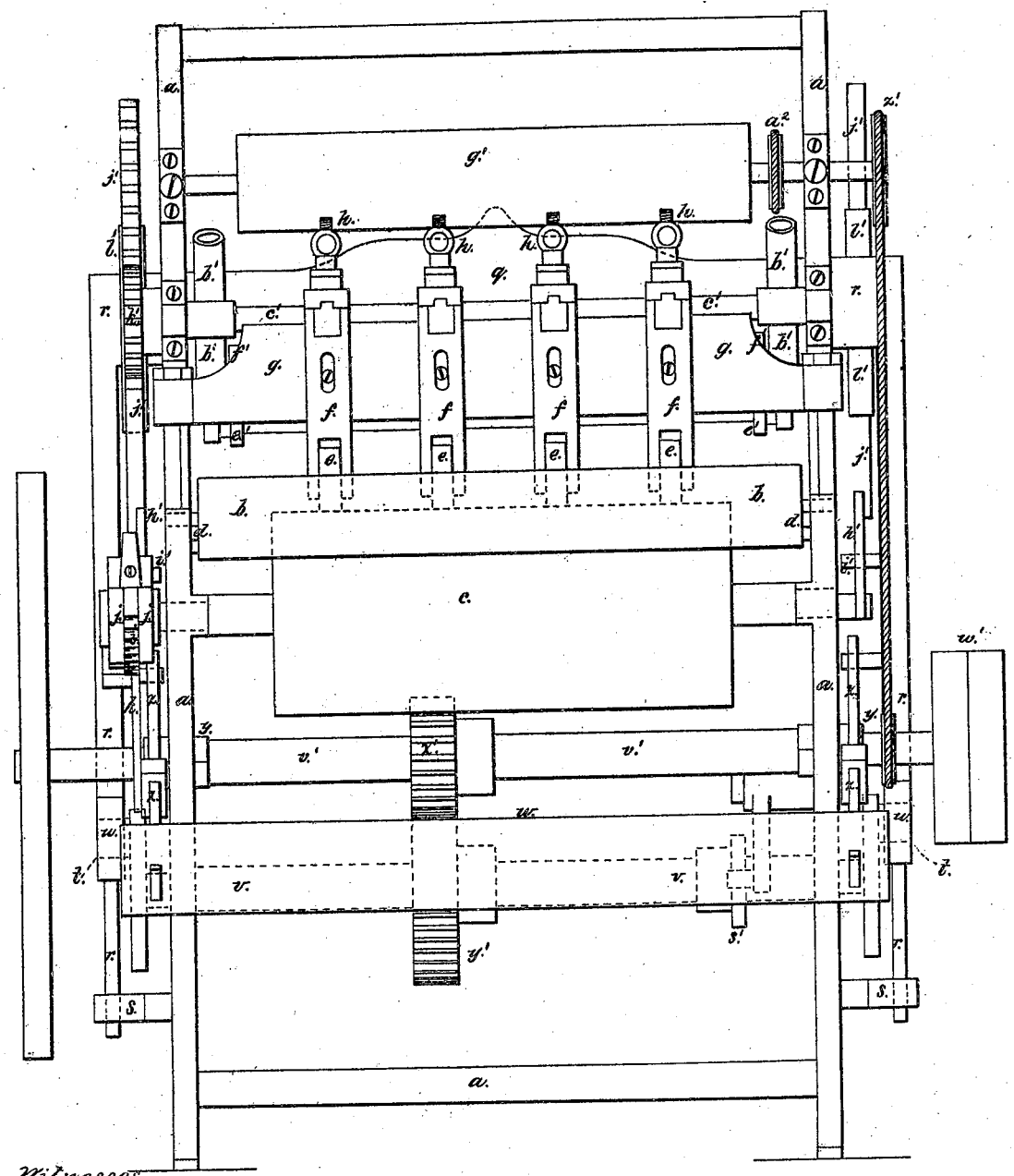
W. T. Cushing. Sheet 1, 3 Sheets.

Printing Railroad Tickets.

No. 55201. Patented May 29, 1866.

Fig. 1.



Witnesses.

Wm. A. Bishop

Andrew De Lacy

Inventor.

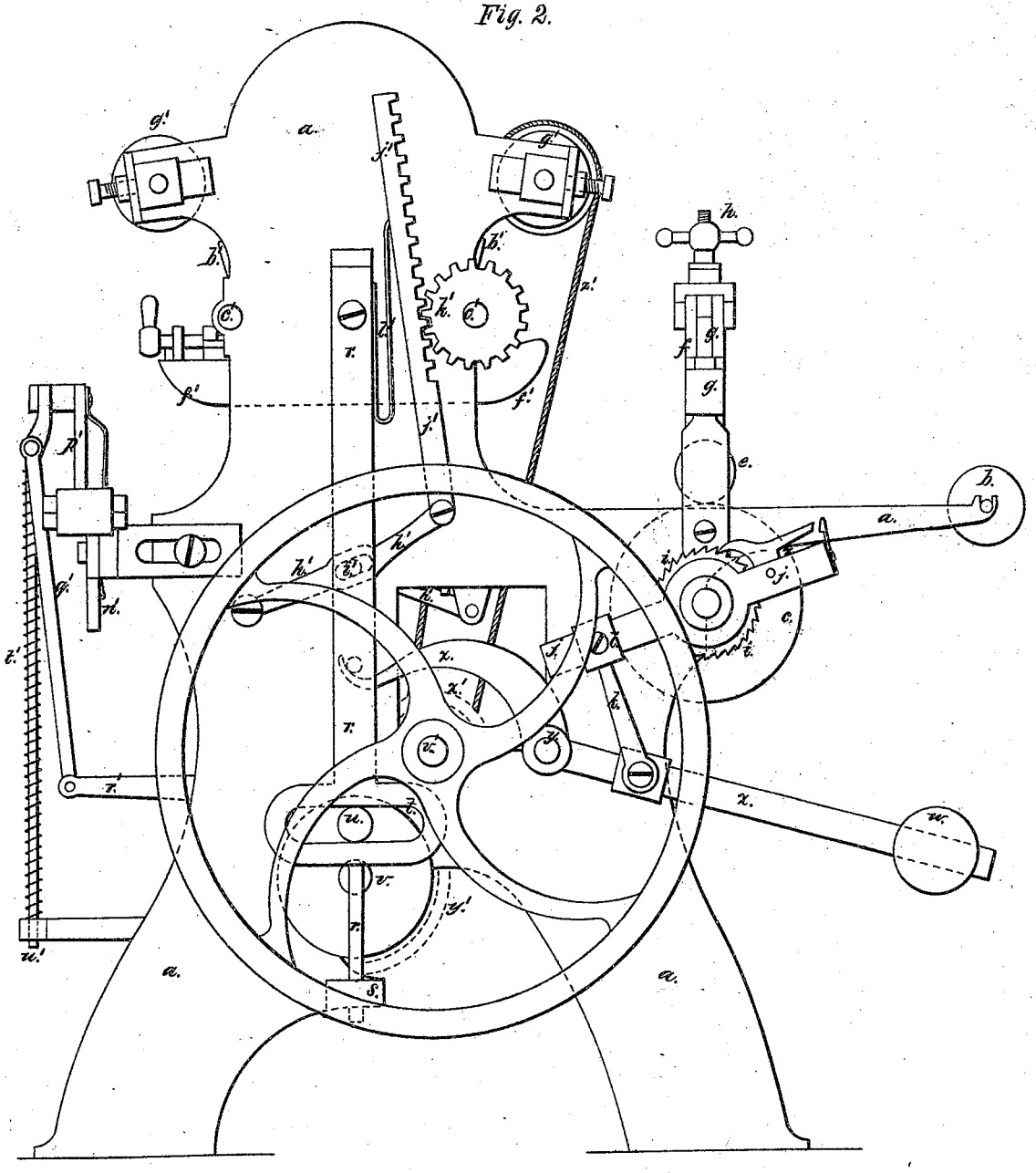
W. T. Cushing

W. T. Cushing. Sheet 2. 3 Sheets.

Printing Railroad Tickets.

No. 55201. Patented May 29. 1866.

Fig. 2.



Witnesses.

Wm. A. Rivers

Andrew de Lacy

Inventor.

W. T. Cushing

W. T. Cushing. Sheet 3. 3 Sheets.

Printing Railroad Tickets.

No. 55201. Patented May 29. 1866.

Fig. 3.

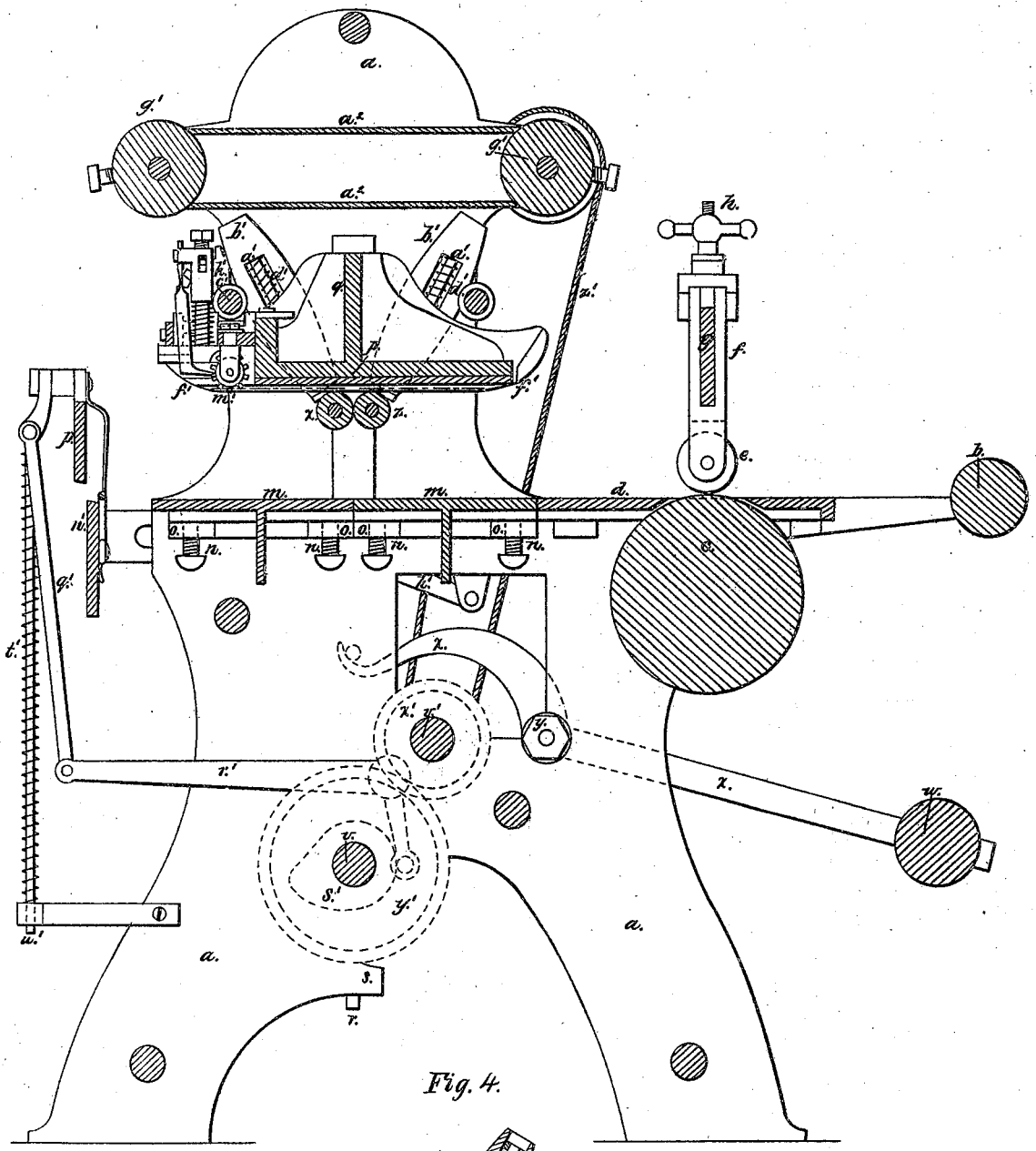
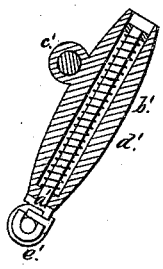


Fig. 4.



Witnesses.

W. H. Burton

Andrew de Lacy

Inventor.

W. T. Cushing

UNITED STATES PATENT OFFICE.

WILLIAM T. CUSHING, OF NEW YORK, N. Y., ASSIGNOR TO SANFORD, HARROUN & CO., OF SAME PLACE.

IMPROVEMENT IN MACHINERY FOR PRINTING RAILROAD-TICKETS.

Specification forming part of Letters Patent No. **55,201**, dated May 29, 1866.

To all whom it may concern:

Be it known that I, WILLIAM T. CUSHING, of the city, county, and State of New York, have invented certain new and useful Improvements in Machinery for Printing Railroad-Tickets and other Articles in Two or More Colors; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a front elevation; Fig. 2, a side elevation; Fig. 3, a longitudinal vertical section; and Fig. 4, a section of one of the arms of the rocking shaft by which the inking-rollers are operated.

The same letters indicate like parts in all the figures.

My said invention relates to improvements in machinery for printing railroad-tickets and other articles in two or more colors; and the first part of my said invention relates to the machinery for feeding in the strips of paper or pasteboard, by means of which improvement several strips of paper or pasteboard of different thicknesses can be fed into the machine to print at the same time several series of tickets or other articles on paper or pasteboard of different thicknesses; and the second part of my said invention relates to an improvement in the mechanism for operating the inking-rollers by which the ink is applied to the forms of types.

In the accompanying drawings, *a* represents a frame of suitable construction, and *b*, a roller mounted in the front end of the frame, and on which the several strips of paper to be printed are rolled, and from which they are unrolled as required by the feeding operation.

If the printing is to be done on pasteboard so thick that it cannot conveniently be rolled up on a roller the strips may be supplied from a table, in which case the several strips should pass between guides to keep them at the required distance apart and in line with the forms of type.

The strips of paper are fed to the printing operation by the intermittent motion of a roller, *c*, which is so mounted in the frame *a* that its periphery extends up through a slot in the table *d*, and slightly above the upper surface thereof; and the strips of paper or board are pressed down onto the feed-roller *c* to give the required bite by means of a series of pressure-rollers, *e*, one for each strip. Each one of these rollers is mounted in the lower end of a stock, *f*, which is slotted from the upper end down, to embrace and slide up and down on a cross-bar, *g*, of the frame. There is a cap secured to the upper end of the stock, above the bar *g*, and from the upper edge of said bar projects a screw, *h*, that passes through a hole in the center of the cap, so that by turning the nut in one direction the stock will be depressed to increase the pressure of the roller *e* on the feed-roller to bite the paper, and when turned in the opposite direction to permit the stock and its roller to be lifted by the tension of a spring interposed between the bar *g* and the cap of the stock. There are four such pressure-rollers and appendages represented in the accompanying drawings, which is the number required for printing four strips at the same time. The number can be increased or decreased.

On the shaft of the feed-roller *c* there is a ratchet-wheel, *i*, and by the side of the ratchet-wheel a ratchet-lever, *j*, which turns freely on the shaft. The lever *j* is connected by a joint-link, *k*, with a balance-lever, (to be presently described,) which receives motion from one of the connecting-rods which operate the platens of the press, so that as the platens are being lifted after giving an impression the ratchet-lever is vibrated in one direction to turn the feed-roller to the required extent to feed forward the strips of paper for each succeeding impression. The joint-link *k*, instead of being directly attached to the ratchet-lever, is hinged to a block, *l*, which is fitted to slide on the lever, and which is provided with a temper-screw, so that it can be shifted and fastened at any required distance from the shaft on which the lever vibrates to suit the required range of motion according to the size of ticket to be printed.

The press represented in the accompanying drawings is designed for printing in two colors with two forms of types for each strip of paper. The beds *m m* of the press, on which the impressions are made, are two flat plates resting on two sets of adjusting-screws, *n*, tapped in flanges *o o*, projecting inward from the side pieces of the frame, so that they can

be separately adjusted to the two series of forms of types, and the two series of forms of types are secured to the under face of one platen *p*, instead of two platens, as heretofore used in machines for printing in two colors. The platen is secured to or made part of a cross-head, *q*, which slides in vertical ways formed in slots in the side frames, and to the ends of the cross-heads are secured vertical bars *r r*, one at each end, the lower ends of which bars work in guide-brackets *s s*. These bars have cross-slots *t t* near their lower ends, in which crank-pins *u u* on the ends of the main shaft *v*, work to give the required up-and-down motion to the platen.

The weight of the platen and its appendages is balanced by a counter-weight, *w*, which extends across the whole width of the machine, and is attached to the outer ends of two levers, *x x*, that vibrate on stud-pins *y y*, projecting from the side frames, the inner arms of these levers extending under pins projecting from the inner faces of the vertical bars *r r*, which are attached to the cross-head. It is one of these levers *x* which communicates motion to the feeding-roller *c*, before described, the joint-link *k* of the ratchet-lever *j* being connected with one of the said counter-balance levers *x*.

There are two inking-rollers, *z z*, one front and the other back, so that one can apply ink of one color to one series of forms of types, and the other a different color to the other series of types. The journals of these inking-rollers are mounted in the outer ends of rods *a' a'*, adapted to slide in the arms *b' b'* of two rock-shafts *c' c'*, the said rods being surrounded by helical springs *d'* within the arms *b'*, the tension of which tends to draw the inking-rollers inward against the outer ends of the arms *b' b'*. The shafts of the inking-rollers have wheels *e' e'* secured near each end, and the platen is formed with guideways *f' f'* near each end, under which the wheels *e' e'* roll as the inking-rollers pass under the forms of types, and the form of these ways is such as to guide the inking-rollers and cause them to travel in the right path for applying ink to the forms of type by the tension of the springs on the rods *a' a'*, which keep the wheels *e' e'* against the surface of the guideways.

The required motions are given to the rock-shafts *c' c'* for carrying the inking-rollers from the distributing-rollers *g' g'* of the inking apparatus under the forms of types and back to the distributing-rollers by two levers, *h' h'*, one for each rock-shaft, and placed on opposite sides of the frame. These levers are slotted each to receive a pin, *i'*, projecting from the bars *r r* on the ends of the platens. To the end of each of these levers is hinged the lower end of a rack, *j'*, the cogs of which engage the cogs of a pinion, *k'*, on one end of each corresponding rock-shaft *c'*. The racks are held in gear with the pinions by springs *l'*.

As the platen is lifted the rock-shafts are vibrated to carry the inking-rollers under the forms of type, and as the platen descends to give the impression the rock-shafts are turned in the opposite direction to carry the inking-rollers back to the ink-distributing rollers, and they are there held to receive the required supply of ink while the platen remains at rest as the cranks *u u* on the main shaft pass their lower dead-points.

By the simple arrangement above described I avoid the use of cams and the complicated machinery, such as heretofore used for this purpose, to give the required motions to the platens and the inking-rollers, and at the same time I avoid much of the wear and tear heretofore experienced. By making the bed in two or more parts, separately adjustable—that is, one for each of the series of colors to be printed—I avoid the necessity of having one platen for each of the series of colors to be printed, with all the connecting mechanism; and by the use of a series of separately-adjustable pressure-rollers in combination with the feed-roller I am enabled at the same time to print a series of tickets on paper or pasteboard of different thicknesses.

The numbering-wheels for numbering the tickets are mounted on the platen, at the back thereof, as at *m'*, and the shears for cutting off the tickets from the strips after they are printed and numbered are mounted, as heretofore, at the back of the frame. The fixed blade *n'* is attached to the back of the frame, and the movable blade *p'* is hinged at one end to the frame, and the other end is connected by a rod, *q'*, with a lever, *r'*, which is acted upon by a cam, *s'*, on the main shaft, to depress the blade and shear off the printed tickets. After the passage of the cam the blade is forced up by the tension of a helical spring, *t'*, on a rod, *w'*.

The driving-shaft *v'* is provided with a fast and loose pulley, *w'*, and motion is communicated from this shaft to the main shaft by the pinion and cog wheel *x' y'*; and motion is also communicated from the shaft *v'* to the distributing-roller *g'* of one inking apparatus by a band, *z'*, and from this to the other inking apparatus by another band, a^2.

I am aware that machines have been made and are now used for the purpose of printing railroad-tickets in two different colors by means of two forms of type; but such machines are made with two separate and independent platens, each provided with a separate mechanism for operating it, the motions of each platen and corresponding inking-roller being derived from a separate pair of cams of peculiar form, which are liable to wear, and the wear of which requires readjustment.

What I claim as my invention, and desire to secure by Letters Patent in machinery for printing railroad-tickets and other articles, is—

1. The feeding-roller, substantially as described, in combination with a series of press-

ure-rollers on separate adjustable stocks, substantially as described, whereby tickets of different thicknesses can be printed at the same time and by the same machine.

2. The one platen for receiving two series of forms of types, in combination with two adjustable beds, substantially as described, whereby the two series of impressions are obtained by the movement of one platen alone.

W. T. CUSHING.

Witnesses:
WM. H. BISHOP,
ANDREW DE LACY.