

925,175.

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DELIVERY APPARATUS.  
APPLICATION FILED JAN. 26, 1909.

Patented June 15, 1909.  
4 SHEETS—SHEET 1.

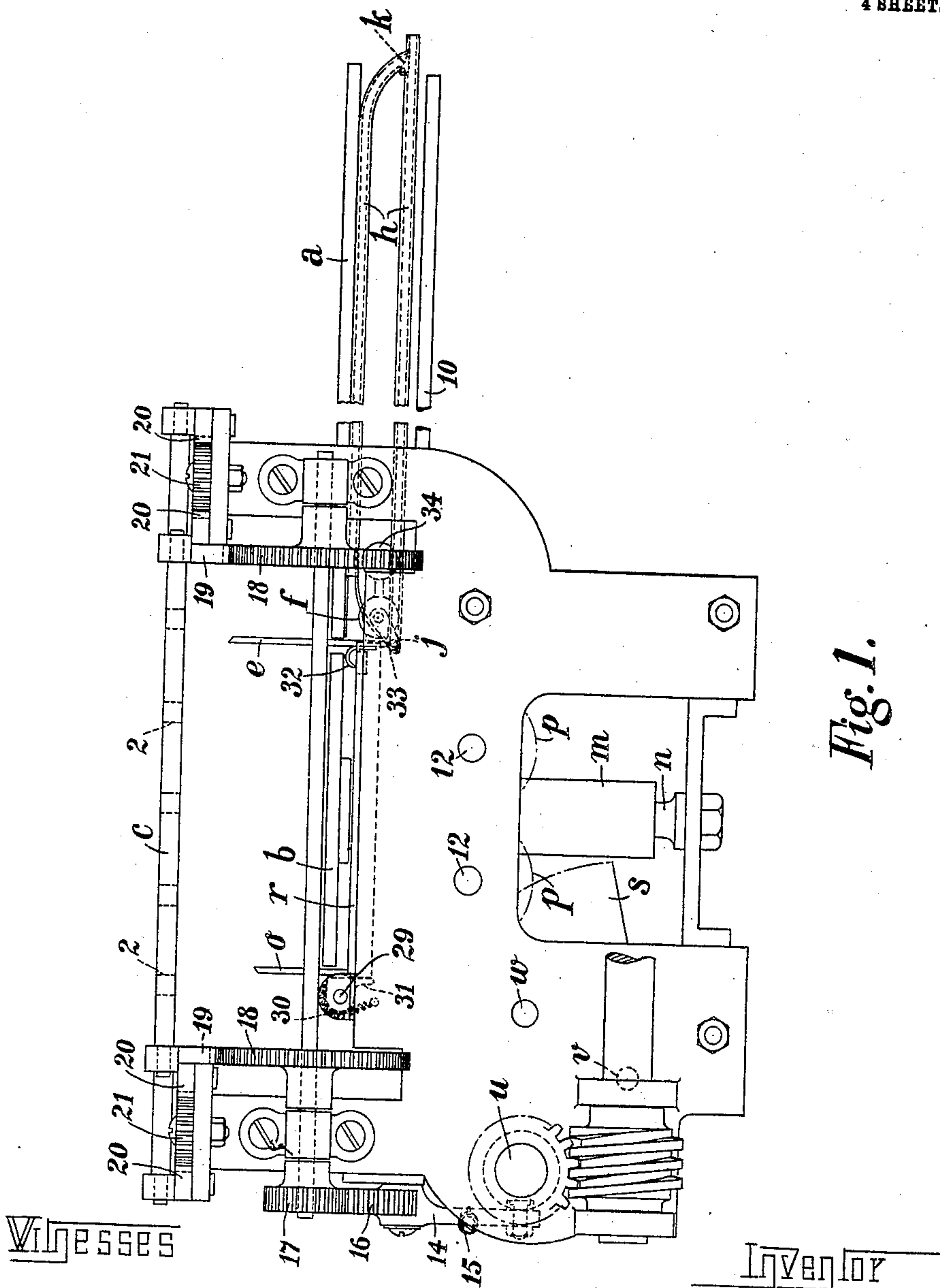


Fig. 1.

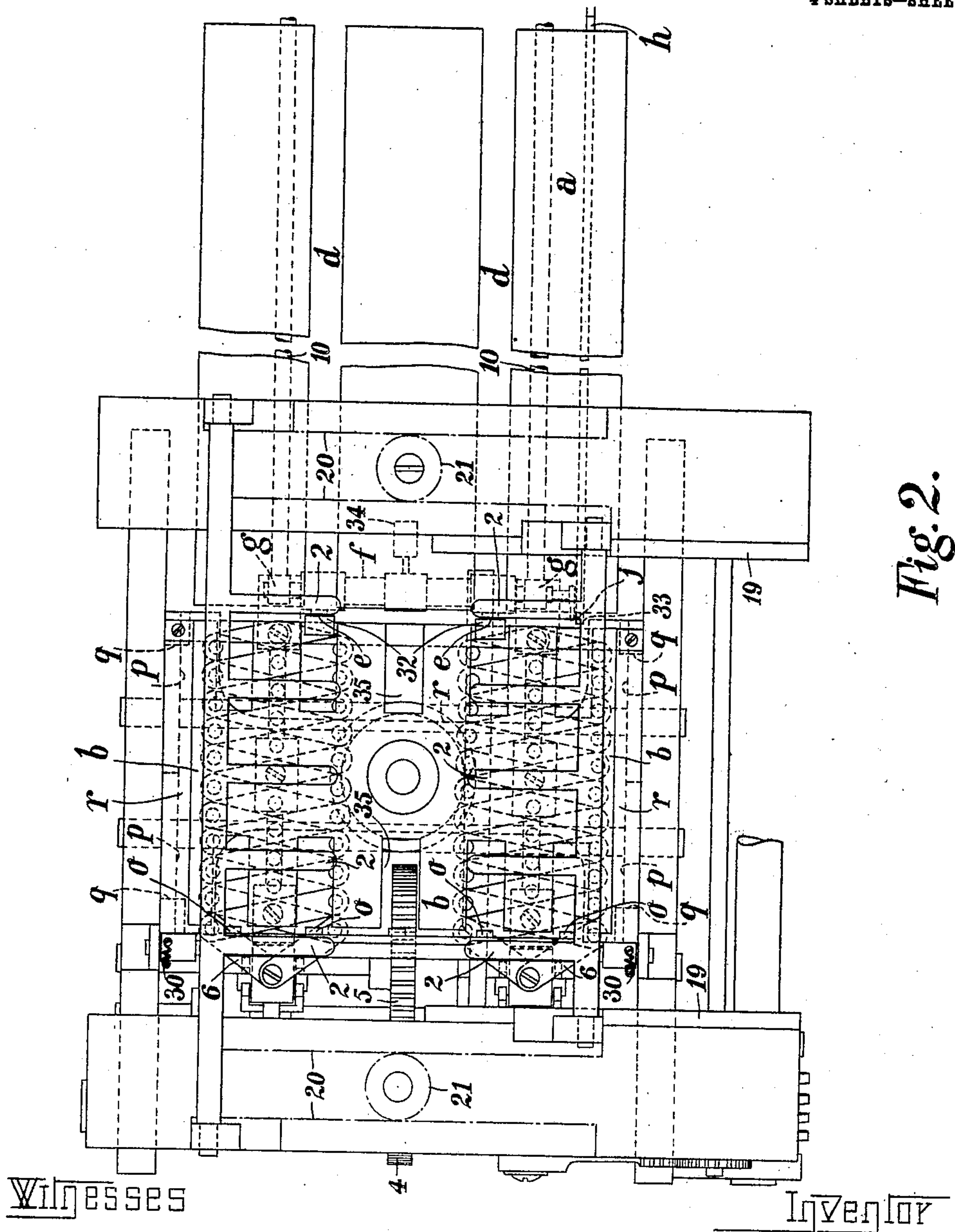
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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 4.

Fig. 5.

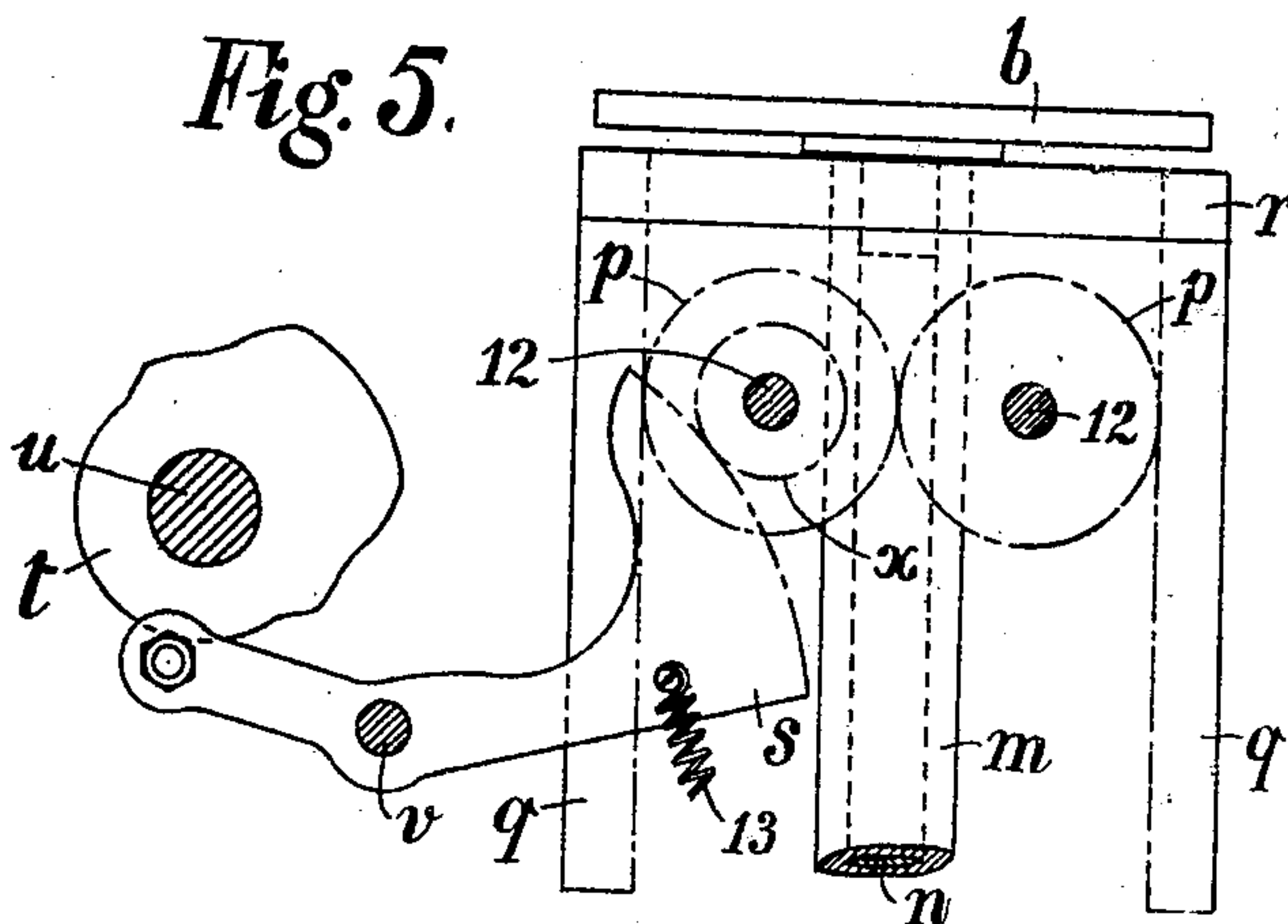
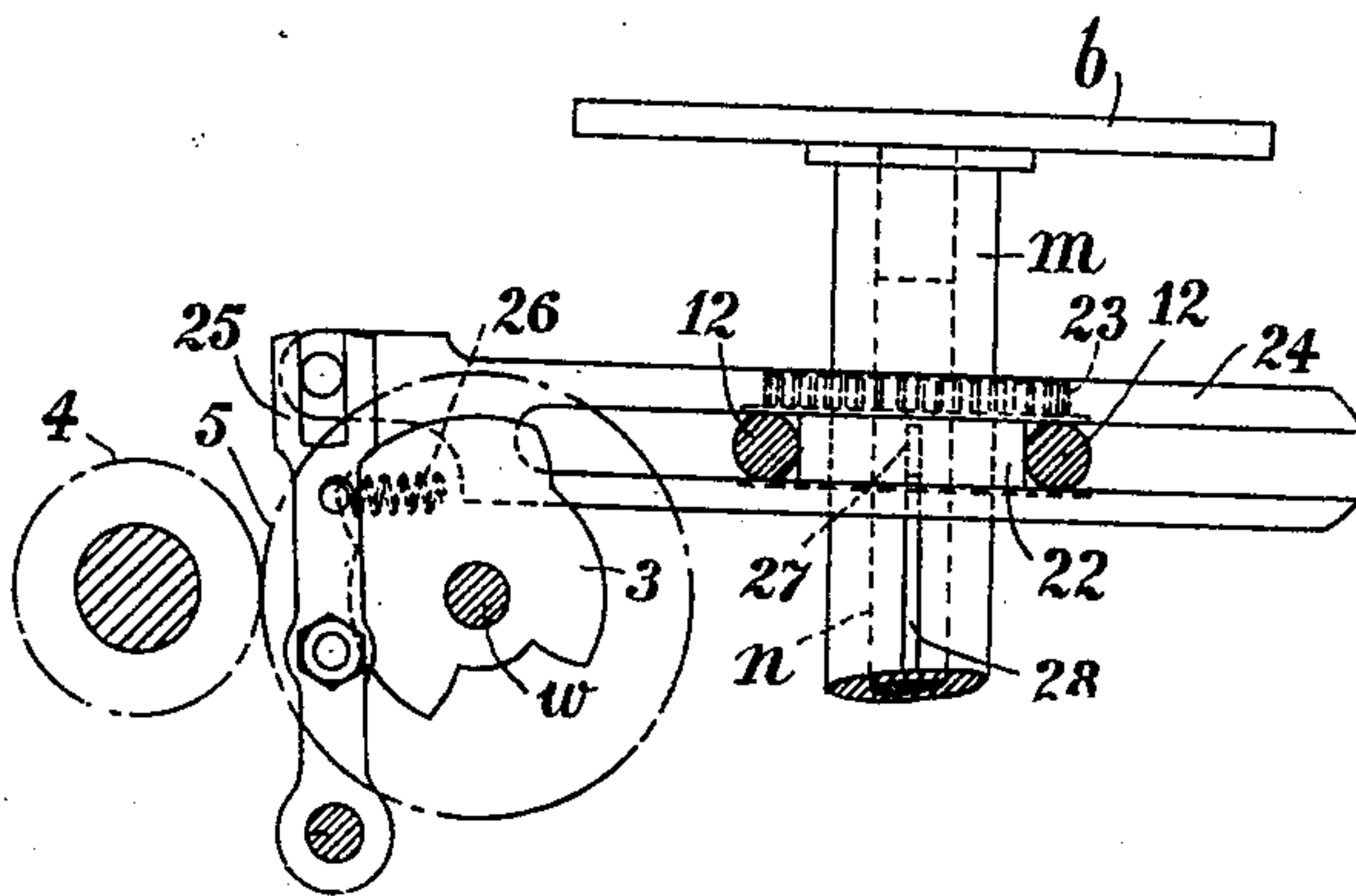


Fig. 6.



Witnesses

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# UNITED STATES PATENT OFFICE.

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## DELIVERY APPARATUS.

No. 925,175.

Specification of Letters Patent.

Patented June 15, 1909.

Application filed January 26, 1909. Serial No. 474,317.

*To all whom it may concern:*

Be it known that I, ELLIS HALLAM, subject of the King of Great Britain, residing at Manchester, in the county of Lancaster, in the Kingdom of England, have invented certain new and useful Improvements in Delivery Apparatus, of which the following is a specification.

This invention relates to delivery apparatus, and is more particularly intended for use with rotary printing machines of the type used for producing newspapers. The usual arrangement for the delivery of the papers from such machines comprises a device for discharging the papers and a device for moving the discharged papers forward at intervals. The papers fall out from the discharge device and accumulate in a pile below the point of discharge. When a predetermined number, say thirteen, of papers, has been discharged, the second device comes into operation and moves forward the pile a short distance. This is repeated so that the resulting pile of papers is arranged in steps. As the point of discharge of the paper is usually located toward the bottom of the machine and is accordingly only a short distance from the floor, it is only possible to allow a comparatively small number of papers to accumulate below the aperture before it becomes necessary to remove some of these to prevent choking of the machine. Accordingly an attendant must be continually engaged in watching the discharge of the papers and removing them at frequent intervals, the removal always being from the bottom of the pile.

The present invention has for its object to dispense with this supervision, and to perform mechanically the operation equivalent to those performed by the attendant.

The invention will be described with reference to the accompanying drawings, as arranged for use with a printing machine.

In these drawings:—Figure 1 is a side elevation; Fig. 2, a plan; and Fig. 3, an end elevation of the complete machine; while Figs. 4–6 show certain parts of the operating mechanism, the sections being on lines X X, Y Y, and Z Z, respectively, of Fig. 3.

In carrying out the invention, a tray *a* is provided which when in use is arranged below the discharge device to receive the papers as they fall out. When a predetermined number of papers have fallen in a pile

on the tray *a* they are moved forward so as to leave the tray entirely clear for the next series of papers to fall in the place previously occupied by the first set. This first set is brought on to a table *b* by means of which it is lifted, and placed in position on a support device *c* (Fig. 1) located above the table. When the required number of papers has fallen on to the tray *a* to complete a second set, this is treated in similar manner, being moved forward on to the table *b* and lifted upward so as to lie on the support device *c* underneath the first set. In order that this operation may be effected, the parts of the support device *c* which holds the final stack of papers are made movable so that at the moment the table *b* is about to raise a fresh set of papers to the bottom of the stack the support moves aside and then returns after the papers have been placed in position. The table *b* then sinks into its normal position, leaving the papers on the support device *c*. It will thus be seen that the final stack of papers is continually built up on the support device *c* from below. In order that the sets of papers shall be distinguished so as to facilitate counting, the table *b* is during its operation turned so as to present each set to the pile on the support device *c* in a position turned through 180 degrees relative to the preceding set. This is preferably effected by arranging the table *b* so as to be when in its normal position half way between the two positions at which it presents the papers to the stack, so that by turning it through 90 degrees in one direction when raising one set of papers to the stack and through 90 degrees from its normal position in the opposite direction when raising the succeeding set, the desired arrangement of the sets in the final stack is produced. This method of arrangement also has the advantage of keeping the stack straight and its upper surface horizontal, as the thickened edges which result from folding the paper are disposed alternately at opposite sides of the stack.

From the preceding description of the apparatus and its action, it will be seen that it provides that only a comparatively small number of papers shall remain in front of the discharge aperture, and that these shall be at intervals removed and arranged in a stack which is fed from below and which may rise to a considerable height before the



services of an attendant are necessary to remove any of the papers.

In using the apparatus the tray *a* is arranged horizontal a short distance below the discharge outlet for the papers from the machine. Across this tray are provided two slots *d*, along which a pair of fingers *e* may travel. These fingers *e* are mounted on the shaft *f* which is pivotally arranged at *g* so that the fingers may either project vertically upward through the slots *d* or may lie below the surface of the tray *a*. In order to effect the change from one position to another, a guide *h* is provided underneath the tray *a*. By this means when the fingers are traveling back from the table *b* to the tray *a*, they are carried beneath the surface of the tray so as to pass under the papers which are resting thereon, the guide crank *j* lying in the upper one of the guides *h*. When they reach the outer end of the slots *d* the curved part of the guide causes them to turn into a vertical position so as to stand behind the papers lying on the tray. Just before the fingers *e* reach the vertical position, the guide crank *j* moves aside the spring pawl *k* and enters the lower part of the guide in which it is retained during the forward movement of the fingers. When the required number of papers have fallen, the fingers *e* move forward in their slots *d* pushing the set of papers before them off the tray *a* and on the table *b* which stands in line therewith. This table *b* is of the size and shape of the papers and is movable both vertically and rotatably, being guided in its movement by a sleeve *m* sliding on the pillar *n*.

The operating mechanism comprises parts as follows:—

Across the front of the machine extends the main driving shaft *u*. On this shaft are arranged three cams *y* *t* and *z* which operate respectively the movement of the pair of fingers *e* which feed the papers from the tray *a* to the table *b*, the lifting movement of the table *b*; and a reciprocating motion of two sets of horizontal fingers 2 forming part of the stack supporting device *c*. The rotary movement of the table *b* is operated from a cam 3 on the second shaft *v* driven from the main driving shaft *u* at half the speed of this latter by means of wheels 4 and 5.

The two pivotal fingers *e* are carried at the ends of systems of jointed links 6 forming devices usually known as lazy-tongs. The member at one end of each of these devices 6 is connected to a lever 7 (see Fig. 4) fast on the shaft *v*. To this shaft is also connected the arm 8 which receives motion from its driving cam *y*. By this cam in conjunction with a spring 11 attached to one of the levers 7 a reciprocating movement is imparted to the end member of the series of links 6, and since the pivotal point of the next member

of each tongs is fixed by means of set-screw 9 to shaft 10, the movement of the end member produces the opening and closing of the tongs, which results in the longitudinal action of the fingers *e*. The rods 10 serve as guides for the moving parts of the tongs.

The rising and falling motion of the table is imparted to it by means of pinions *p* on shafts 12 (see Fig. 5) engaging with vertical racks *q* attached to the under side of the table support *r*. Motion is imparted to these by means of a pinion *x* and a quadrant *s* on one end of a cranked lever pivoted on the shaft *v*, the other end of which lever is in engagement with the driving cam *t*. A spring 13 holds the lever up to this cam. Similar mechanism effects the backward and forward movement of the horizontal supporting fingers 2. In this case the cam *z*, against which the lever 14 is held by the spring 15 imparts at each revolution a reciprocatory movement to the quadrant 16 with which the pinion 17 gears. On the same shaft as this latter are two larger wheels 18 which gear with horizontal racks 19 attached to the bar carrying one set of the fingers 2 of the support device *c*. The bar carrying the other set is actuated by means of racks 20 and pinions 21 so as to move oppositely to the other bar.

The rotary motion of the table *b* is imparted to it by means of a sleeve 22 held in position by the shafts 12 and carrying a toothed wheel 23 which engages with a rack 24 which is reciprocated by a pivotal lever 25 moved by the driving cam 3 and spring 26. The central pillar *m* on which the table *b* is supported is free to move up and down in this sleeve 22, but is connected by means of a feather 27 and groove 28 so as to be rotated with the toothed wheel 23. At the opposite side of that at which the papers are fed on to the table *b* is arranged a second set of vertical fingers *o* which act as a stop for the papers. These two sets of fingers *e* and *o* accordingly act to bring the papers into exact position on the table and at the same time would straighten out the pile if the papers were not previously arranged exactly one above the other. The fingers *o* are mounted on a pivoted shaft 29 which is under the action of a spring 30. A depending lug 31 is provided on this shaft and arranged so as to normally lie against the side of the table support *r*. When, however, this latter is raised the lug is released the shaft 29 and fingers *o* are tilted back so as to be clear of the table *b* when this is turned. At the same time the fingers *e* are thrown back by the pressure of the rising support *r* against a projecting part 32, which releases the guide crank *j* from the spring catch 33 arranged at the front end of the lower member of the guides *h*. The counter-weight 34 then causes the fingers *e* to fall back below



the surface of the tray *a*, the guide crank *j* entering the upper member of the guides *h*.

The operation of the table and its co-acting parts is as follows:—The papers being  
5 in position, movement is then imparted to the table *b*. The first movement is vertically upward for a short distance. This upward lift of the table releases the two  
10 sets of fingers *c* and *o* from their vertical position and permits them to fall therefrom so as to lie out of the way of the table when it is turned. After the fall of these fingers the table is rotated horizontally through 90 degrees. It then performs a further rise,  
15 coming gradually up to the level at which the support device *e* for the stack is arranged. This support device comprises the two sets of fingers 2, previously mentioned, extending horizontally from the longitudi-  
20 nally extending side bars. These bars and fingers, as previously explained, are adapted to slide toward and from each other at the required moments. Accordingly just as the papers on the table *b* rise up against the  
25 lower sides of the fingers 2, these latter are retracted so as to permit the further rise of the papers and table. When this upward movement has been accomplished the fingers return, entering slots 35 cut in the table  
30 surface, and come to lie below the papers. The table then executes a descending movement, leaving the papers supported on the fingers 2. The return movement of the table is simply the reverse of its rising movement,  
35 and the table comes to rest again in its initial position. In the meantime the pair of fingers *c* has traveled back below the surface of the tray *a*, and come into position behind  
40 the next set of papers, so that these latter may be moved forward on to the table *b* when their number is complete. In raising this second set of papers to the stack, the operations performed are the same as in the  
45 first case, with the exception that the table turns in the opposite direction.

The apparatus is connected with suitable driving gear so that it runs continuously while the printing machine is in operation.

It will be understood that although one  
50 form of construction has been described in considerable detail, this description has been only given by way of example. It will be obvious that as far as the actual mechanism employed is concerned, considerable depar-  
55 ture may be made from the details of construction given above without going beyond the present invention.

I declare that what I claim is:—

1. A delivery apparatus comprising in  
60 combination, means for continuously receiving the articles, means for moving said articles in sets away from the point of reception, means for elevating each set of said  
65 articles, after said removal, means for sup-

ported position after said elevating means has fallen again, and means for arranging each set displaced through 180 degrees relative to the preceding set in said stack.

2. A delivery apparatus comprising in 70 combination, means for continuously receiving the articles, means for moving said articles in sets away from the point of reception, a table on to which each set of articles is moved by said last mentioned 75 means, means for elevating said table after a set of articles has been placed in position, supporting means arranged above said table, means for transferring each set of articles from the table when elevated to said 80 supporting means, and means for returning said table to its initial level in readiness for the next set of articles.

3. A delivery apparatus comprising in combination means for continuously re- 85 ceiving the articles, means for moving said articles in sets away from the point of reception, a table on to which each set of articles is moved by the said last mentioned means, means for elevating said table after 90 a set of articles has been placed in position, supporting means arranged above said table, means for turning said table to present each set of articles to the supporting means displaced through 180 degrees relative to 95 the position in which the preceding set was presented, means for transferring each set of articles to the supporting means from the elevated table and means for lowering said table to its initial height in readiness 100 for the next set of articles.

4. A delivery apparatus comprising in combination, means for continuously re- 105 ceiving the articles, means for moving said articles away from the point of reception, a table on to which each set of articles is moved by said last mentioned means, pro- 110 vided at opposite sides with inwardly extending slots, two oppositely disposed supporting members arranged above said table, each having a set of projecting fingers, means for elevating said table, means for bringing the fingers of the supporting mem- 115 bers to lie in the slots in the table underneath the articles thereon, and means for re-

turning said table to its initial height.  
5. A delivery apparatus comprising in combination, means for continuously re- 120 ceiving the articles, means for moving said articles away from the point of reception, a table on to which each set of articles is moved by said last mentioned means pro- 125 vided at opposite sides with inwardly extending slots, two oppositely disposed supporting members arranged above said table, each having a set of projecting fingers, means for elevating said table, means for bringing the fingers of the supporting mem- 130 bers to lie in the slots in the table underneath the articles thereon, means for pro-



ducing relative rotary movement between said table and said fingers between successive engagements of these parts, and means for returning said table to its initial height  
5 after each of these engagements.

6. A delivery apparatus comprising in combination, means for continuously receiving the articles, means for moving said articles in sets away from the point of reception,  
10 a table on to which each set of articles is moved by said last mentioned means, provided at opposite sides with inwardly extending slots, two oppositely disposed supporting members arranged above said table,  
15 each having a set of projecting fingers, means for elevating said table to the level of said sets of fingers, means for moving said sets of fingers outward out of the way of the articles on said table as the table rises,  
20 means for moving said sets of fingers inward after the table has reached the level thereof so that the fingers come to lie in the slots in the table underneath the articles thereon, and means for lowering said table to its  
25 initial height.

7. A delivery apparatus comprising in combination, means for continuously receiving the articles, means for moving said articles in sets away from the point of reception, a table on to which each set of articles  
30 is moved by said last mentioned means provided at opposite sides with inwardly extending slots, two oppositely disposed supporting members arranged above said table, each having a set of projecting fingers,  
35 means for lowering said table to its initial height, means for turning said table through 90 degrees each time that it passes from its initial to its elevated position and from its  
40 elevated to its initial position.

8. A delivery apparatus comprising in combination, means for continuously receiving the articles, means for moving said articles in sets away from the point of reception, a table on to which each set of articles  
45 is moved by said last mentioned means provided at opposite sides with inwardly extending slots, two oppositely disposed supporting members arranged above said table, each having a set of projecting fingers,  
50 means for lowering said table to its initial height, means for turning said table through 90 degrees each time after it passes from its initial to its elevated position and from its  
55 elevated to its initial position, said last mentioned means being arranged to turn the table in opposite directions at alternate times and passing from the initial to the elevated position.

9. A delivery apparatus comprising in combination, a tray for continuously receiving the articles, means for sliding said articles in sets along said tray away from the  
60 point of reception, a table on to which each set of articles is moved by said last men-

tioned means, means for elevating said table after each set of articles has been placed in position, supporting means arranged above said table, means for transferring each set of articles from the table when elevated to  
70 said supporting means, and means for returning said table to its initial level in readiness for the next set of articles.

10. A delivery apparatus comprising in combination, a tray for continuously receiving the articles, fingers projecting through  
75 slots in said tray, means for moving said fingers along said slots to slide the articles in sets along the tray, a table on to which each set of articles is moved by said fingers, means for elevating said table after each set of articles has been placed in position, supporting means arranged above said table,  
80 means for transferring each set of articles from the table when elevated to said supporting means, and means for returning said table to its initial level in readiness for the next set of articles.

11. A delivery apparatus comprising in combination, a tray for continuously receiving the articles, fingers working in conjunction with said tray, means for projecting  
90 said fingers through slots in said tray behind the point of reception of the articles, means for moving said projecting fingers along the slots to slide the articles along the tray, means for lowering said fingers through said  
95 slots, means for returning said lowered fingers to their initial position, a table on to which each set of articles is moved by said fingers, means for elevating said table after each set of articles has been placed in position, supporting means arranged above said  
100 table, means for transferring each set of articles from the table when elevated to said supporting means, and means for returning said table to its initial level in readiness for the next set of articles.

12. A delivery apparatus comprising in combination, a tray for continuously receiving the articles, fingers projecting through  
110 slots in said tray, means for moving said fingers along said slots to slide the articles in sets along the tray, a table on to which each set of articles is moved by said fingers, a second set of fingers normally upstanding at the side of the table opposite that by which the articles arrive thereon, means for elevating said table after each set of articles  
115 has been placed in position, means for lowering said two sets of fingers as the table rises, supporting means arranged above said table, means for turning said table to prevent each set of articles to the supporting means in a position differing from that in which the  
120 preceding set was presented, means for transferring each set of articles to the supporting means from the table, and means for lowering said table to its initial level.

13. A delivery apparatus comprising in 130



combination, a tray for continuously receiving the articles, fingers projecting through slots in said tray, means comprising lazy tongs for moving said fingers along said  
5 slots to slide the articles in sets along the tray, a table on to which each set of articles is moved by said fingers, means for elevating said table after each set of articles has been placed in position, supporting means ar-  
10 ranged above said table, means for transferring each set of articles from the table when

elevated to said supporting means, and means for returning said table to its initial level in readiness for the next set of articles.

In witness whereof, I have hereunto signed 15  
my name this 13th day of January, 1909, in the presence of two subscribing witnesses.

ELLIS HALLAM.

Witnesses:

JOHN W. THOMAS,  
MALCOLM SMETHURST.