

No. 674,919.

Patented May 28, 1901.

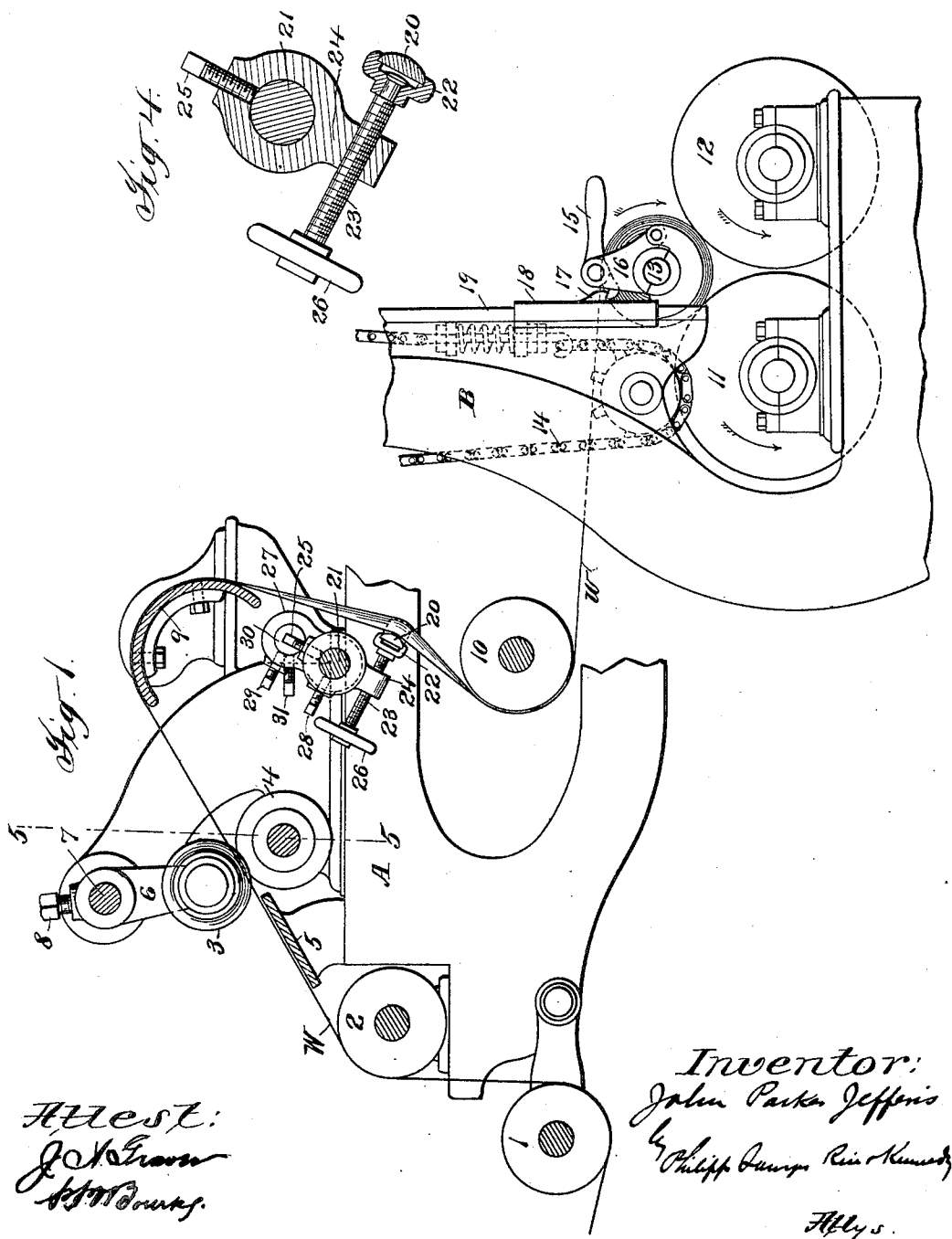
J. P. JEFFERIS.

WEB SLITTING AND WINDING APPARATUS.

(Application filed Mar. 7, 1901.)

(No Model.)

3 Sheets—Sheet 1.



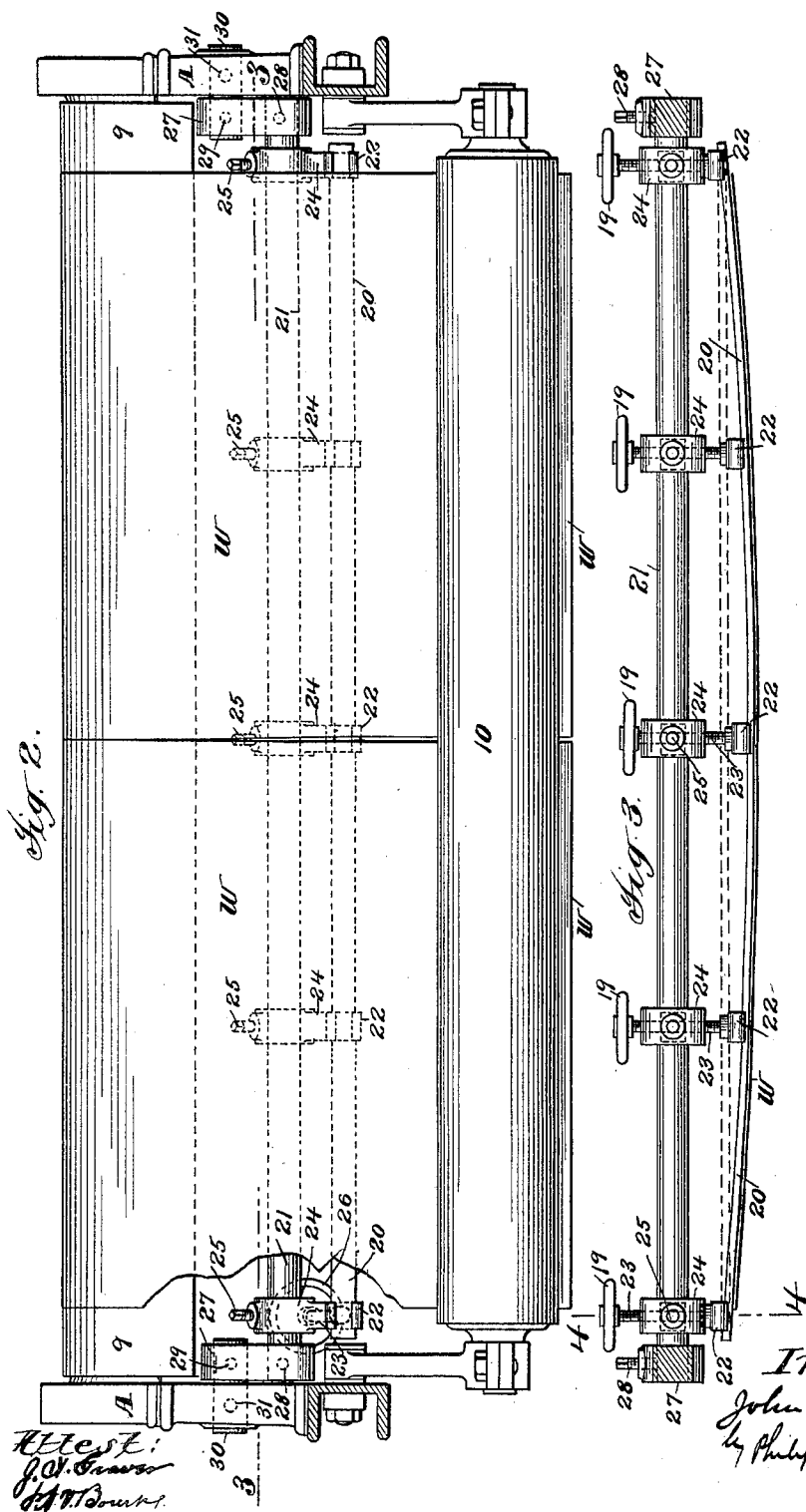
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3 Sheets—Sheet 2.



Attest:
J. W. Brown
J. W. Brown

Inventor:
John Parker Jeffris
by Philip Sawyer, Atty. General

H. L. S.

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3 Sheets—Sheet 3.

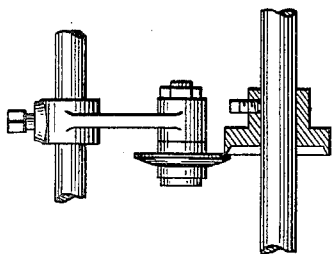


Fig. 5.

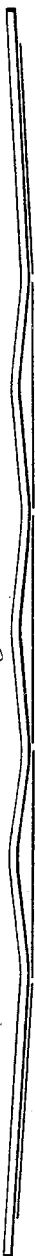


Fig. 6.



Fig. 7.



Fig. 8.



Fig. 9.

Attest:
J. W. Evans
Atty. Genl.

Inventor:
John Parker Jeffers
by Philip Langer Rice Kennedy

Atty.

UNITED STATES PATENT OFFICE.

JOHN PARKER JEFFERIS, OF WILMINGTON, DELAWARE.

WEB SLITTING AND WINDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 674,919, dated May 28, 1901.

Application filed March 7, 1901. Serial No. 50,181. (No model.)

To all whom it may concern:

Be it known that I, JOHN PARKER JEFFERIS, a citizen of the United States, residing at Wilmington, county of Newcastle, and State of Delaware, have invented certain new and useful Improvements in a Combined Web Slitting and Winding Apparatus, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to combined web slitting and winding apparatus—that is to say, apparatus in which a main web is slit longitudinally into a number of webs, which are then guided onward side by side to a winding mechanism, where the several webs are by frictional contact with a suitably-driven winding drum or drums wound side by side into a like number of rolls upon a core which is common to the several rolls and which is removable, so that when the winding operation is completed it may be withdrawn from the rolls wound upon it and reused in the winding of other webs.

In combined web slitting and winding apparatus as heretofore constructed the webs as they travel onward side by side from the slitting mechanism to the winding mechanism have a tendency to approach each other and to overlap at their adjacent edges, so that the several rolls formed from the webs instead of being disconnected, as they should be, have their ends connected to the extent to which the webs so overlap. This prevents the formation of perfect rolls, as the overlapping of the edges of the webs produces wrinkles, causes each roll to be loose or soft and of unequal diameter, (the roll being larger at its ends than between them,) and, moreover, renders it necessary in order to separate the rolls upon withdrawal of the core for the workman to forcibly pull the several rolls apart.

It is the object of the present invention to overcome these difficulties and to provide a novel form of web-spreading device for engaging the webs as they travel onward from the slitting mechanism in such way as to spread them apart, and thus overcome this tendency to approach each other, so that the webs upon reaching the winding mechanism will be wound into rolls disconnected from

each other and without any overlapping of their adjacent edges, the means provided for this purpose by the present invention being adjustable, so as to spread apart not only two such webs, but any number of webs into which a main web is slit as it travels onward to the winding mechanism.

The improvements of the present invention have been designed particularly for use in apparatus for operating upon webs of paper, in which apparatus they have peculiar advantages, and they will therefore and for convenience be described in connection with such apparatus.

In the accompanying drawings, Figure 1 is a side elevation of a combined web slitting and winding apparatus embodying the present invention, illustrating also means for guiding the main web to the slitting mechanism and for guiding the slit webs from the latter to the winding mechanism. Fig. 2 is a front view, looking toward the left of Fig. 1, of the means for guiding the slit webs from the slitting mechanism to the winding mechanism, illustrating also the spreading device provided by the present invention for engaging the slit webs and spreading them apart, the number of webs shown as so spread apart in this view being two. Fig. 3 is a section on the line 3 3 of Fig. 2, illustrating particularly the manner in which the spreading device engages the surfaces of the slit webs to spread them apart. Fig. 4 is a section, on an enlarged scale, on the line 4 4 of Fig. 3. Fig. 5 is a section on the line 5 of Fig. 1; and Figs. 6, 7, 8, and 9 are edge views of the spreading device adjusted or bent into position to spread apart five, four, three, and six webs, respectively.

Referring to said drawings, 1 2 represent a pair of web-guiding rolls for guiding a main web W of paper from the usual unwinding mechanism (not shown) or other source of supply toward the slitting mechanism of the apparatus, consisting in the case shown of upper and lower slitters 3 4, while 5 represents a web-guiding board or plate interposed between the roll 2 and said slitting mechanism for guiding and supporting the web from the former to the latter. The upper slitter 3, which is driven by frictional engagement with lower slitter 4, is journaled in an arm 6, adjustably secured to a shaft 7 in frame A by a

set-screw 8, so that the slit 3 may be adjusted longitudinally of said shaft and to and from lower slit 4 or swung into or out of operative relation to said slit 4. The lower slit 4 is also adjustably secured to a suitably-driven shaft 4^a, so that it may be adjusted longitudinally thereof. Only one pair of such slitters is shown; but it will of course be understood that as required others may be added or removed according as the main web W is to be slit into a greater or a less number of minor webs. The main web W in passing between slitters 3 4 is slit longitudinally into a number of minor webs *w*, (two in the case shown,) which minor webs pass from said slitters over a guiding-segment 9 and under a guiding-roller 10, and thence to the paper-winding mechanism. The particular form of paper-winding mechanism shown in the present case forms no part of the present invention, being selected merely for illustration, and is the same as that shown and described in Letters Patent to Thomas H. Savery, No. 667,893, and Vincent G. Hazard, No. 667,879. Briefly described, it consists of a pair of suitably-driven winding-drums 11 12, which by frictional engagement with the minor webs *w* as they are wound upon a removable core 13 rotate said core, and thus wind the webs *w* thereon, as more fully described in the aforesaid patents. As the webs *w* are thus wound upon the core 13 and the rolls of material on the latter are thus increased in diameter the core 13 moves upwardly, as described in the aforesaid patents, its upward movement being at first resisted and then assisted, so as to secure proper winding of the webs, by a pressure device (not shown) connected to and operated by a sprocket-chain 14, which is in turn operated by the core 13 as it moves upwardly through connections consisting of a lever 15, pivoted in the hinged member 16 of the bracket in which the core 13 is journaled and engaging a catch 17 upon a bracket 18, secured to the sprocket-chain 14 and mounted so as to slide vertically upon a guide 19 on the frame B. For a fuller description of the construction and operation of this winding mechanism reference is hereby made to the aforesaid patents.

As before stated, the slit webs after leaving the slitting mechanism and on their way to the winding mechanism have a tendency to approach and overlap at their adjacent edges. To overcome this difficulty, I provide means, which will now be described, for engaging the surfaces of the webs as they travel onward from the slitting mechanism to the winding mechanism in such way as to spread their edges apart slightly.

The means shown consists of a spreading-bar 20, mounted upon a shaft 21, and which in use is bowed or bent out of parallelism with the face of the guiding-segment 9, so as to engage the under surfaces of the webs *w* and deflect or bend them outwardly from a straight line, and thus cause their adjacent edges to separate, with the result that the several webs

will be wound upon the core 13 without any overlapping of their adjacent edges and with the several rolls upon the core disconnected from each other and each roll wound uniformly widthwise and free from wrinkles.

In Figs. 1 to 3 a single pair of slitters 3 4 is shown located centrally of the main web W, so that the main web is severed into only two minor webs *w*, and the spreading-bar 20 of these figures therefore has but a single curved or high part for engaging and spreading apart the two webs, this curved or high part being located in line with the adjacent edges of the webs. In combined web slitting and winding machines, however, the number of minor webs into which a main web is slit varies, the main web being sometimes slit by the employment of additional slitters 3 4 into three, four, or even a greater number of webs. The spreading-bar 20 of this application is therefore designed to operate not only upon two webs, as shown in Figs. 1 to 3, but upon such additional webs, and for this reason it is made of flexible material, so that it may be readily adjusted or bent into any desired number of curves, and is also provided with devices for so adjusting or bending it, which devices will now be described. Each of the adjusting devices referred to (of which there may be any number, according to the number of slit webs to be operated upon and the number of curves to be formed in the bar 20) consists of a support or clamp 22, in which the spreading-bar is mounted, a screw-threaded spindle 23 free to turn in said clamp, and a bracket 24, (see Fig. 4,) mounted upon shaft 21 and provided with a threaded opening for receiving the threaded end of the spindle. Each of the clamps 22 is connected to the spreading-bar 20 in such way as to permit movement of each relatively to the other longitudinally of the shaft 21, and the brackets 24 are likewise movable longitudinally of said shaft, so that the clamp 22 may be adjusted to any desired position along the spreading-bar 20. Each of the brackets 24 is provided with a set-screw 25, by which it may be secured to the shaft 21 in its adjusted positions, and each of the spindles 23 is also provided with a handle 26 for convenience in turning it. By means of these adjusting devices the spreading-bar 20 may be bent or adjusted into any desired number of curves. For example, to bend or adjust the spreading-bar 20 to operate upon two webs, as in Figs. 1 to 3, the several spindles 23 will be rotated, so that the spreading-bar 20 will be bent into a single curve, with the middle or high part of the bar in line with the adjacent edges of the webs *w*. For three webs the spreading-bar 20 will be bent by the adjusting devices into the form shown in Fig. 8; for four webs, into the form shown in Fig. 7; for five webs, into the form shown in Fig. 6, and for six webs into the form shown in Fig. 9. With the adjusting devices shown in Figs. 1 to 3 the spreading-bar 20 may be bent into either the form shown in Fig. 3 or that shown

in Fig. 8—that is to say, for two and three webs—but for bending the bar 20 into the forms shown in Figs. 6, 7, and 9 additional adjusting devices will of course be employed, the number of adjusting devices employed and their positions along shaft 21 varying as the form of the spreading-bar is varied. In addition to this adjustment or bending outwardly relatively to its supporting-shaft 21 the spreading-bar 20 is adapted for lateral adjustment bodily into and out of the path of movement of the webs *w*, the supporting-shaft 21 for this purpose being mounted at its opposite ends in arms 27, to which it is secured by set-screws 28, the upper ends of said arms being secured by set-screws 29 to pins 30, fixed by means of set-screws 31 in the frame A. By loosening the set-screws 29 and 31 the arms 27 may be swung inwardly or outwardly relatively to the path of movement of the webs, so as to cause the spreading-bar 20 to project to a greater or less extent into the path of movement of the webs *w* or to move said spreading-bar out of operative position relatively to said webs.

What I claim is—

1. The combination with web slitting and winding mechanism, of a web-spreading device for bending the slit webs to prevent overlapping of their adjacent edges, said spreading device being adjustable at a plurality of points lengthwise to adapt it for operation upon the webs as the number thereof varies, substantially as described.

2. The combination with web slitting and winding mechanism, of a web-spreading device for bending the slit webs to prevent overlapping of their adjacent edges, said spreading device being adjustable at a plurality of points lengthwise to adapt it for operation upon the webs as the number thereof varies, and means for so adjusting said spreading device, substantially as described.

3. The combination with web slitting and winding mechanism, of a web-spreading device for bending the slit webs to prevent overlapping of their adjacent edges, said spreading device being adjustable at a plurality of points lengthwise to adapt it for operation upon the webs as the number thereof varies, means for so adjusting said spreading device, and an adjustable support for said spreading device and its adjusting means, substantially as described.

4. The combination with web slitting and winding mechanism, of a flexible web-spreading device for bending the slit webs to prevent overlapping of their adjacent edges, said spreading device being bendable at a plurality of points lengthwise to adapt it for operation upon the webs as the number thereof varies, substantially as described.

5. The combination with web slitting and winding mechanism, of a flexible web-spreading device for bending the slit webs to prevent overlapping of their adjacent edges, said spreading device being bendable at a plural-

ity of points lengthwise to adapt it for operation upon the webs as the number thereof varies, and adjusting means for so bending the spreading device, substantially as described.

6. The combination with web slitting and winding mechanism, of a flexible web-spreading device for bending the slit webs to prevent overlapping of their adjacent edges, said spreading device being bendable at a plurality of points lengthwise to adapt it for operation upon the webs as the number thereof varies, adjusting means for so bending the spreading device, and an adjustable support for said spreading device and its adjusting means, substantially as described.

7. The combination with web slitting and winding mechanism, of an adjustable web-spreading device for bending the slit webs to prevent overlapping of their adjacent edges, and means, adjustable lengthwise of said spreading device, for adjusting it relatively to the webs, substantially as described.

8. The combination with web slitting and winding mechanism, of a flexible web-spreading device for bending the slit webs to prevent overlapping of their adjacent edges, and means, adjustable lengthwise of said spreading device, for bending and adjusting it relatively to the webs, substantially as described.

9. The combination with web slitting and winding mechanism, of a web-spreading device for engaging the slit webs to prevent overlapping of their adjacent edges, said spreading device being adjustable at a plurality of points lengthwise to adapt it for operation upon the webs as the number thereof varies, and a plurality of adjusting devices adjustable lengthwise of said spreading device for adjusting it relatively to the webs, substantially as described.

10. The combination with web slitting and winding mechanism, of a flexible web-spreading device for bending the slit webs to prevent overlapping of their adjacent edges, said spreading device being bendable at a plurality of points lengthwise to adapt it for operation upon the webs as the number thereof varies, and a plurality of adjusting devices, adjustable lengthwise of the spreading device, for bending and adjusting it relatively to the webs, substantially as described.

11. The combination with web slitting and winding mechanism, of an adjustable web-spreading device for bending the slit webs to prevent overlapping of their adjacent edges, and means, adjustable lengthwise of said spreading device, for supporting said spreading device and adjusting it relatively to the webs, substantially as described.

12. The combination with web slitting and winding mechanism, of a flexible web-spreading device for bending the slit webs to prevent overlapping of their adjacent edges, and means, adjustable lengthwise of said spreading device, for supporting said spreading device and bending and adjusting it relatively to the webs, substantially as described.

13. The combination with web slitting and winding mechanism, of a web-spreading device for engaging the slit webs to prevent overlapping of their adjacent edges, said spreading device being adjustable at a plurality of points lengthwise to adapt it for operation upon the webs as the number thereof varies, and a plurality of adjusting devices adjustable lengthwise of said spreading device for supporting said spreading device and adjusting it relatively to the webs, substantially as described.

14. The combination with web slitting and winding mechanism, of a flexible web-spreading device for bending the slit webs to prevent overlapping of their adjacent edges, said spreading device being bendable at a plurality of points lengthwise to adapt it for operation upon the webs as the number thereof varies, and a plurality of adjusting devices, adjustable lengthwise of the spreading device, for supporting said spreading device and bending and adjusting it relatively to the webs, substantially as described.

15. The combination with web slitting and winding mechanism, of a flexible spreading-bar for bending the slit webs to prevent over-

lapping of their adjacent edges, a support for said bar, and a plurality of screw-threaded adjusting devices engaging said bar, substantially as described.

16. The combination with web slitting and winding mechanism, of a flexible spreading-bar for bending the slit webs to prevent overlapping of their adjacent edges, a support for said bar, and a plurality of screw-threaded adjusting devices adjustable on said support and engaging said bar, substantially as described.

17. The combination with web slitting and winding mechanism, of flexible spreading-bar, mounted in clamps, a support for said bar, and threaded adjusting-spindles adjustable mounted on said support and engaging said clamps, substantially as described.

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

JOHN PARKER JEFFERIS.

Witnesses:

THOS. H. SAVERY,
HOWELL S. ENGLAND.