(No Model.) 3 Sheets—Sheet 1.

A. F. TUTTLE.

PRINTING MACHINE.

No. 581,795. Patented May 4, 1897.

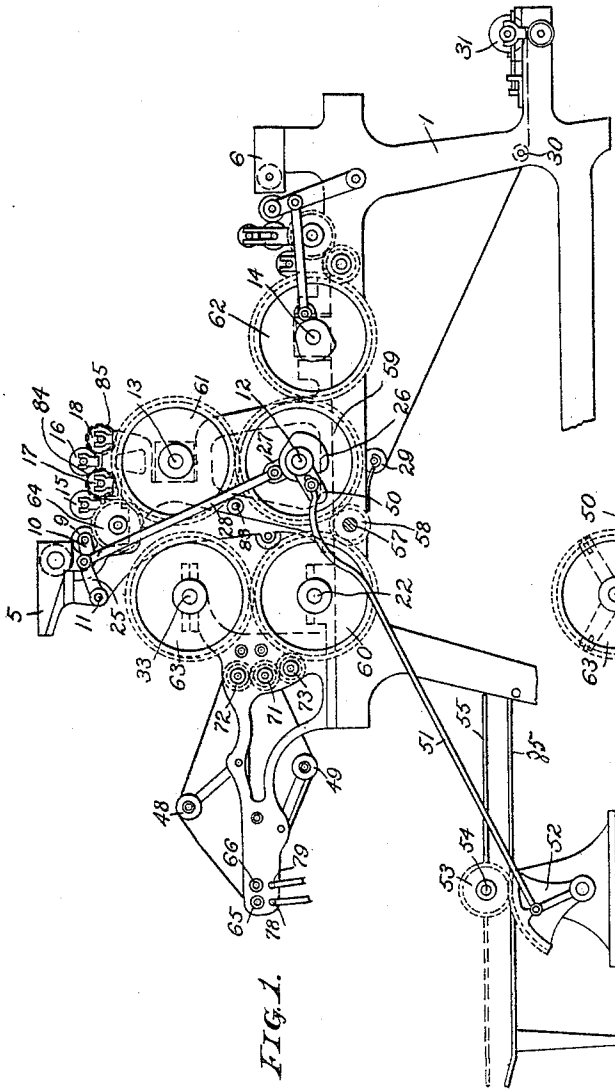

FIG. 1.

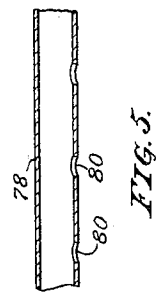

FIG. 5.

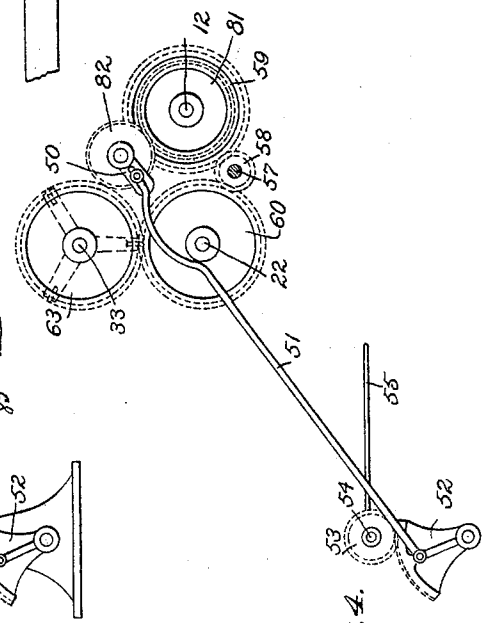

FIG. 4.

Witnesses
H. L. Christy
A. B. Lapham

Inventor
Asa Frank Tuttle
By his Attorney
Henry F. Hayes

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.)

3 Sheets—Sheet 2.

A. F. TUTTLE.

PRINTING MACHINE.

No. 581,795. Patented May 4, 1897.

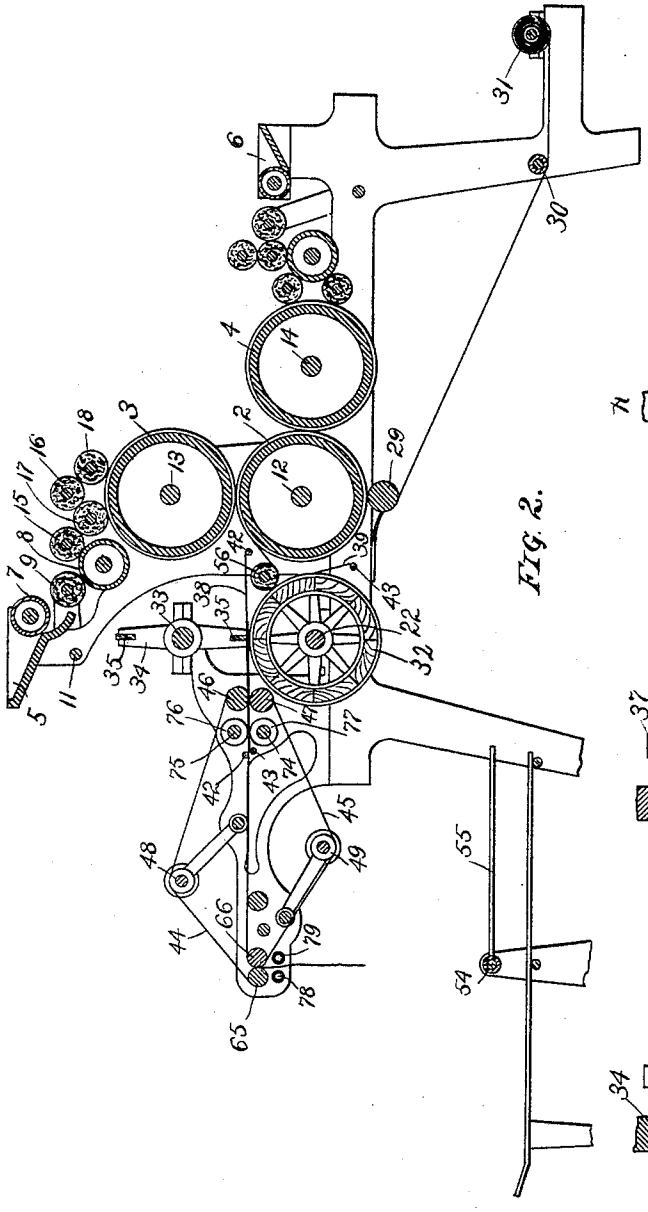

FIG. 2.

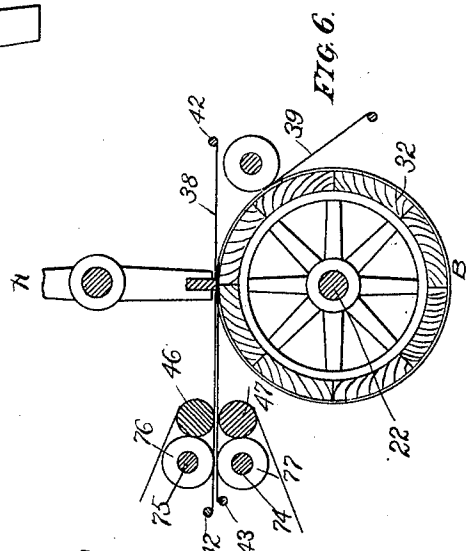

FIG. 6.

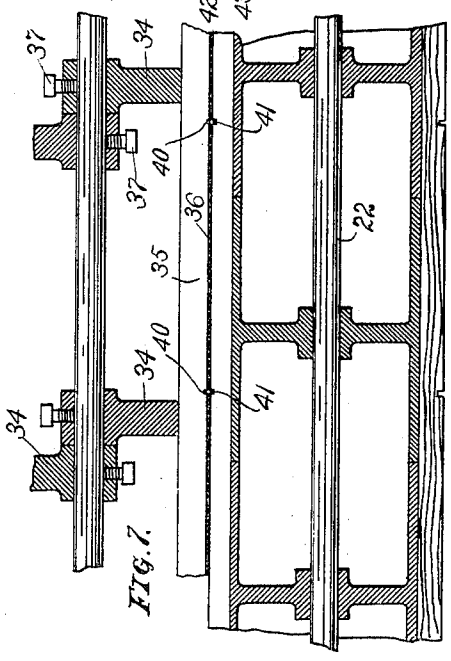

FIG. 7.

WITNESSES

H. A. Christy

A. B. Lapham

INVENTOR

Asa Frank Tuttle

BY Henry F. Noyes

ATTORNEY

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 3.

A. F. TUTTLE.

PRINTING MACHINE.

No. 581,795. Patented May 4, 1897.

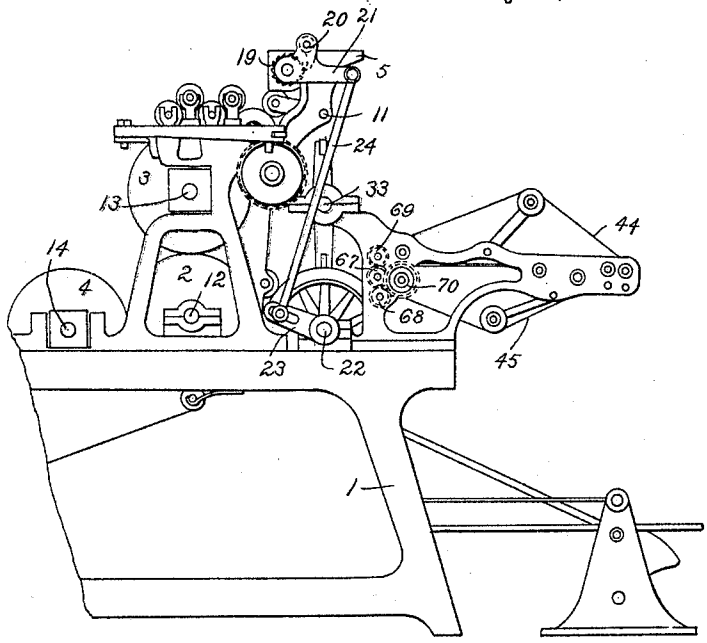

FIG. 3.

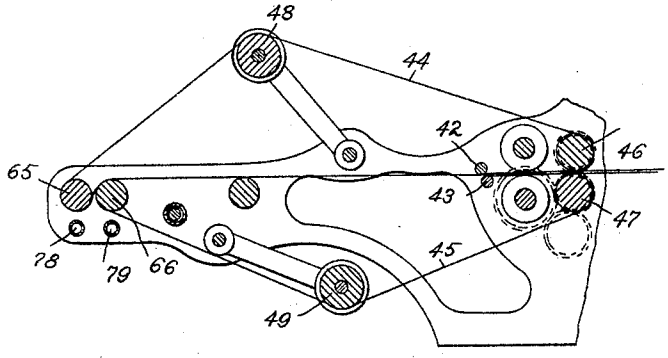

FIG. 8.

Witnesses
H. A. Christy
A. B. Lapham

Inventor
Asa Frank Tuttle
By his Attorney
Henry F. Rogers

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ASA FRANK TUTTLE, OF ELGIN, ILLINOIS.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 581,795, dated May 4, 1897.

Application filed January 16, 1896. Serial No. 575,772. (No model.)

To all whom it may concern:

Be it known that I, ASA FRANK TUTTLE, of Elgin, Kane county, Illinois, have invented certain new and useful Improvements in Printing Machinery, of which the following is a specification.

The object of this invention is to provide mechanism whereby ink of two or more colors may be applied to the material to be printed rapidly and continuously without the usual loss of time which is attendant upon this operation when the colors are applied consecutively.

A further object of this invention is to provide a mechanism whereby the stock after being printed may be cut into any different lengths required and a mechanism to deliver each sheet as cut, timing its operation with that of the cutting mechanism.

A further object of this invention is to provide a means of preventing the stock, after being cut, from sticking to and clogging upon the cutting-knives.

A further object of this invention is to provide a means of parting each sheet from the roll after it has passed under the cutting-knives.

The mechanism by which these improvements are effected is fully described in the specification, more particularly pointed out in the claims, and illustrated in the drawings, in which—

Figure 1 is a side elevation of the machine. Fig. 2 is a vertical sectional elevation on a line taken longitudinally through the center of the machine. Fig. 3 is a partial side elevation taken from the opposite side to that of Fig. 1. Fig. 4 is a detail of the arrangement to cut and deliver a different number of sheets per revolution of the impression-cylinder, three being shown for convenience, while as shown in Fig. 1 only two will be cut and delivered. Fig. 5 is an enlarged view of one of the pipes for supplying compressed air to the sheets as they are taken by the fly. Fig. 6 is an enlarged sectional elevation showing the means of preventing the paper from sticking to and clogging upon the cutting-knives, and Fig. 7 is a partial sectional elevation taken on line A B of Fig. 6. Fig. 8 is an enlarged view of the tapes for carrying the sheets to the fly.

The same reference-figures refer to the same parts in different views.

I provide a main frame 1 to carry the mechanism. Rotating upon suitable bearings in this frame is the impression-cylinder 2, carried by the shaft 12. Contacting this cylinder are the form-cylinders 3 and 4, carried by the shafts 13 and 14, respectively, to which cylinders the color-forms are fastened in any suitable manner and which are so arranged upon the cylinders with respect to each other and to the impression-cylinder that while both are operating at the same time each is applying its color to the desired point upon the paper as it passes around the cylinder 2. It is evident that this arrangement of the color-forms is obtained by adjusting each around upon the periphery of its cylinder until it reaches the right point.

The ink for the cylinder 3 is carried by the fountain 5 and that for the cylinder 4 by the fountain 6. Rotating in the fountain 5 is the feeding-roller 7. From the fountain the vibrating roller 9 takes the ink to the roller 8, suitable arms 10, working upon the shaft 11, being provided to carry said roller 9. The distributing-roller 15 takes the ink from the roller 8 to the roller 17, which contacts the form-cylinder. The distributing-roller 16 takes ink from the roller 17 to the roller 18, which also contacts the form-cylinder. The roller 8 runs close to the form-cylinder, but does not touch it.

To operate the ink-feeding roller 7, it is suitably connected with a ratchet-wheel 19, which is operated by a pawl 20, carried by an arm 21, which is operated from the shaft 22 by the crank 23 and connecting-rod 24.

To obtain the vibration of the shaft 11 necessary to carry the roller 9 back and forth between the rollers 7 and 8, the shaft 11 is supplied with an arm 25, operated from the shaft 12 by the cam 26, which contacts the roller 27 on the rod 28.

The paper is guided to the cylinder 2 by the rollers 29 and 30 and comes from the roller 31, and from the cylinder 2 it is guided to the wooden cylinder 32 by the antismutting felt roller 56.

To receive the cut, I provide upon the shaft 22 the wooden cylinder 32, and just above this, carried by the shaft 33, are the arms 34,

to which are firmly fastened the knife-blades 35. These blades are provided with projecting teeth or points 36, which make indentations in a continuous straight line across the paper, which is easily parted from the roll along that line when it reaches the proper point. These arms 34 are provided with adjusting-nuts 37, to which reference will be made later.

To prevent the paper from sticking to and clogging upon the knife-blades, an upper and an under set of wires 38 and 39, respectively, are provided. To clear the upper set, slots 40 are provided in the knife-blades, and the under set of wires is carried in circumferential grooves 41 upon the surface of the cylinder 32. These wires are tightly fastened to rods 42 and 43, respectively.

The tapes 44 and 45 for pulling the paper through after it has passed the cutting mechanism are carried by the rollers 46 and 65 and 47 and 66, respectively, adjustable guide-rollers 48 and 49 being supplied to tighten the tapes, the wires 38 and 39 serving to guide the paper between these tapes. Operated from the shaft 12 by means of the crank 50 and connecting-rod 51 is the quadrant 52, which drives the gear-wheel 53 upon the shaft 54, carrying the fly 55. Suitable driving mechanism is attached to the shaft 57, which carries the gear-wheel 58, meshing with the gear 59, which drives shaft 12 and gear 60, which in turn drives shaft 22. Gear 59 drives gear 61 and its shaft 13 and gear 62 and its shaft 14, and gear 60 drives gear 63 and its shaft 33. These five gears 59, 60, 61, 62, and 63 are all of the same pitch diameter, and hence drive all the shafts 12, 22, 13, 14, and 33 at the same speed. Driven by gear 61 is gear 64, which drives ink-roller 8, while the form-inking rollers 17 and 18 are driven by the gears 84 and 85, which mesh with the gear 61 and give the roller the same periphery velocity as the cylinder 3 has, thus preventing the form-inking rollers from blurring the type.

The paper as it comes from the impression-cylinder under the felt roller 56 and over the wooden cylinder 32 and between the wires 38 and 39 receives the cut as the knife-blade comes around to contact the cylinder 32, passes between the rollers 46 and 47, where the tapes 44 and 45 receive it and carry it along with them, rollers 46 and 47 being placed a slight distance apart, so that as the paper passes between them it will not be pinched by them, but simply carried along by the friction of its weight upon the tapes. These rollers 46 and 47 are driven by the gears 67 and 69, (shown in Fig. 3,) the latter gears receiving their motion through the idler 68 from the gear 70, which is on the shaft 74, which also carries the gear 71. The latter is driven from gear 60 through the idler 73 and drives the gear 72 and its shaft 75. Shaft 75 carries the slitting rollers or knives 76, working against the form-roller 77, the object of these rollers being to cut the paper longitudinally.

It is evident that, the gear 70 being of larger diameter than the gears 67, 68, and 69, the tapes will be driven at a higher rate of speed than that at which the paper is delivered from the impression-cylinder, but as it is not pinched tightly between the tapes until the advancing end of the paper passes between the rollers 65 and 66 it will drag behind until it reaches that point. When this occurs, which is delayed until the cut or line of indentations in the paper made by the knives 35 has passed beyond the slitting knives or rollers 76 and 77, the paper taking the speed of the tapes is parted from the remainder of the roll along the line of the cut made by the knife and passes down between the rollers 65 and 66 ready to be delivered by the fly 55.

The movement of the fly is timed so that just as the severed end of the sheet passes from between the rollers 65 and 66 the fly comes up and receives it and deposits it on one side or the other, as the case may be.

To prevent the sheet from curling up, just below these rollers 65 and 66 are provided the tubes 78 and 79, so arranged that the sheet passes between them. Each of these tubes is connected with a source of compressed air and provided on its under side with a number of holes 80, (see Fig. 5,) through which a blast of air is delivered to the sheets. These blasts being delivered each side of the sheet keep it in a vertical position and prevent the ends from curling up until it is taken by the fly. Situated beneath the fly is the table 85, which is adapted to receive the sheets. Compressed air is supplied to these tubes from any suitable source.

It will be noted that for every revolution of the shaft 12 by means of the crank-arm 50 and connecting-rod 51 the quadrant 52 is given a reciprocating motion and that a stroke one way operates to swing the fly completely over to the position shown by the broken lines, and the return stroke operates to bring it back.

It will also be noted that as the shaft 33 is revolved at the same speed as the shaft 12 during one revolution of the shaft 12 the knives, as set in Fig. 2, will make two cuts. Hence the fly will act in unison with the knives. These knives are carried upon arms which can be adjusted by loosening the set-screws 37. Now if it is desired to cut the paper into different lengths—say, for example, into one-third the circumference of the cylinder 32—another set of knives is put upon the shaft 33, and the three sets are arranged so as to divide the circle into three equal parts, thus making three cuts per revolution.

It will be noted that the length of the color-forms is that of the desired sheet and that the points of the cutting-knives describe a circle of a diameter equal to that of the form-

cylinders and that the cutting-knives are arranged so that the distance between them, measured on the circumference of a circle equal in diameter to that of the form-cylinders, is equal to the length of the color-forms. Two forms whose lengths are unequal up to certain limits may be placed upon the form-cylinder. Then the distances between the cutting-knives will be arranged to correspond. If three color-forms are placed upon the form-cylinders, an additional knife is added to shaft 33, and the three knives are arranged so that the distances between them correspond with the length of the forms.

To make the fly act in unison with the knives, the arm 50 is removed from the shaft 12 and replaced by a gear 81. Another gear, with the crank-arm fastened to it, is placed upon the stud 83. These gears are so proportioned that for one revolution of gear 81 gear 82 makes one and a half revolutions, and hence the quadrant is given three strokes to one revolution of shaft 12, and the fly takes a sheet in unison with each operation of the cutting-knife. It is evident that other variations could be made in the same way. Thus will be seen the advantages of this invention.

Ink of two colors can be applied to the paper continuously, and it is evident that by changing the positions of the form-cylinders more than two colors could be applied in the same way.

The sheets can be cut to any desired length, and as the fly delivers at each stroke it can work much faster than where it only delivers every other stroke.

The cutting mechanism has little chance of becoming clogged and delaying the work.

Each sheet is readily parted from the roll after it has been cut and is received and delivered by the fly in a smooth and even condition.

While I have described my invention with more or less completeness as regards the details thereof and as being embodied in more or less precise form, I do not desire to be limited thereto unduly, as I contemplate all proper changes of form, omission of parts, and the substitution of equivalents as circumstances may suggest or necessity render expedient.

I claim—

1. In a printing-press, the combination of a cut-receiving cylinder, cutting-knives carried by suitable shafts, a means of guiding the stock from said cylinder to a fly, a quadrant operating said fly, a connecting-rod operating said quadrant, said rod and said knives connected by gearing whereby said fly is adapted to operate in unison with the strokes of said cutting-knife, as and for the purpose set forth.

2. In a printing-press, the combination of a cut-receiving cylinder, a set of cutting-knives operating upon said cylinder and carried upon suitable arms, a shaft to support said arms, a means of guiding the stock from said cylinder to a fly, a quadrant operating said fly, a connecting-rod operating said quadrant, said rod and said knives connected by gearing whereby said fly is adapted to operate in unison with the strokes of said cutting-knives, as and for the purpose set forth.

3. In a printing-press, the combination of a cut-receiving cylinder, cutting-knives operating upon said cylinder and carried by a suitable shaft, connections between said shaft and said cylinder, a means of guiding the stock from said cylinder to a fly, a toothed quadrant operating said fly, a connecting-rod operating said quadrant, said cylinder and said rod connected by gearing whereby said fly is adapted to operate in unison with the strokes of the cutting-knife, as and for the purpose set forth.

4. In a printing-press, the combination of a cut-receiving cylinder, cutting-knives carried by a suitable shaft, a means of preventing the stock from sticking to said knives after it has been cut, a means of guiding the stock from said cylinder to a fly, a quadrant operating said fly, a connecting-rod operating said quadrant, said rod and said knives connected by gearing whereby said fly is adapted to operate in unison with the strokes of said cutting-knife, as and for the purpose set forth.

5. In a printing-press, the combination of a cut-receiving cylinder, cutting-knives carried upon a suitable shaft, tapes adapted to carry the stock from said cylinder to a fly, means of driving said tapes at a speed greater than the speed at which the stock is delivered to them, a quadrant operating said fly, said rod and said knives connected by gearing whereby said fly is adapted to operate in unison with the strokes of the cutting-knife, as and for the purpose set forth.

ASA FRANK TUTTLE.

Witnesses:
P. M. BLACKMAN,
J. C. PENCHARD.