

(No Model.)

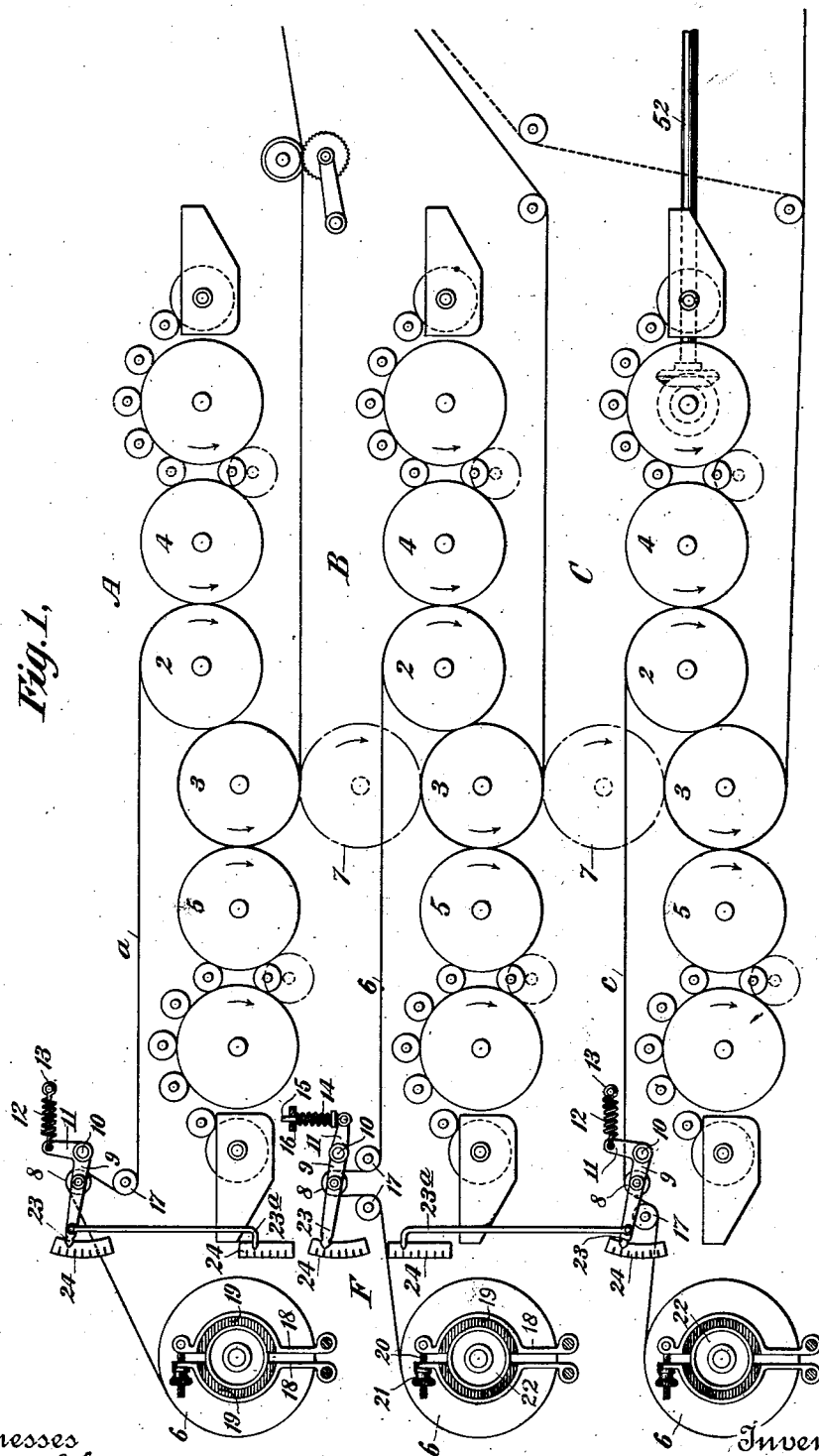
3 Sheets—Sheet 1.

W. SCOTT.
PRINTING MACHINE.

No. 571,982.

Patented Nov. 24, 1896.

Fig. 1.



Witnesses
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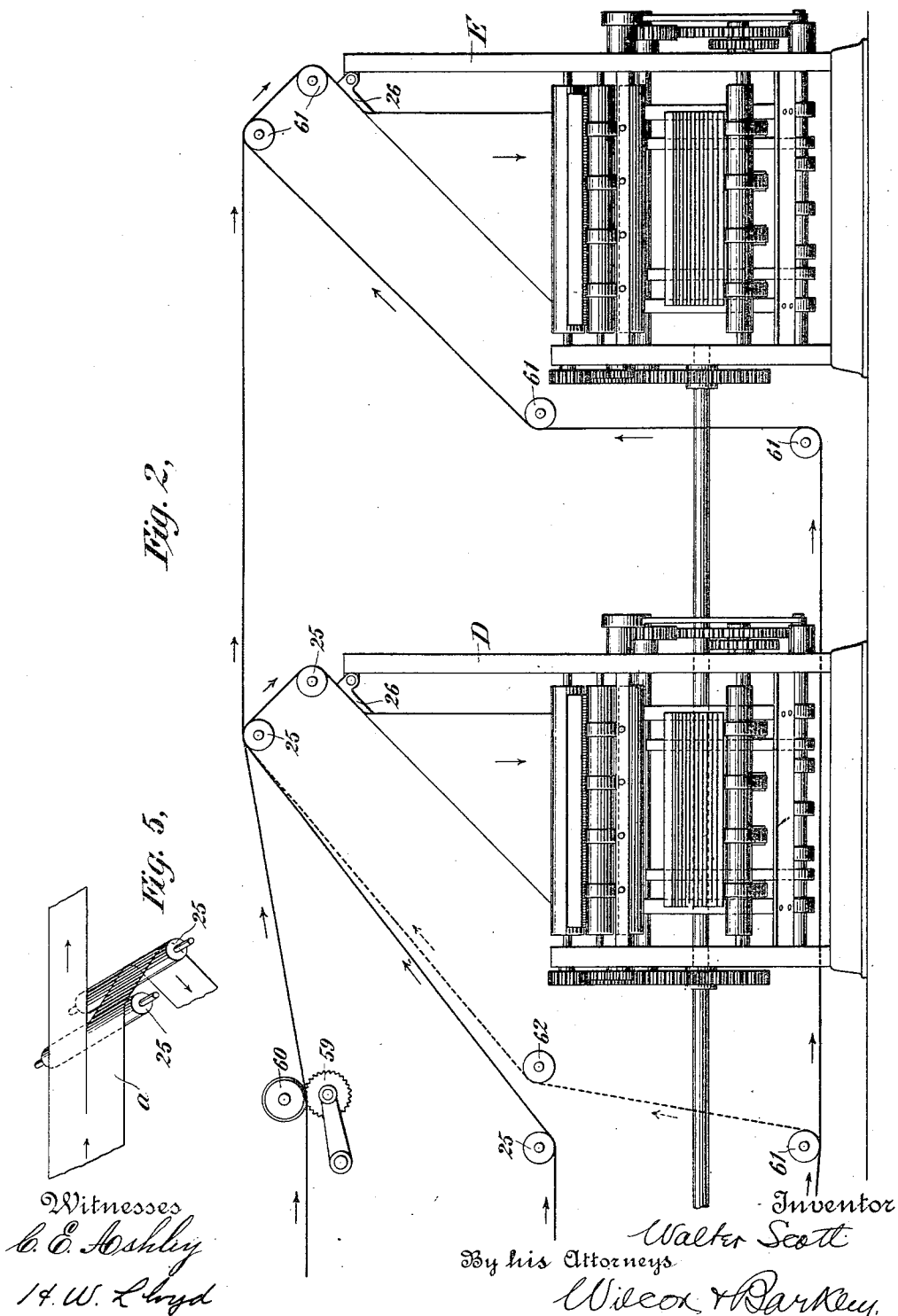
(No Model.)

3 Sheets—Sheet 2.

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3 Sheets—Sheet 3.

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Fig. 3,

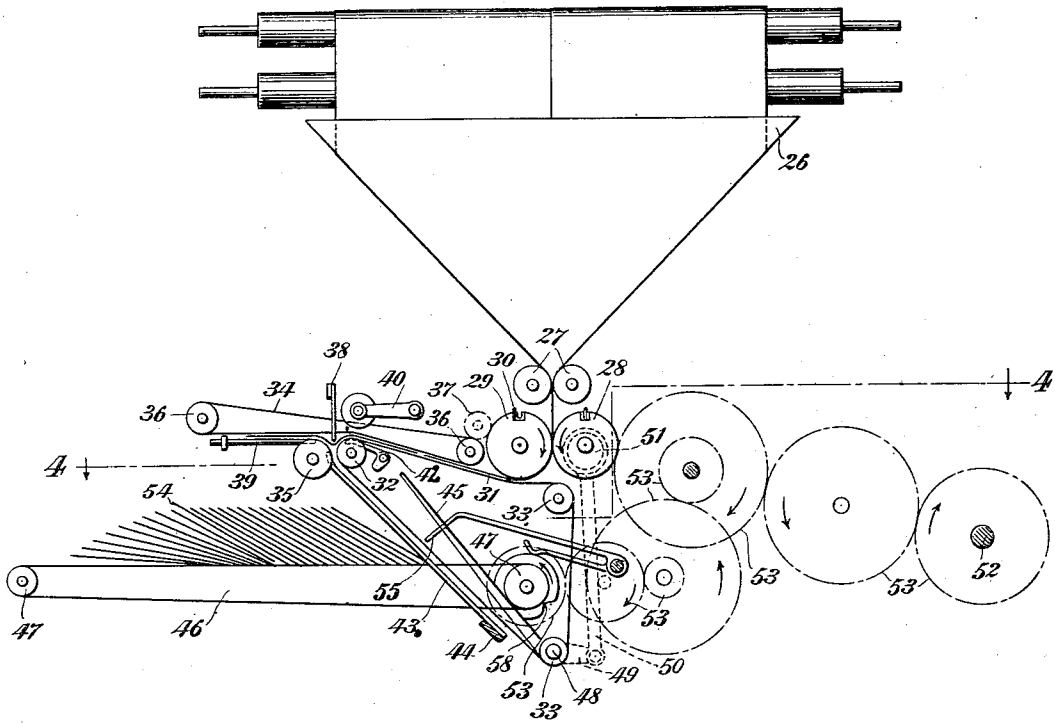
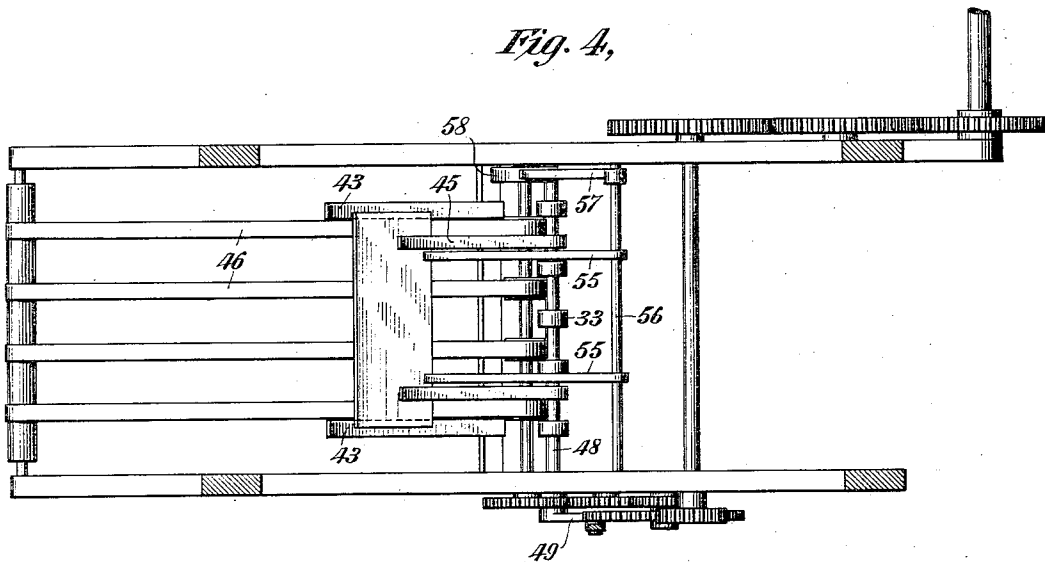


Fig. 4,



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UNITED STATES PATENT OFFICE.

WALTER SCOTT, OF PLAINFIELD, NEW JERSEY.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 571,982, dated November 24, 1896.

Application filed October 23, 1893. Serial No. 488,896. (No model.)

To all whom it may concern:

Be it known that I, WALTER SCOTT, a citizen of the United States, and a resident of Plainfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Printing-Machines, of which the following is a specification.

This invention relates to that class of printing-machines wherein one or more webs are perfected and are then led to a cutting mechanism to be cut transversely to form part or all of a product which is then delivered.

One object of the invention is to obtain proper register of the transverse margins of the web or webs with the cutters of the transversely-cutting mechanism. This part of the invention is more especially useful when the web or webs are folded longitudinally before they reach the transversely-cutting mechanism.

Another object is the counting of the products or copies as they are delivered, and other objects as will appear.

To these ends the invention includes a web-operated web-tension indicator. It also includes the combination, with web-folding mechanism for giving a longitudinal fold, of cutting mechanism for cutting the folded web or webs transversely and a web-operated web-tension indicator. It also includes the combination, with delivery mechanism, of an intermittently-acting stop for arresting copies and so causing them to project from the bundle or package upon the receiver, thus counting the copies as they are delivered, and of other combinations hereinafter described, all as more particularly pointed out in the claims concluding this specification.

One form of the invention is shown in the accompanying drawings, forming part hereof, in which—

Figure 1 is a diagrammatic side view of a printing-machine, showing means for indicating web-tensions and varying the length of the web-paths. Fig. 2 is a side elevation of two folding-machines the points of whose longitudinal folders are placed toward the printing mechanism shown in Fig. 1. Fig. 3 is an end view of a folding-machine, showing certain parts thereof only. Fig. 4 is a plan view of the counting mechanism, packer, and receiver; and Fig. 5 is a diagram show-

ing the course of the webs of the three printing-presses when both folders are in operation and producing six-page copies, &c.

The machine shown in the drawings includes three web-printing presses A, B, and C, of the rotary type, placed one above another, and two folding mechanisms D E, placed one behind the other at the delivery end of the printing mechanism. The printing-presses are or may be duplicates of each other. Their impression-cylinders are marked 2 and 3, and their plate-cylinders are marked 4 and 5. The latter are or may be inked by usual means. Hence no description of inking devices will be given herein. The axes of the impression-cylinders of each printing-press are shown as being in a plane making an angle with the horizontal. The webs *a b c* for the presses are led from suitable supported rolls 6 in a direct path to the upper impression-cylinder of each press.

The means for indicating the web-tension are placed, by preference, in the path of the webs between the web supply (as rolls 6) and the printing mechanism. This causes a slight departure from the direct path of the web. From the printing-presses the webs are led to one or both the folding-machines shown, being suitably guided thereto. The members of the printing-presses are geared to each other in usual ways (not shown) and the presses are connected by suitable gears, (see reference 7.)

It is well known that unequal tensions of one or of two or more associated webs cause want of register of the printed matter at the cutting mechanism. Heretofore the attendant at said mechanism has had to equalize said tensions by personally going to the rolls and tightening or loosening one or more of the friction devices; or another attendant at the rolls tightens or loosens said friction devices as directed by the attendant at the cutting mechanism. It is an object of this invention to enable the attendant at the rolls to know the tension of each web and so discover the state of the register of the associated webs at the cutting mechanism. For this purpose suitable means for indicating the web-tension are used, and one form thereof will now be described.

A roller 8 is supported by the arms 9 of a

rock-shaft 10, which is suitably journaled in the framework. (Not shown.) The rock-shaft is rocked one way by a suitably-placed spring. In each case shown in the drawings the shaft 10 is so rocked by a spring acting on an arm 11, rigid with the shaft. This spring may be either a pull-spring, as 12, which is fast to arm 11 and to a support 13 on the framework; or a push-spring, as 14, which surrounds a rod 15, pivotally connected with arm 11, and passing through a stationary part, as a lug 16, or it may be arranged otherwise. One or more rollers 17 are placed near the rollers 8 in the framework, and the web passes between said rollers 8 and 17. Any suitable means may be used to vary the tension of the webs. There is shown one such means, consisting of the pivoted jaws 18, having friction-liners 19, the pivoted screw 20, and its nut 21, all of usual construction. One of the jaws 18 is split or forked at the end to allow the screw to be thrown out of engagement therewith. By tightening or loosening the contact of liners 19 with the shaft supporting the roll 6 or with a pulley 22 thereon the tension of the web may be increased or decreased. Since the pressures of the printing and the cutting mechanisms are or may be constant, any variation of the resistance of roll 6 to unwinding will cause a motion of roller 8 toward or from roller 17 and a corresponding variation of the tension of the web. The power tending to move roller 8 against the pull of the web being fixed in each case, (and this power may be adjustable,) the motion of roller 8 is proportioned to the web-tension and may be suitably shown. For so showing the web-tension a scale and pointer may be used, one of which is movable and connected with the shaft 10.

In the drawings are shown a pointer 23, which is borne by shaft 10, and a scale 24, which is or may be adjustably fixed to the framework (not shown) as by a screw. To bring the several tension-indicators within the scope of the eye at one and the same time, the scales 24 may be placed adjacent each other, as at F, and pointers 23^a be pivotally attached to the arm 11 of one or more of shafts 10. In practice the web-tensions are to be regulated by varying the frictional resistance to unwinding until the pointers indicate the same tensions on the scales. When the scales show that the tensions are equal, the webs will arrive at the cutting mechanism in proper register if properly set or adjusted.

Passing now to the folding mechanism shown, the web *b* is guided by rollers 25 to the longitudinal folder 26 of machine D, whence it passes between rollers 27 to the cutter, which is or may be of any usual form, and which is shown as formed of male and female cutting-cylinders 28 29, the latter of which has retainers, as pins 30, to hold the end of the webs after sheets have been sev-

ered therefrom. The severed products are released by the retainers as the latter pass the tapes 31, which run on pulleys or rollers 32 and rollers or pulleys 33. The tapes 31 coact with tapes 34 to feed the copies forward over folding-rollers 32 35. Tapes 34 run on rollers or pulleys 36, one of which is geared to cylinder 29 by gear 37. A creaser 38 coacts with rollers 32 35 to fold the copies at the times they extend beyond roller 35. The tapes 31 34 are or may be of the class known as "accelerating." An accelerating drop-roll 40 may be used to drop on each copy and nip it off in case the cutter of the cutting-cylinders is of that form which perforates or partially severs the web into sheets. The tapes 31 34 in this case accelerate the sheets. Rocking guides or rods 42 may be used to lift the ends of sheets to lead them over the rollers 32. From the rollers 32 35 the folded copies are run between tapes or between rods or between tapes and rods, as on the two guides 43, which support the sides thereof only, and which are supported by the bar 44 of the framework. The tapes 31 coact with guides 43, as shown. At proper times the vibrating packer 45 strikes the backs of the copies as they slide down the guides 43 and pushes them through between the same upon the receiver. The receiver shown consists of tapes 46, which run on rollers or pulleys 47. The packer 45 is carried by shaft 48 (upon which the pulleys 33 are loose or they may be on a separate shaft) and is operated in any suitable manner, as by the crank 49, rod 50, and eccentric 51 on the shaft of cylinder 28. The tapes 46 are shown as receiving their motion from the side shaft 52 by a speed-reducing train of gearing 53.

For the purpose of counting or tallying the delivered copies as they are delivered a suitably-operated stop intermittently arrests a copy before it descends on the guides 43 as far as those not so arrested. As the packer acts at regular intervals, the arrested copies are piled on the receiver with their ends projecting, as indicated at 54. The stop shown consists of two stop-fingers 55, which point substantially at right angles to the course of the copies along guides 43, and which are borne by a shaft 56, journaled in the framework. An arm 57 of the shaft 56 lies over a cam 58, which is borne by the shaft carrying pulleys 47. The arm 57 is kept in contact with the cam 58 by its weight and that of the fingers or by a spring.

The folding-machines D and E may be duplicates, and either may be used to fold all the webs coming from the printing mechanism and each may be used to fold half the webs. Thus to produce six-page copies (or multiples thereof) the web *c* is led to folder E, web *b* is led to folder D, and web *a* is split by the cutter 59 and wheel 60, one half going to folder D with web *b* and the other half going to folder E with the web *c*. The last-

named web is led to folder E underneath folder D and is guided by the rollers 61. In case all the webs go to the folder D the web passes, as indicated in the broken line, about roller 62. By the use of one, two, or three webs of full width copies of four, eight, or twelve pages or multiples thereof may be produced at one place, as folder D, or copies of four or six pages may be produced at two places. By running two presses with full-width webs and the other with a half-width web copies of ten pages may be produced at one place and various other arrangements may be made.

The web-tension indicators are especially useful when a longitudinal folder is employed to fold two or more webs, for it is not possible then to observe the register of the margins of the inner webs (after the fold) with the cutters. It is well known that in such cases the inner web or webs are not pulled along with the same force as the outer web by the rollers employed, and more or less trouble is always experienced in ascertaining the state of the case and regulating the web-tensions accordingly. By the use of the indicators herein described it is easy to ascertain by looking the exact state of affairs as regards the register of margins with the cutting mechanism and to remedy any defect therein.

The springs for operating the shafts 10 may be used at each end thereof to avoid the possible torsion thereof.

The rollers for moving the index of the web-tension indicator may be mounted in spring-supported slides or in other convenient ways.

It will be observed that with the lead for the web shown in the drawings the under side thereof is printed last, and that with the described arrangement of the longitudinal folder the first-printed side of the webs is brought in contact therewith. This gives a longer time for the ink to dry on the side so coming in contact therewith, which is also "blotted," so to speak, by the blanket.

Many changes may be made in the details and parts of combinations without departing from the spirit of this invention, which is not limited to the precise form thereof shown and described.

I claim—

1. In a web-perfecting printing-machine, the combination with transversely-cutting mechanism, of a web-operated web-tension indicator, and a web-tension regulator, substantially as described.

2. In a web-perfecting printing-machine, the combination with longitudinally-folding mechanism, of transversely-cutting mechanism, a web-operated web-tension indicator, and a web-tension regulator, substantially as described.

3. In a web-perfecting printing-machine, a web-operated web-tension indicator, substantially as described.

4. The combination of a transversely-cut-

ting mechanism, mechanism for supplying two or more printed webs thereto, movable rollers or guides for lengthening and shortening the path of one or more of the webs as the tension thereof decreases or increases, a web-tension indicator for and actuated by each of said rollers, and web-tension regulating means, substantially as described.

5. The combination of two or more web-perfecting printing-presses, a transversely-cutting mechanism for the webs thereof, web-operated web-tension-indicating mechanism for indicating the tension of one or more of the webs, and web-tension-regulating means, substantially as described.

6. In a printing-machine, the combination of a web-perfecting printing-press, a transversely-cutting mechanism for the web, web-tension-regulating means, and a web-operated web-tension indicator, substantially as described.

7. In a printing-machine, the combination of a transversely-cutting mechanism, mechanism for supplying printed webs thereto, web-tension-regulating means, and web-operated web-tension indicators grouped near each other, substantially as described.

8. In a printing-machine, the combination of transversely-cutting mechanism, means for supplying two or more webs thereto, web-tension-regulating means for the webs, and means for indicating the tension of one or more webs irrespective of anything on the same, substantially as described.

9. In a printing-machine, the combination of a printing-press for perfecting a web, a longitudinal folder for folding the web, transversely-cutting mechanism for the folded web, a web-tension regulator, a scale, and a web-operated pointer coacting with the said scale for indicating the web-tension, substantially as described.

10. In a printing-machine, the combination of printing mechanism for perfecting a plurality of webs, a longitudinal folder for folding the said webs, transversely-cutting mechanism for the folded webs, means for regulating the web-tensions, and mechanism for indicating the tension of one or more webs irrespective of anything thereon, substantially as described.

11. In a printing-machine, the combination of a number of web-perfecting printing-presses, means for regulating the web-tensions, web-associating mechanism, a transversely-cutting mechanism for the associated webs, and means for indicating all the web-tensions irrespective of anything on said webs, substantially as described.

12. In a printing-machine, the combination of a number of web-perfecting printing-presses, web-tension-regulating means, web-associating mechanism, a transversely-cutting mechanism for the associated webs, and web-tension-indicating means located between the web supply and the printing mechanism for indicating the web-tensions irre-

spective of anything on said webs, substantially as described.

13. The combination of printing machinery for perfecting a web drawn from a roll, a roll-holder, transversely-cutting mechanism for the printed web, adjustable frictional mechanism for regulating the speed at which the roll unwinds, a scale, and a web-operated pointer coacting with said scale for indicating the web-tension, substantially as described.

14. In a printing-machine, the combination of inclined guides for the edges of folded copies, a receiver, means for pushing said copies between said guides onto said receiver, and an intermittently-acting stop for arresting copies on the guides and causing them to project, substantially as described.

15. In a printing-machine, the combination of inclined guides for the edges of folded

copies, a receiver, means for pushing said copies between said guides onto said receiver, and a reciprocating stop intermittently arresting copies on the guides and causing them to project, substantially as described.

16. In a printing-machine, the combination of inclined guides for the edges of folded copies, means for pushing said copies between said guides; a rocking stop for intermittently arresting copies on the guides, and a cam operating said stop, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 10th day of October, 1893.

WALTER SCOTT.

Witnesses:

FREDERIC GOODWIN,

RICHARD W. BARKLEY.