No. 753,344. PATENTED MAR. 1, 1904.

G. S. WITHAM.

PAPER WINDING MACHINE.

APPLICATION FILED SEPT. 28, 1903.

NO MODEL.

Fig. 1.

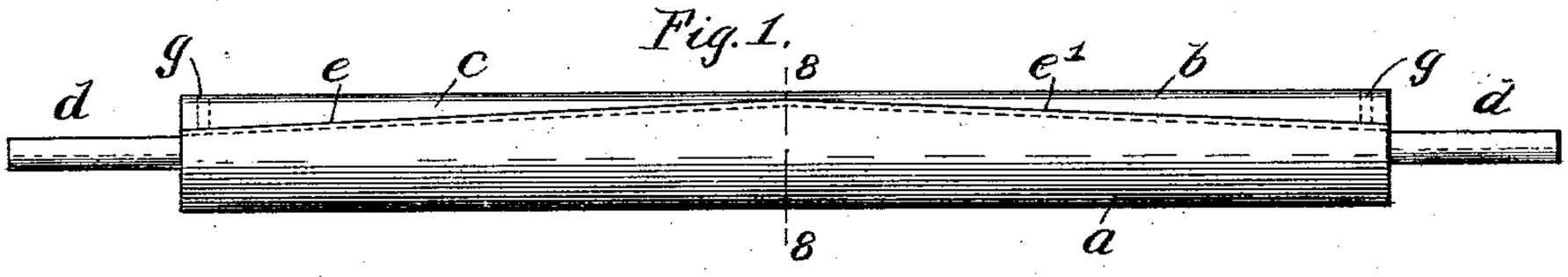


Fig. 2.

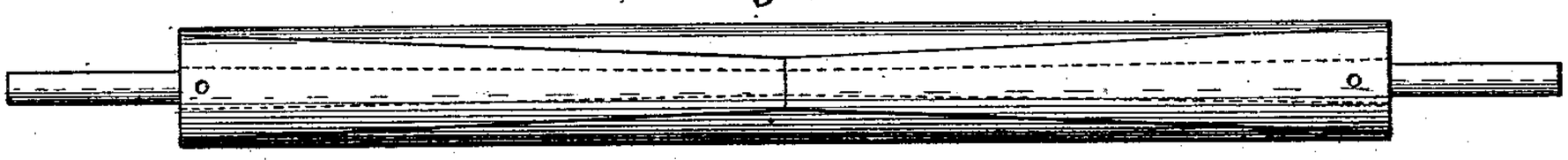


Fig. 3.

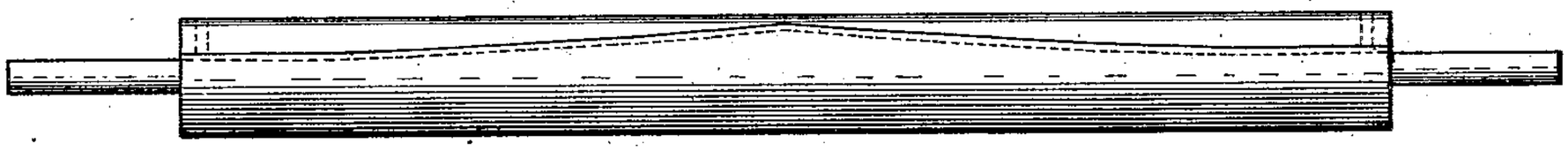


Fig. 4.

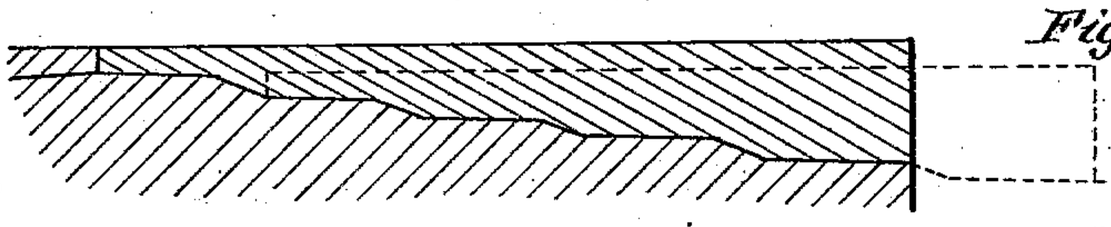


Fig. 5.

Fig. 6.

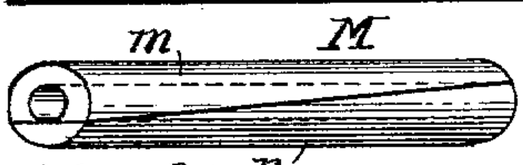


Fig. 7.

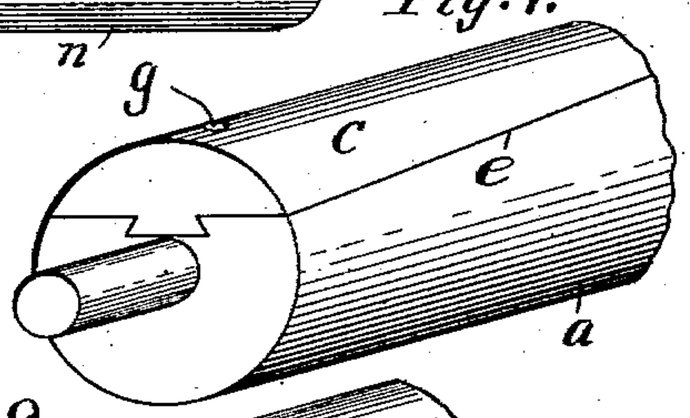


Fig. 8.

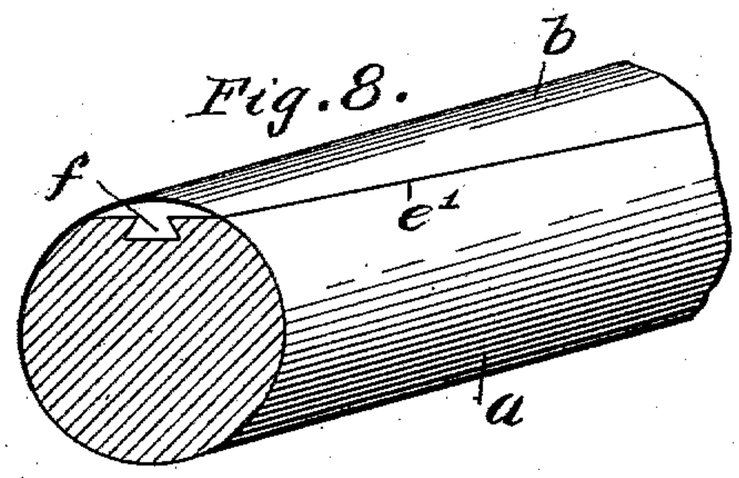


Fig. 9.

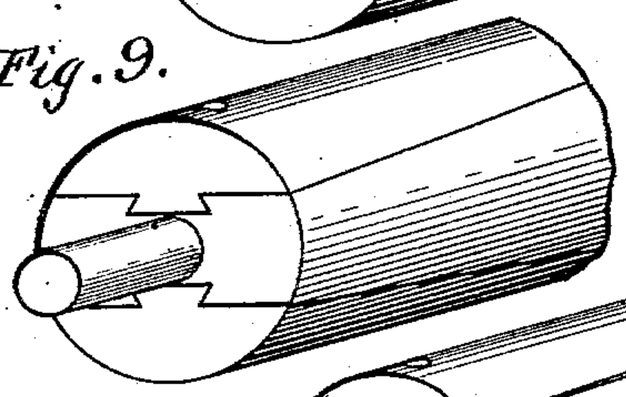
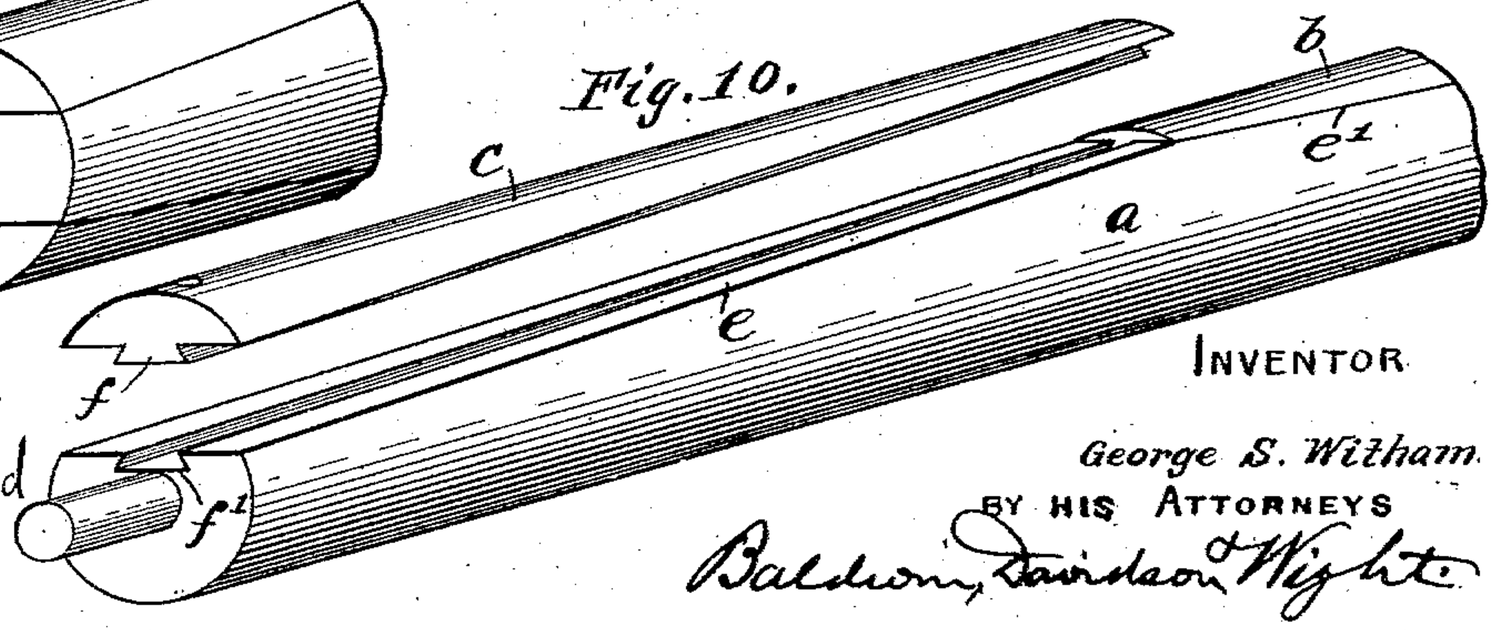


Fig. 10.



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No. 753,344. Patented March 1, 1904.

UNITED STATES PATENT OFFICE.

GEORGE S. WITHAM, OF MILLINOCKET, MAINE.

PAPER-WINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 753,344, dated March 1, 1904.

Application filed September 28, 1903. Serial No. 174,892. (No model.)

To all whom it may concern:

Be it known that I, GEORGE S. WITHAM, a citizen of the United States, residing at Millinocket, in the county of Penobscot and State of Maine, have invented certain new and useful Improvements in Paper-Winding Machines, of which the following is a specification.

It is the present practice for paper makers to ship large rolls of paper to newspaper-printing establishments on tubular iron cores, which are adapted to fit over a shaft on the printing-press from which the paper is unwound during the operation of printing. Substitutes for such cores heretofore suggested have not met with success. The iron core in ordinary use has the paper wound on it while the core is carried on the winding-shaft of a paper-winding machine, which shaft is sometimes over one hundred and forty inches in length. After the paper is wound on this tubular iron core the winding-shaft is removed from it and the roll of paper containing the core is shipped to the printer. These cores are expensive to make and are heavy and the expense of freighting them to and from the printing-houses is large. The cores are usually not perfectly true in outline, as the expense of machining them is prohibitive, and hence the paper does not wind evenly upon them. This latter defect is very important and occasions much loss of time in winding and handling the paper. Sometimes the paper is wound directly on the bare winding-shaft, and such shafts are often split from end to end on a taper, so that when it is desired to remove the winding-bar from the paper it may be done with diminished friction by sliding one section of the bar lengthwise on the other. In a long winding-bar—say one hundred and forty inches long—and where the diameter is only, say, four inches the taper is very gradual and it is necessary to give considerable endwise movement to one of the bar-sections before the friction is relieved to a sufficient extent to allow the bar to be removed easily.

According to my invention instead of winding the paper around a core on the winding-bar I wind the paper on the bar itself and provide a core of a novel construction, which may be readily inserted into the hole in the paper-roll from which the winding-bar is removed. The winding-bar instead of being split on a taper from end to end is split on a taper from its central portion in opposite directions toward the ends of the bar, so that it is necessary to only pull each section out longitudinally—say one-half as far as when the bar is tapered from end to end.

A bar tapered in accordance with my invention is stronger than the old form of bar, because the central portion, where the greatest strength is required, is of nearly the full thickness of the bar, whereas the old form of bar is split at the middle portion, which materially weakens the bar as a whole and causes it to spring, and thus produce uneven winding. My winding-bar can be accurately made, so as to present a smooth even surface, and absolutely uniform winding is insured.

In the accompanying drawings, Figure 1 shows a side elevation of the winding-bar of a paper-making machine constructed in accordance with my invention. Fig. 2 shows a plan view of such a bar. Fig. 3 shows a side elevation of a modification. Fig. 4 is a diagram illustrating the construction shown in Fig. 3. Fig. 5 is an enlarged view in section further illustrating the modification shown in Fig. 3. Fig. 6 illustrates the form of core which I employ. Fig. 7 is a detail view in perspective of one end of my improved winding-bar. Fig. 8 is a detail view in perspective and in section on the line 8 8 of Fig. 1, but on a somewhat larger scale. Fig. 9 shows a detail view in perspective of another modification. Fig. 10 is a perspective view further illustrating the manner in which the bar-sections are connected.

The winding-bar shown in Fig. 1 is made in three sections, the larger or main section *a* and the smaller or sliding sections *b* and *c* which when in place on the main section, form with it a complete cylinder adapted to have the paper wound directly upon it. The curved exterior surfaces of the several sections are machined to render them perfectly

smooth, and the main section is formed with journals *d* at opposite ends. The main section *a* is formed with inclined seats *e e'* for the sliding sections *b* and *c*. These seats are inclined from the middle portion of the bar toward the ends thereof in opposite directions inward toward the axis of the bar, and the inner sides of the sections *b* and *c* are formed with inclined surfaces to correspond with the seats *e e'*, so that when the sections *b* and *c* are in the position shown in Fig. 1 their inner ends abut and the sections together form a complete cylinder. It is obvious that if the sections *b* and *c* are moved away from each other while resting on the seats *e e'* the diameter of the roll as a whole will be reduced. In order to hold the sections together, a dovetailed connection of the form shown is employed. Preferably a dovetailed tongue *f* is formed on each sliding section *b c*, while corresponding grooves *f'* are formed in the main section *a*. By giving the sliding sections a slight endwise movement they may be caused to release the paper without themselves being released from the main section. A suitable tool may be employed to move the sliding sections, and such tool may be inserted into recesses *g* at the outer ends of the sliding sections.

It will be observed by reference to Fig. 2 that the dovetailed tongues and grooves are tapered. Where these are straight there is some friction, as the tongues fit the grooves closely; but by tapering them, as indicated in Fig. 2, as soon as the sections are moved away from each other to a very slight extent the tongues will separate laterally from the walls of the grooves, and thus entirely relieve the friction occurring on the vertical sides and doing away with the incident binding action. In this way a much freer movement is given to the sliding sections. This is an important feature, owing to the very great length of these winding-bars, wherein the side friction occuring in the dovetailed connections is sometimes very great. I therefore prefer to taper the dovetails in the manner before described; but so far as part of my invention is concerned I am not limited to this feature.

In Fig. 1 the inclined seats are shown as straight or continuous from the central portion of the bar toward the ends; but I have found that by giving to each seat a series of inclinations better results are obtained. In Fig. 4 I have illustrated diagrammatically the theory upon which this part of the invention is based, while Figs. 3 and 5 show more accurately the precise construction preferred. The inclines gradually merge into each other; but by employing a series of inclines they may be made more abrupt, and thus cause the sliding sections to recede very rapidly from the paper, so that much less longitudinal movement is required to be given to the sliding sections than where the inclined seats are straight or uniform. In fact, I have found that one-half as much movement is required to be given to the sliding sections of the form shown in Fig. 5 as is given to such as shown in Fig. 1.

In Fig. 9 I have indicated how a bar may be provided with four sliding sections; but I do not consider the use of so many sliding sections necessary.

Fig. 6 shows a core for the paper which I prefer to employ. It may be made of wood, paper, or other suitable material. It should be tubular; but the bore may be of any cross-section. It is, however, split diagonally from end to end, so that it may be readily inserted into a roll of paper after the latter has been removed from the winding-bar. It will be understood that after the roll of paper is complete the sections of the winding-bar are loosened in the manner described and then the entire bar is removed from the roll. Then one of the sections *m* or *n* of the core M is inserted into the bore of the paper-roll and then the other section of the core M is driven home. It will be understood that the core M is of the same diameter as the winding-bar, while the bore of the core M is adapted to receive a supporting-bar for the paper-roll on a printing-press.

It will thus be seen that by my improvements I can wind paper with great accuracy, inasmuch as it is practicable to provide the winding-machine with a well-made bar having a true smooth surface to start the winding, and such a bar is stronger than others heretofore used, being not so liable to spring, and hence the winding operation is uninterrupted, as is the case in the use of the old forms of bars. The core M which is employed is considered an important improvement. The iron cores heretofore used are expensive to make and the freight charges on them are large, as before stated, while the wooden cores are cheap and the freight charges on them are comparatively small.

I claim as my invention—

1. A winding-bar for paper-winding machines comprising a main section having its maximum diameter at its middle portion and two sliding sections resting on seats on the main section which are inclined in opposite directions from the middle portion of the bar toward the opposite ends thereof.

2. A winding-bar for paper-winding machines comprising a main section having its maximum diameter at its middle portion and two sliding sections resting on seats on the main section which are inclined in opposite directions from the middle portion of the bar toward the opposite end thereof and a tongue-and-groove connection between the sections.

3. A winding-bar for paper-winding machines comprising a main section having its

maximum diameter at its middle portion, a sliding section resting on an inclined seat on the main section and a laterally-tapered dovetailed tongue-and-groove connection between the sections.

4. A winding-bar for paper-winding machines, comprising a main section and two sliding sections resting on seats on the main section which are inclined in opposite directions from the middle portion of the bar toward the opposite ends thereof and laterally-tapered dovetailed tongue-and-groove connections between the several sections.

5. A winding-bar for paper-winding machines comprising a main section and two sliding sections resting on seats on the main section, each of which comprises a series of inclines extending from the middle portion of the bar toward the end thereof and a laterally-tapered tongue-and-groove connection between the several sections.

In testimony whereof I have hereunto subscribed my name.

GEORGE S. WITHAM.

Witnesses:
CLINTON STEVENS,
W. F. WITHAM.