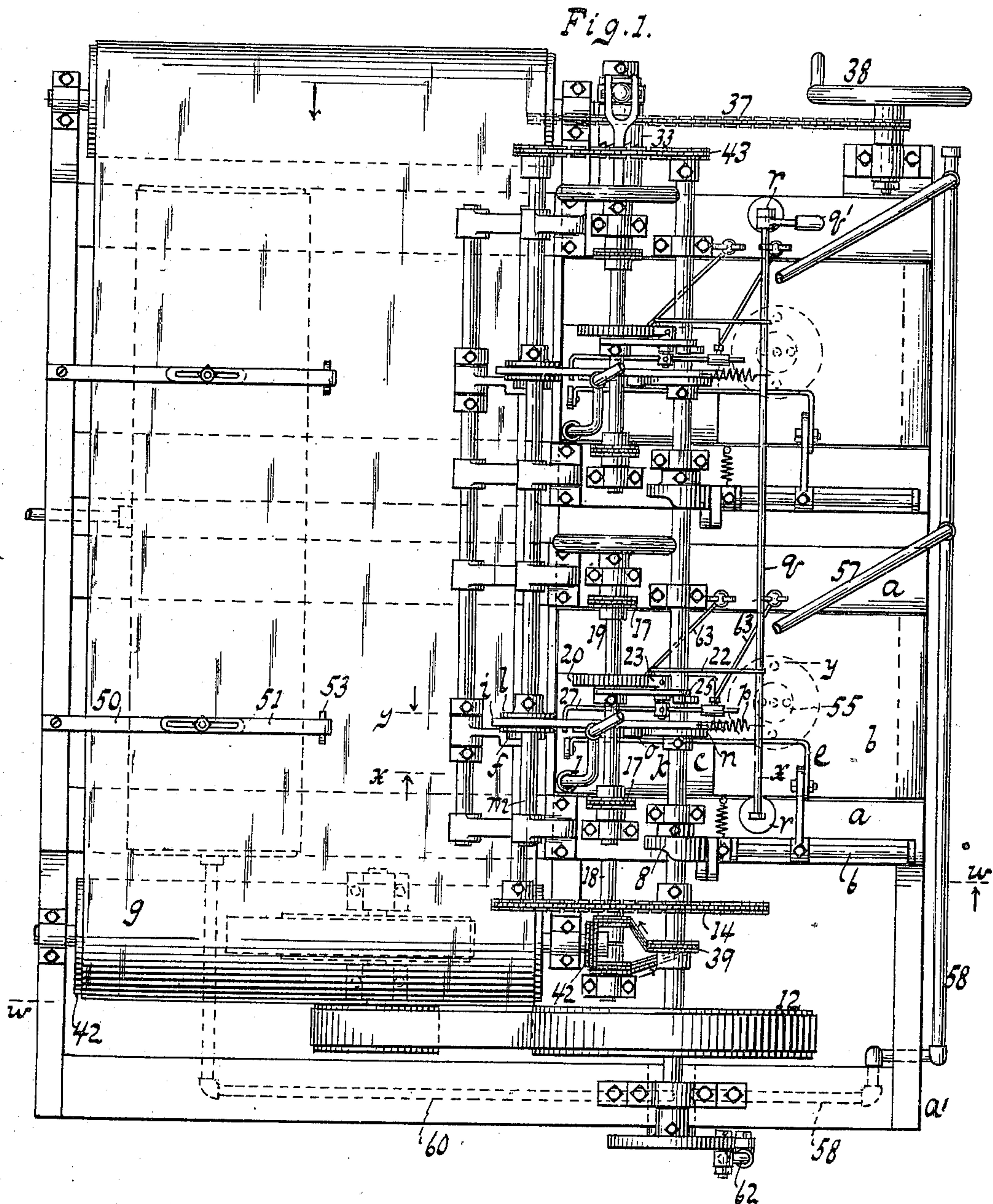
E. F. GOODMAN.

MACHINE FOR FEEDING OR GATHERING SHEETS, SIGNATURES, &c.

(No Model.)

(Application filed Sept. 20, 1900.)

3 Sheets—Sheet 1.



WITNESSES:

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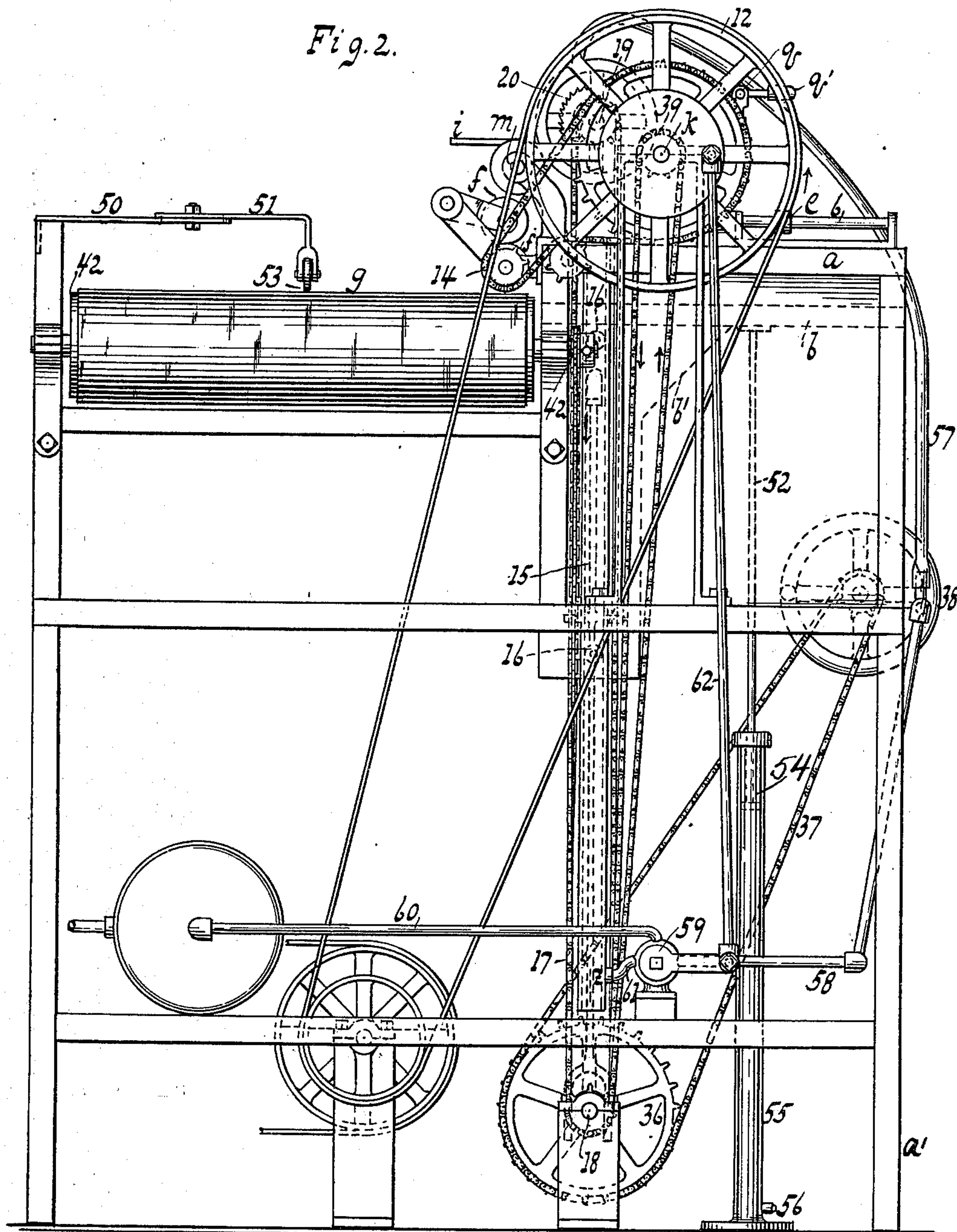
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3 Sheets—Sheet 2.

Fig. 2.



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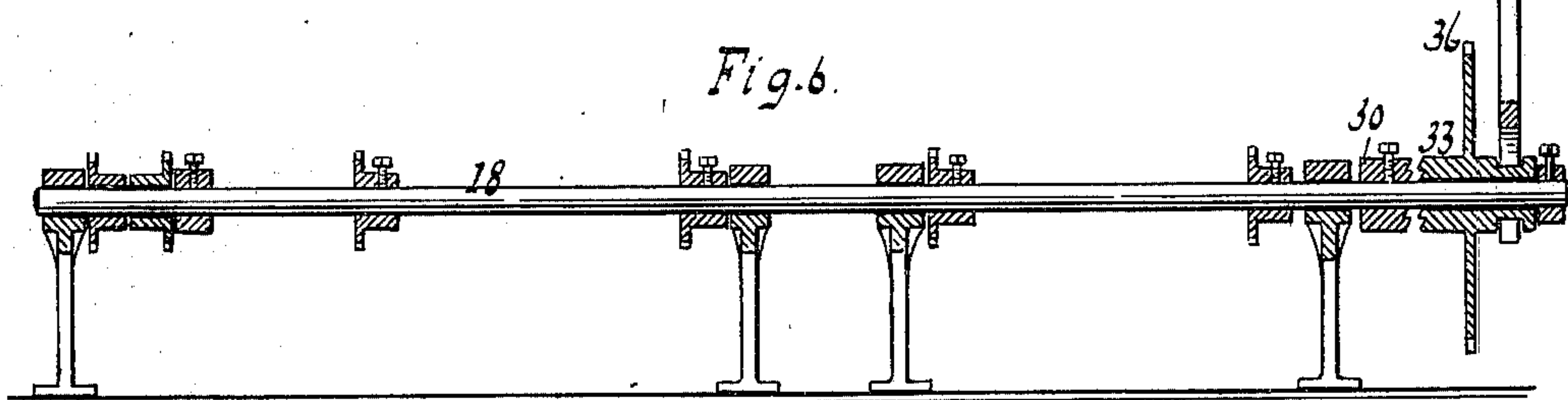
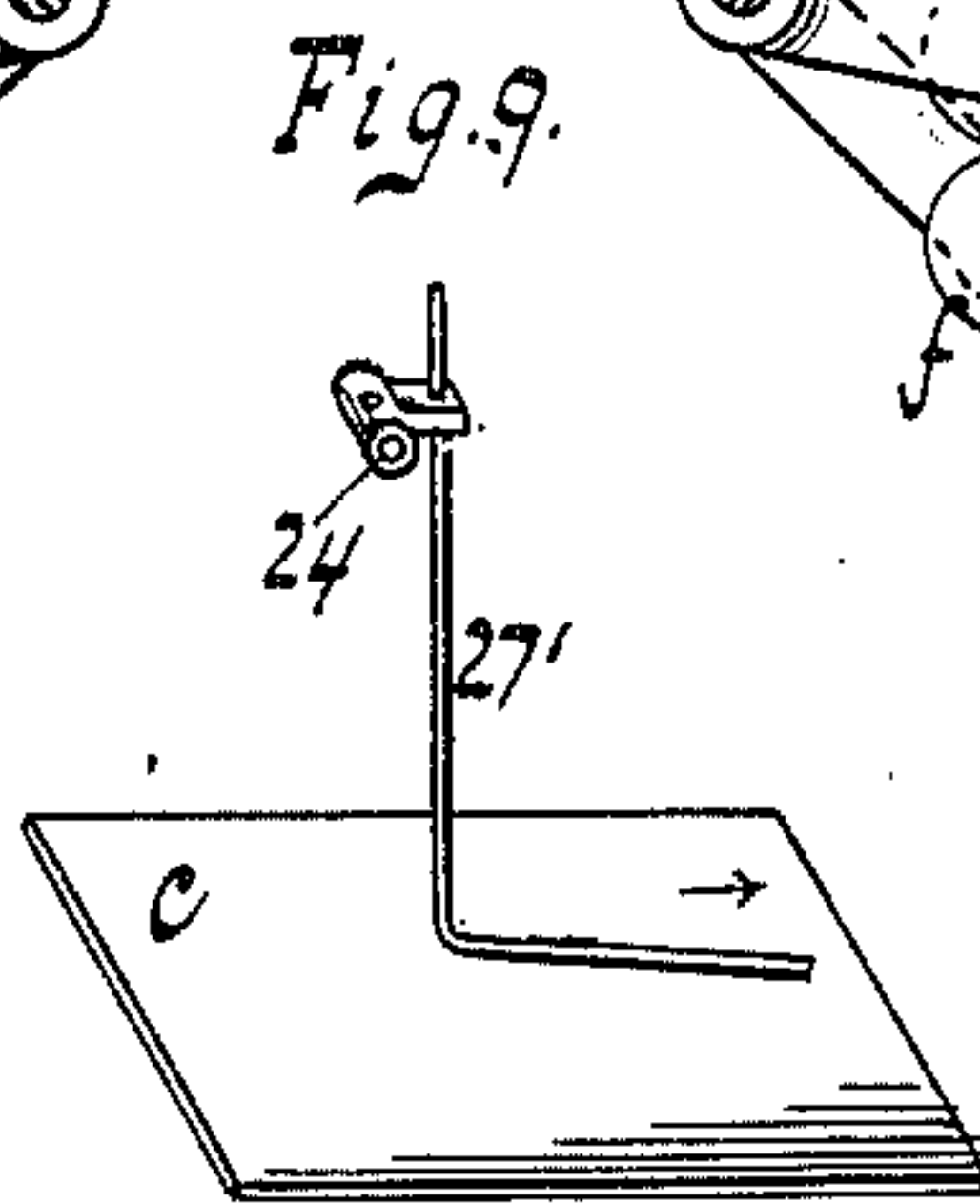
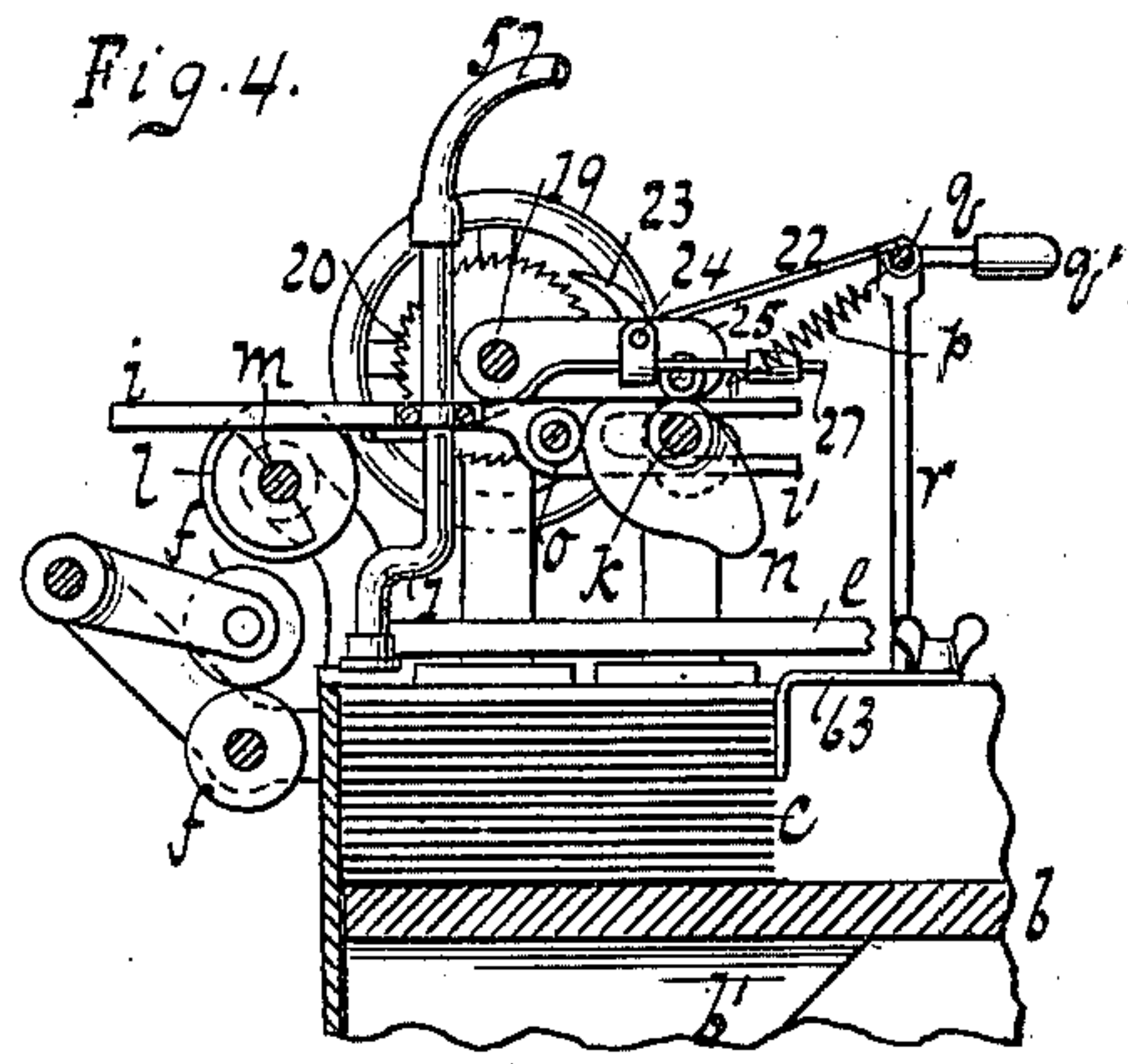
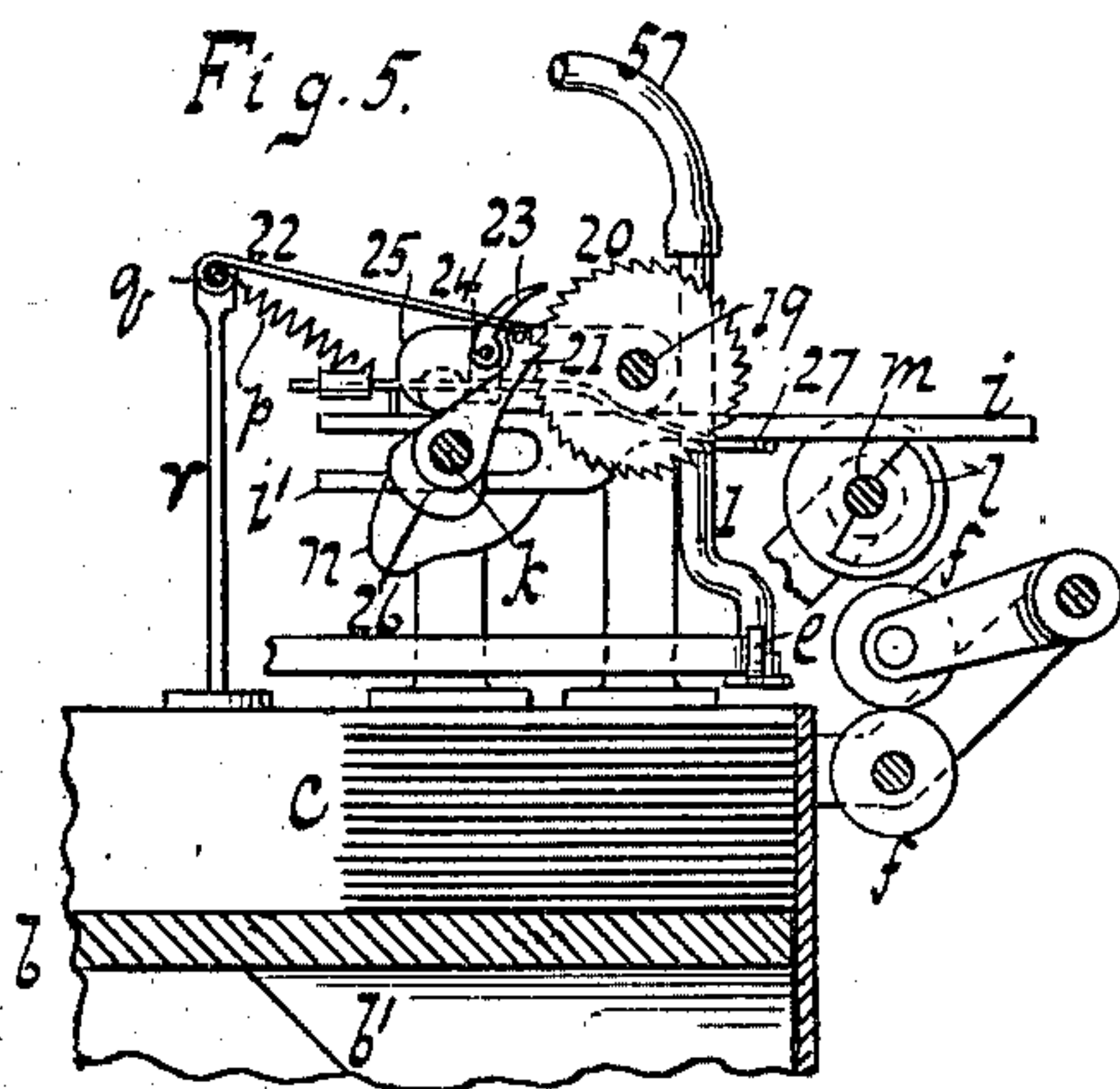
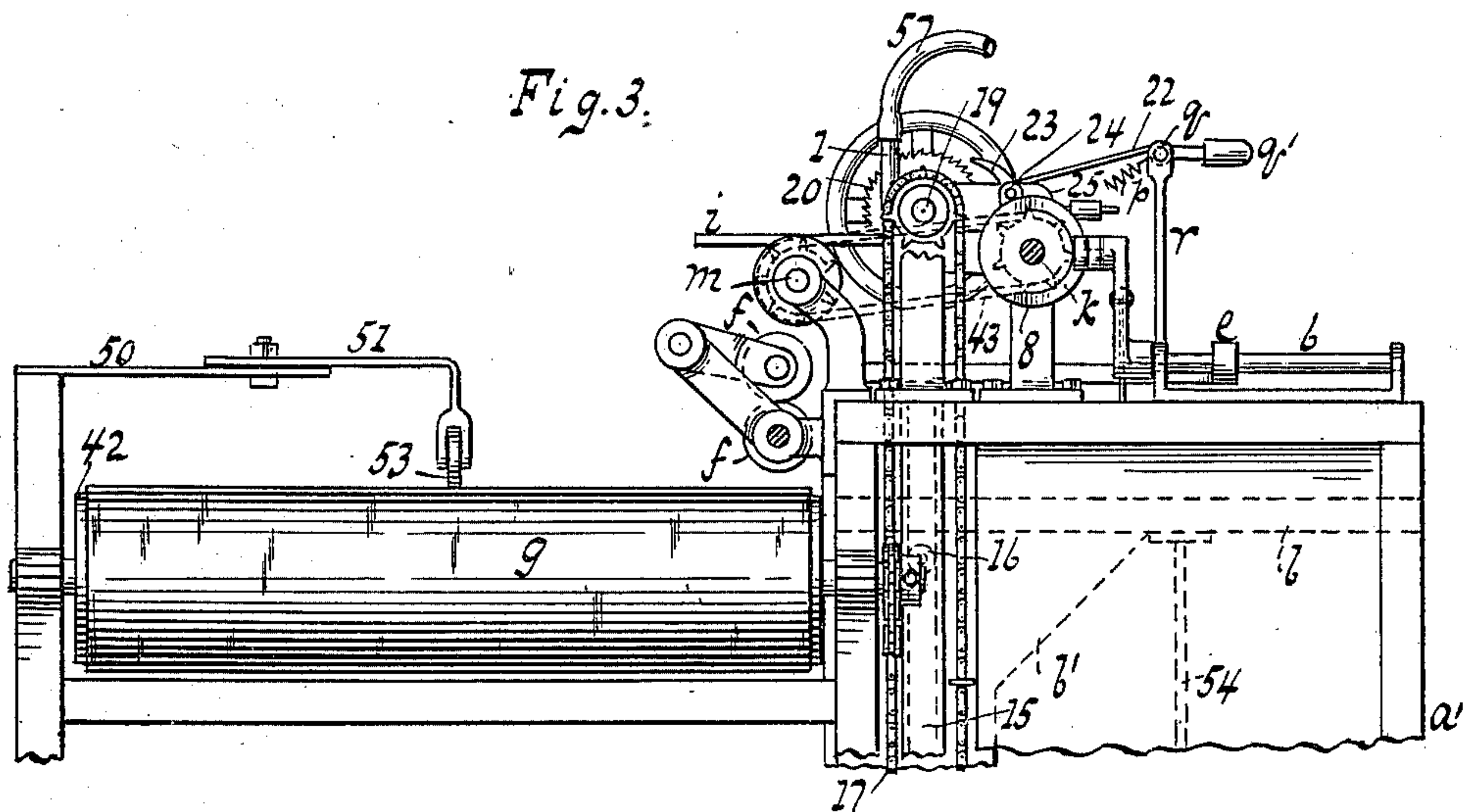
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(Application filed Sept. 20, 1900.)

(No Model.)

3 Sheets—Sheet 3



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UNITED STATES PATENT OFFICE.

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MACHINE FOR FEEDING OR GATHERING SHEETS, SIGNATURES, &c.

SPECIFICATION forming part of Letters Patent No. 672,761, dated April 23, 1901.

Application filed September 20, 1900. Serial No. 30,603. (No model.)

To all whom it may concern:

Be it known that I, EUGENE F. GOODMAN, a citizen of the United States, residing at Manhattan borough, in the city, county, and State of New York, have invented new and useful Improvements in Machines for Feeding or Gathering Sheets, Signatures, and the Like, of which the following is a specification.

This invention relates to so-called "sheet feeding or gathering machines," and the invention resides in the novel features of construction set forth in the following specification and claims, and illustrated in the annexed drawings, in which—

Figure 1 is a plan view of the machine embodying this invention. Fig. 2 is a section along *ww*, Fig. 1. Fig. 3 is a side elevation of Fig. 1. Fig. 4 is a section along *xx*, Fig. 1. Fig. 5 is a section along *yy*, Fig. 1. Fig. 6 is a detail view of a shaft with clutch. Figs. 7 and 8 show different positions of a valve. Fig. 9 shows a modification.

A base or support comprises legs *a'*, carrying side pieces *a*, in which a sheet support or board *b* can be raised and lowered. This support is shown in Fig. 4 with a supply *c* of sheets or signatures. The top sheet or signature is lifted or fed off the pile by what is commonly known as a "suction-tube" 1 and which has a feeding or four-motion stroke. When this feeder-tube drops onto the top sheet, the latter adheres or is sucked to such tube and is raised off the pile on the rise of such feeder. As this feeder 1 now moves forward or toward the gathering device or apron *g* the top sheet is carried forward or fed between the rollers *f*, by which such top sheet is fed outward or onto such apron. The exhaust or suction in tube 1 being cut off or temporarily interrupted, as hereinafter explained, the sheet is released by the tube and is free to be carried entirely out or forward by rollers *f*. The tube 1 returning and dropping onto the next succeeding sheet of the pile will raise or feed the latter in its turn, and so on.

The feeder is carried by bar *i*, Fig. 4, having a rear or forked portion *i'*, sitting about the driving-shaft *k*, and its front portion resting on cam *l* on shaft *m*. The shaft *k* has cam *n*, acting against roller *o*, Fig. 4, on rod

i to give the forward or feed motion to the feeder. The spring *p* retracts the feeder after it has fed. The cam *l* causes the feeder to rise and allows it to fall when to contact with or feed a sheet.

The spring *p* can be suitably hitched, as to a shaft *q*, on risers *r*, secured to side pieces *a*. The shaft *q* can be rocked by a handle *q'*, for a purpose presently explained.

The detent *e* is carried by shaft 6, rocked by cam 8, Fig. 1, on shaft *k*. This detent-arm *e* acts as a sort of auxiliary to feeder 1, as it insures the latter feeding only one sheet or signature at a time. This arm *e* presses on the top signature at a suitable distance from the feeder as the latter sucks or bends up a corner portion of the top sheet. Should the next underlying sheet have a tendency to adhere to the top sheet, the corner portions of these sheets as the feeder sucks up or raises will spring apart or separate. The detent *e* then rising will leave the entire top signature free to rise or strip off the underlying signature or pile on the continued rise and forward stroke of the feeder. The free or pile-pressing end of detent *e* could have a roller applied to allow the top sheet to move laterally a certain extent on the rise of the feeder, thus reducing friction and lessening the strain on the suction.

The shaft *k* is driven by any suitable means. In the drawings is shown a pulley or wheel 12, which can have a crank, belt, or other driving means. This pulley has also a belt or connection 14 for driving the shaft of the lower feed-rollers *f*. The upper rollers *f* on swinging arms fall or rest on the lower rollers *f*, and a sheet or signature passed between the upper and lower rollers *f* will be fed as noted. As successive top sheets are fed off the pile the sheet-support *b* is raised to bring the remainder of the pile up to the level for the discharge of the next succeeding top sheet. This board *b*, Fig. 2, is shown with side pieces *b'*. The sides *a* have tracks or U-shaped rails 15, along which travel the wheels or guide-rollers 16 on side pieces *b'* as the board *b* rises or falls.

In the drawings are shown two endless chains 17. Each chain has a branch secured to the holder or board *b* or its side pieces *b'*.

The chains are guided about pulleys on the lower shaft 18 and on the upper shaft 19, Figs. 1 and 3. The upper shaft has a ratchet 20, Fig. 5, and the locking-pawl 21 when engaging the ratchet prevents retrograde rotation of the same, so that the board *b* cannot fall or sink. This pawl 21 does not, however, prevent the rise or upward feeding of board *b*. The holding-pawl 21 can be withdrawn or freed to allow the board *b* to sink or lower when required. The cord or connection 22 extends from pawl 21 to rock or winding shaft *q*, Fig. 5, and when by handle *q'* this shaft is suitably turned to wind up the connection 22 and cause the latter to free or withdraw the locking-pawl the board *b* is free to lower.

The upward feed of the board *b* is effected by pawl 23 rotating ratchet 20. This feed-pawl 23 is pivoted at 24 to arm 25, Fig. 5, which rises and falls as the cam 26 is rotated by shaft *k*. The pawl-pivot 24 has fixed there to a releasing-arm 27, which is shown so overweighted that at intervals it rises as the bar *i* lifts, and thus swings pawl 23 out of gear, while when the pawl is to feed the arm *i*, dropping onto the low part of its cam *l*, causes arm 27 to swing down for pawl 23 to move into action when the paper or pile *c* is too low. While arm *i* is raised and feeder 1 is feeding out a sheet, the pawl 23, being held out of action, will not disturb or raise the board or pile.

The arm or wire 27' is shown in the modification in Fig. 9 with its lower or free end descending to the pile, and should the latter be lifted to or above the required level such pile will have lifted arm 27 to hold pawl 23 out of action until the pile has been suitably diminished or lowered. The arm or lifter 27' can then sink to allow pawl 23 to move into gear. By either arrangement the feed of board *b* by pawl 23 can be temporarily interrupted.

The shaft 18, Fig. 6, has a clutch member 30, which when engaged by driving clutch member 33 causes rotation of the shaft. The pulley 36 connects by belt 37 with crank or hand wheel 38, so that the board *b* can be raised or lowered by hand when clutch 33 is locked and locking-pawl 21 is freed.

From shaft *k* extends a belt 39, Fig. 1, to pulley 42 of gathering-apron *g*. This apron can travel or be extended along indefinitely in front of a series of machines or boards *b* to gather sheets or signatures coming from said several machines. The shaft 18 can also extend across or connect with a series of machines.

The shaft *m*, Fig. 3, can be driven from shaft *k* by belt or connection 43.

An arm 50 has adjustably connected there to an arm 51, to which is connected roller 53. A sheet fed from rollers *f* will be stopped by roller 53 from going too far forward.

The retractor or winding-shaft *q*, it may be noted, can be extended indefinitely across a

series of machines or supports *b*, so as to form a release common to a number of holding-pawls 21. To release an individual pawl 21, in each case its chain or connection 22 can be pulled while shaft *q* is left at rest. One support *b* can thus be lowered by itself or a series of supports lowered simultaneously.

In mentioning belts, as 14 39, it is understood that sprocket-chains and corresponding pulleys or gears are included and have been found advantageous in practice as preventing slipping or lost motion.

The sheet-holder *b*, as noted, will drop when pawl 21 is released. To ease or slow the drop or descent of this holder or support, a piston 54, Fig. 2, and cylinder 55 are applied, forming what may be called an "air-cushion" or "spring." To allow the compressed air in the cylinder to escape with suitable slowness, a vent or nipple 56 has been found practical.

The suction-tube 1 has a hose or flexible connection 57 with tube 58, and as the valve 59 is moved to one position, Fig. 8, or another, Fig. 7, the tube and hose connect either with the suction or exhaust 60 or with inlet 61. When the exhaust or tube 60 is in communication with tube 1, the air entering the mouth or free end of the latter will cause a sheet to adhere to or be fed by such tube 1. When this feeder 1 has delivered a sheet to rollers *f* and the communication between feeder 1 and exhaust 60 is cut off and communication with inlet 61 opened, the feeder 1 releases the sheet, or, as it might popularly be expressed, the suction is interrupted. A sheet released by feeder 1 and taken by rollers *f*, as already noted, is fed out to apron *g*. The valve 59 or its lever can be set or actuated by link 62, Fig. 2, oscillated by shaft *k* or pulley 12, with which this link has a suitable eccentric or crank-pin connection.

As seen in Fig. 1, wires or fingers 63 can be adjustably secured to a side piece *a* and made to hold the signatures *c* against the other side piece and forward toward feeder 1, these fingers 63 being set as required by larger or smaller sheets *c*.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a feeding-machine, the combination of the arm *i*, a suction-tube 1 carried thereby, a driving-shaft, said arm being supported at one end by and horizontally movable on said shaft, a rotary cam on which the other end of said arm is supported and operating to raise and lower said arm, a cam on the driving-shaft arranged to feed said arm forward, and a spring for retracting said arm, substantially as described.

2. In a feeding-machine, a vertically-movable sheet holder or support, a pawl and ratchet for raising said holder or support, a suction-tube for feeding the sheets, means for raising and lowering and moving said tube backward and forward, an arm fixed on the pivot of said pawl, a weight on one end of said arm and operating to throw the pawl out of

engagement with the ratchet, and means actuated by the downward movement of the suction-tube for rocking said arm to throw the pawl into engagement with the ratchet, substantially as described.

3. A sheet holder or support, a feeder-arm and a detent, combined with a ratchet and pawl for the support, and an overweighted pawl-releasing arm extended toward the feeder-arm to be actuated by the latter substantially as described.

4. A sheet-feeding machine provided with a holder or support having side pieces and guide-rollers 16, rails against which said rollers are made to bear or run, lifting-chains connected to the side pieces and extended about the rails, a driving ratchet and pawl for the chains, means actuated by the upward movement of said holder or support for periodically throwing said pawl and ratchet out of operation, and hand-operated mechanism independent of said means for releasing said ratchet at will to permit of the descent of the holder or support, substantially as described.

5. In a machine for gathering signatures the combination of the following instrumentalities, to wit; a signature-support, means for elevating the support as the signatures are successively removed, a suction-feeder adapted to engage the top signature near the forward edge, means for moving the feeder upwardly and forwardly to first separate a signature from those beneath it and then advance the same, a detent engaging the signature in rear of the feeder to hold the body of the signature down while the feeder raises the edge to insure a separation of the signatures, means for moving said detent into engagement with the signature and means for raising said detent as the feeder moves forwardly and subsequent to its upward movement to separate the signature; substantially as described.

6. In a machine for gathering signatures, the combination of the following instrumentalities, to wit; a signature-support, means for elevating the support as the signatures are successively removed therefrom, a suction-feeder adapted to engage the top signature near its forward edge, means for moving the feeder upwardly and forwardly to first separate the signature from those beneath it and then advance the same, a detent engaging the signature in rear of the feeder to hold the body of the signature down while the feeder raises the edge to insure a separation of the signatures, and mechanism for moving the detent into and out of engagement with the signature independent of the feeder and timed to move the detent out of operative engagement with the signature after the feeder has lifted the edge of the signature and before the signature is fed forward; substantially as described.

7. In a machine of the character specified, the combination with signature-feeding mechanism, of a support for a pile of signatures

and mechanism controlling the advance of said support embodying the following instrumentalities, to wit; a drive-shaft, a second shaft adapted by its rotation to elevate the support, a ratchet-wheel for rotating said last-mentioned shaft, a pawl oscillated by the drive-shaft and loaded to normally stand out of engagement with the ratchet-wheel where- by no movement of the support takes place, a reciprocatory member adapted to move into and out of contact with the pile of signatures and a connection between said member operating when the member moves downward abnormally to positively move the pawl into engagement with the ratchet-wheel against its normal tendency to remain disengaged therefrom; substantially as described.

8. In a machine of the character specified, the combination with reciprocatory signature-feeding mechanism, of a support for a pile of signatures and mechanism controlling the advance of said support embodying the following instrumentalities, to wit; a drive-shaft, a ratchet-wheel adapted by its rotation to elevate the support, a pawl oscillated by the drive-shaft and loaded to normally stand out of engagement with the ratchet-wheel, an arm moving with the pawl and cooperating with the reciprocatory feeding mechanism when said feeding mechanism moves downward an abnormal distance to move the pawl into engagement with the ratchet-wheel to elevate the support, said arm moving out of operative engagement with the feeding mechanism during the operative movement of the pawl; substantially as described.

9. In a signature-gathering machine the combination with a series of vertically-movable supports for the piles of signatures, feeding mechanism for feeding signatures successively from each support, elevating mechanism for each support embodying a ratchet-wheel, an operating-pawl and a holding-pawl, of a release-shaft and a loose connection between each of the holding-pawls and said release-shaft, whereby all of said pawls may be released simultaneously by the operation of the shaft, or individually independent of the movement of the shaft; substantially as described.

10. In a signature-gathering machine, the combination with a support for a pile of signatures, means for advancing the support as the signatures are removed therefrom and a pair of driven feed-rolls, of a vertically and horizontally movable feeder for advancing the signatures successively to the rolls, a cam for elevating the feeder and supporting the same in its elevated position and a cam for advancing the feeder without changing its angular position whereby the edge of the signature is presented squarely to the rolls; substantially as described.

11. In a signature-gathering machine, the combination with a support for a pile of signatures, means for advancing the support as the signatures are removed therefrom and a

pair of driven feed-rolls, of a suction-feeder, a carrier on which the feeder is mounted, a cam on which said carrier rests for elevating the feeder and on which the carrier may move
5 in a right line and a second cam for advancing the carrier and feeder when elevated; substantially as described.

12. In a signature-gathering machine, the combination with a series of signature-feeding mechanism operating simultaneously, of
10 a conveyer-belt onto which the signatures are fed by the feeding mechanism, gearing connecting the feeding and belt-driving mechanisms and so timed that each succeeding feeding mechanism will feed its signature on top
15 of that fed by the mechanism adjacent thereto at the last previous feeding movement and adjustable stops under which the belt travels

for checking the movement of the signatures transversely of the belt; substantially as described. 20

13. In a signature-gathering machine, the combination with a signature-feeding mechanism and a conveyer-belt onto which the signatures are fed, of an adjustable stop having
25 a roller traveling on the belt for arresting the movement of the signatures transversely of the belt; substantially as described.

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

EUGENE F. GOODMAN.

Witnesses:

W. C. HAUFF,

E. F. KASTENHUBER.