July 10, 1923.

1,461,068

T. REGENSTEINER

PRINTING ROLLER

Filed July 29, 1922

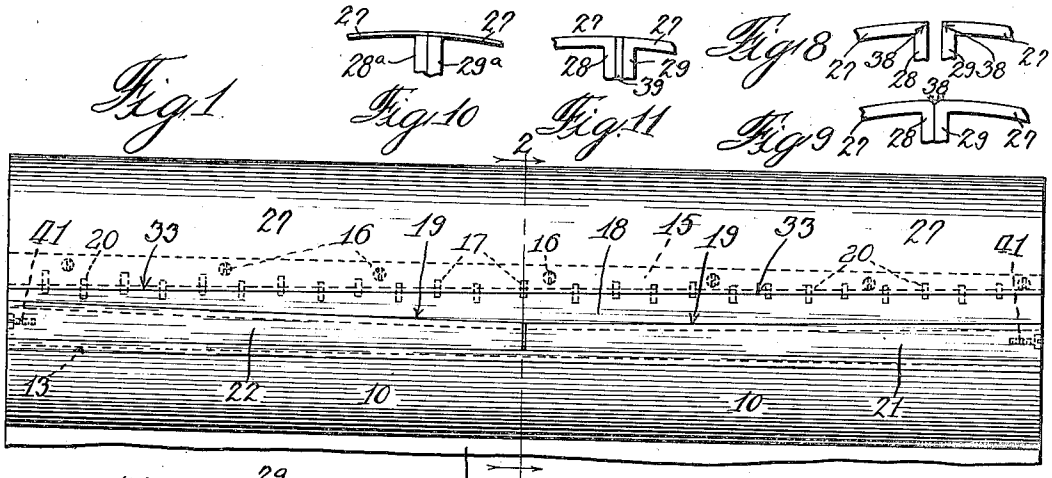


Fig. 1.

Fig. 10.

Fig. 11.

Fig. 8.

Fig. 9.

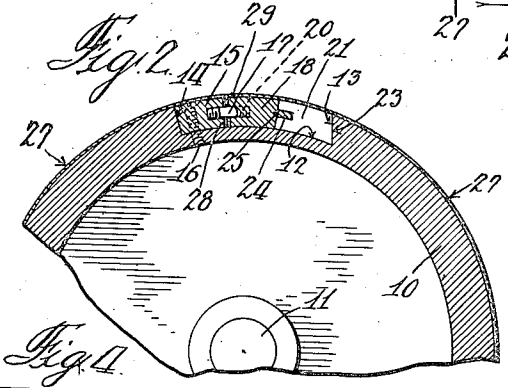


Fig. 2.

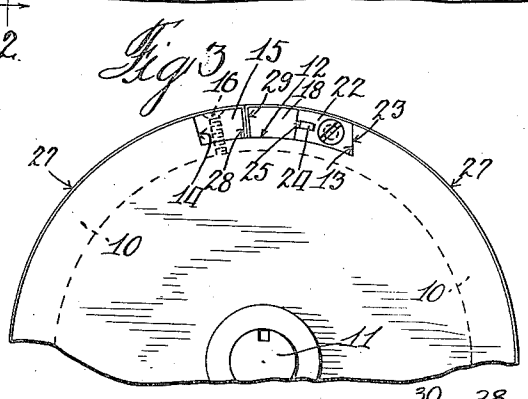


Fig. 3.

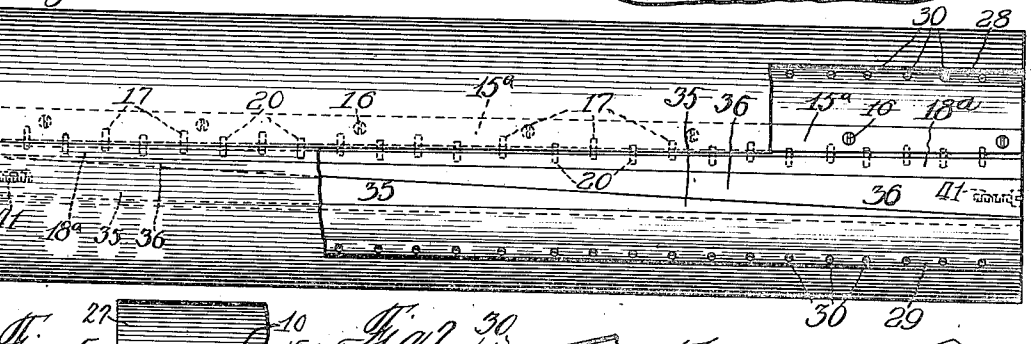


Fig. 4.

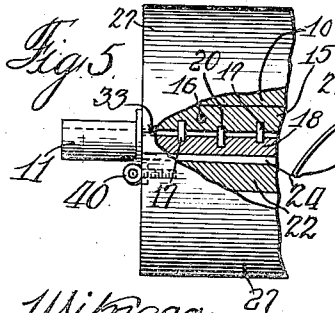


Fig. 5.

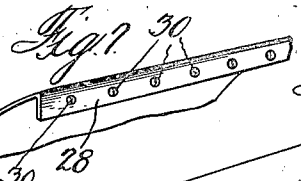


Fig. 7.

Fig. 6.

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By Luther Johns Atty

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UNITED STATES PATENT OFFICE.

THEODORE REGENSTEINER, OF CHICAGO, ILLINOIS.

PRINTING ROLLER.

Application filed July 29, 1922. Serial No. 578,310.

To all whom it may concern:

Be it known that I, THEODORE REGENSTEINER, a citizen of the United States, residing in Chicago, Cook County, Illinois, have invented certain new and useful Improvements in Printing Rollers, of which the following is a specification.

For carrying out what is known as rotary photogravure printing it has been suggested heretofore to provide a printing roller consisting of a cylindrical metal core upon which is frictionally held a tubular shell of copper having an original thickness of about half an inch. It has also been suggested to deposit copper electrically upon the core to a depth of from say a quarter of an inch to half an inch thus also forming a relatively thick body of copper of tubular shape upon the core. The copper layer upon the core is then nicely surfaced to cylindrical shape and given a fine finish. A paper sheet having a gelatinous surface of sensitized material and containing photographic impressions is then applied to the roller and smoothed down tightly so as to adhere closely thereto, with the paper exposed, and the paper is then washed away leaving the gelatinous substance defining the photographic impressions tightly adhering to the roller. The surface of the roller is then etched with acid, and the roller may then be used for such photogravure work.

After a particular piece of photogravure printing is run off the press the roller is placed in a specially constructed grinding machine and the surface of the roller is ground away till all trace of the previous etching has been removed. After the grinding-down operation the desired smooth surface is restored by hand by means of charcoal blocks. The operation of restoring the surface is a long, laborious, and a necessarily expensive one in loss of time, labor and material. The original cost of the tubular copper and of a roller having the copper deposit upon it is also relatively great.

The principal objects of the present improvements are to provide means whereby a relatively thin sheet of copper may be employed for such work, and in an easy and convenient manner, to the end that a large amount of time and expense may be saved without loss of advantage. A specific object is to provide improved means whereby such a thin sheet of metal may be easily and quickly applied to and removed from the core.

Among the advantages of such a thin sheet of copper are the availability of copper in that form, the ease with which it may be handled, the avoidance of the resurfacing operations, and the fact that after a particular job is printed the copper sheet may be saved for further use, as is often desired, with a consequent having of much time and expense necessary to get such an etched impression upon a roller the second time.

In the accompanying drawings which form a part of this specification, Figure 1 is a face view of a printing roller in preferred form having one end of the copper sheet held and with its other end free and broken away; Fig. 2 is a fragmentary cross-section, on an enlarged scale, on the line 2—2 of Fig. 1; Fig. 3 is a fragmentary end view of the roller having the copper sheet thereon in its operative position; Fig. 4 is a face view showing a modified form of the wedge elements, the copper sheet being shown as torn apart and laid back at several places; Fig. 5 is a fragmentary detail of one end of the roller with a face portion broken away; Fig. 6 is an enlarged perspective of one of the wedges shown in Figs. 1, 2, 3 and 5; Fig. 7 is a fragmentary view of an end portion of the copper sheet; Figs. 8 and 9 are fragmentary views of end portions of the copper sheet showing one way to produce a continuous surface at the joint; Fig. 10 shows a modified form of the end portions of the sheet, and Fig. 11 shows a modified form of the joint.

The core 10 may be considered an iron casting mounted on a shaft 11. The core is provided at one place with a longitudinal recess extending from end to end, the bottom wall of the recess being shown at 12, Fig. 2, one side wall thereof being shown at 13 and the other side wall thereof at 14. An anchoring block 15 is secured, as by screws 16, within this recess and against the wall 14. The block 15 has a plurality of rigid studs 17 extending therefrom into the recess mentioned. By making the block 15 a separate piece the machining of it and the application of the holding studs is facilitated.

A tightening block 18 is also positioned within the core recess and it faces the block 15. A plurality of studs 20 rigid with the block 18 are directed toward the block 15.

The alternate studs 17 and 20 are shown equally spaced apart from end to end of the blocks. The block 18 has holes to receive the studs 17 and the block 15 has holes to receive the studs 20. The two blocks 15 and 18 may therefore be brought closely against each other, and the block 18 will be locked by the studs against outward movement.

Means for forcing the block 18 toward the block 15 are shown in Figs. 1, 2, 3 and 5 as a pair of wedges 21 and 22, (Fig. 6) of equal length and substantially meeting each other end to end. Each block 21 and 22 has a slanting surface on its side 23 adapted to fit against the undercut side wall 13 of the recess in the core, this construction providing simple means for locking the wedges against outward movement. The block 18 is provided with a rib or tongue 24, and each wedge member 21 and 22 is provided with a groove 25 accommodating the rib or tongue 24, this construction cooperating to hold the block 18 and the wedges against outward movement. The outer surfaces of the wedges and blocks respectively conform to the cylindrical surface of the periphery of the core.

From Fig. 1 it will be noted that the block 18 has its sides at 19, 19 tapered to conform with the taper of the wedges 21 and 22, and that the undercut side wall 13 and the interfitting side walls of the wedge members are on straight-across lines.

It will also be observed from Fig. 1 that the block 18 and the block 15 meet each other on a line which is not straight-across but which is slightly diagonal from one end of the blocks respectively to the other.

The copper surfacing sheet 27 is shown as extending from end to end of the core. Each of its end portions is turned over substantially at right angles to provide ends 28 and 29, the length of the copper sheet being such that when these ends 28 and 29 are brought into abutment face to face, as shown in Figs. 2 and 3, the sheet will be drawn tightly upon the core. Each end 28 and 29 is provided with holes 30 (Fig. 7) spaced apart to correspond with the spacing of the studs 17 and 20, the holes having substantially the diameter of the studs but sufficiently larger that the studs may pass with a substantially good fit through them respectively, the holes 30 being so positioned with respect to the studs that when the studs pass through them respectively the sheet is held tightly upon the outer peripheries respectively of the blocks 15 and 18.

The ends 28 and 29 of the copper sheet are turned over on lines having the direction of the meeting sides of the blocks 15 and 18, that is, the direction of the line 33, Fig. 1, so that when the ends 28 and 29 are brought together as in Figs. 2 and 3 their meeting faces will define a joint which is not straight-across but is slantingly or diagonally directed from one end to the other.

To place the sheet 27 upon the core 10 the block 18 and the wedges 21 and 22 are removed and the end 28 of the sheet is placed in engagement with the studs 17 in the position shown in Fig. 1. Thereupon the block 18 is placed in the crotch of the bend at the other end of the sheet with the studs 20 projecting through the holes (as 30 Fig. 7) in the turned-over end 29, and the block 18 carrying the end of the sheet is placed substantially as shown by Fig. 2 with the studs 17 and 20 projecting through holes in both the ends 28 and 29 of the sheet and also into the holes in the opposite blocks respectively. Thereupon the wedge members 21 and 22 are inserted and forced home, drawing the sheet tightly upon the core and the ends 28 and 29 together forming a tight joint.

After the copper sheet is thus positioned upon the core the etching process may be carried out as in the prior practice.

When the roller is being used in the printing press it rotates with its lower portion immersed in a receptacle containing ink in a substantially thin and liquid form, the surface of the copper becoming thereby heavily coated. As this coated surface travels upward it encounters a wiping device which is arranged straight across the surface of the roller and consists of a thin strip of flexible metal held yieldingly upon the roller. The effect of the wiper is to remove substantially all of the ink from the surface of the roller except that which is within the etched-out recesses. The cleaned surface then advances to the impression roller over which the paper to be imprinted travels, and the paper is pressed sufficiently into these inked recesses to receive ink therefrom and the reproduction is thereby made. Since the line 33, Fig. 1, showing the junction between the two ends of the copper sheet is not straight across, but is on a diagonal with respect to this wiper blade, the wiper rides over this junction smoothly and without any tendency to jump and thereby to mar its effectiveness. The degree of diagonal of this junction line 33 may be very slight and still effect the desired purpose, and while the printed paper will show this line, unless the fit of the ends be made exceptionally well or unless some means are taken to make a continuous surface at the junction, this line will occur at marginal portions which are usually trimmed off in any event, so that the presence of such a line upon the work will be unimportant in most operations.

Should it be desired to make the ends as 28 and 29 abut each other with a continuous surface the slightly rounded corners at the bends respectively may be coated with solder or some other metal or alloy, as indicated at 38, Figs. 8 and 9, and the applied metal 38

surfaced to provide a sharp edge as the periphery where the ends abut each other. After the ends are drawn together as in Fig. 9 the adjacent surfaces of the applied metal parts respectively may be burnished so as substantially to blend into each other.

Another modification of the end construction is shown in Fig. 10 wherein the ends 28ª and 29ª are shown as metal strips secured, as by brazing, to the under surfaces of the ends of the sheet 27. According to this construction the parts may be fitted together to produce a very close joint. In Fig. 11 I have shown an auxiliary strip 39 tightly clamped between the ends 28 and 29. This strip 39 may be of copper or softer metal, and its outer edge may be burnished down to complete the cylindrical surface at the joint.

It is here pointed out that the joint at the ends of the sheet as 27 is an ink-proof one, and is liquid-proof as used. If it were not ink-proof the ink would leak through the joint, get between and around the sheet-holding elements, get between the sheet and the core, ooze out at the edges and would creep and be thrown upon the work. While in some printing operations using a metal sheet the ends of the sheet may be even widely spaced apart (and in connection with which the present sheet-holding means may advantageously be used), in the photogravure work mentioned the joint between the ends of the sheet must be a tight one. According to these improvements such a tight joint may be had without prejudice to the ready application of the impression sheet to the core and its ready removal therefrom.

Turning now to Fig. 4, the only material departure from the construction as already described consists of the provision of two wedges 35 and 36 which overlap each other from end to end. The blocks 15ª and 18ª may be considered as being like the blocks 15 and 18 except for the side of the block 18ª which is shown as meeting the wedge 36 on straight-across lines.

For drawing the wedges out of their holding positions a screw-eye 40 (Fig. 5) may be used. The screws 41 (Figs. 1, 4 and 6) are mere fillers intended to prevent the ink from collecting in the screw holes provided for the screw eyes as 40 and from being thrown thence upon the work.

Reference should be had to the appended claims to determine the scope of the improvements herein set forth.

I claim:

1. A printing roller of the character described comprising in combination a cylindrical core, a thin and flexible sheet around the core, said sheet having a continuous outer surface, and means for holding the end portions of the sheet in abutment with each other in a continuous line extending from one side edge of the sheet to the other thereof and with the abutting ends readily separable from each other and with a substantially ink-tight joint.

2. A printing roller of the character described comprising in combination a cylindrical core, a thin and flexible sheet around the core, said sheet having a continuous outer surface, and means for drawing the sheet tightly upon the core with end portions of the sheet abutting each other on a continuous line extending from one side edge of the sheet to the other thereof and in readily-separable relation and forming a substantially ink-proof joint.

3. A printing roller of the character described comprising in combination a cylindrical core, a thin and flexible sheet around the core, each of the two end portions of the sheet being bent over inward from the periphery of the sheet, the sheet having a continuous outer surface between end portions thereof where bent over, and means for holding the sheet upon the core with an ink-tight, joint, the bent over end portions at the bends forming abutment surfaces of such joint and being free from each other.

4. A printing roller of the character described, comprising in combination a cylindrical core, a thin and flexible sheet around the core, each of the two end portions of the sheet being bent over inward from the periphery of the sheet, the sheet having a continuous outer surface between end portions thereof where bent over, and means for drawing the sheet tightly upon the core with the bent over end portions of the sheet at the bends abutting each other and forming an ink-tight joint on a continuous line from one side edge of the sheet to the other.

5. A printing roller of the character described comprising in combination a cylindrical core, a thin and flexible sheet around the core, each of the two end portions of the sheet being bent over inward from the periphery of the sheet, and means for drawing the sheet tightly upon the core with the bent over end portions of the sheet abutting each other and forming substantially an ink-proof joint on lines diagonal to lines which are straight across the periphery of the roller.

6. A printing roller of the character described comprising in combination a cylindrical core, a thin and flexible sheet around the core, the core having a recess in its peripheral surface extending longitudinally of the core, the sheet having its two end portions bent over so as to lie within said recess, means for holding one of said end portions relatively fixed to withstand tightening strains directed against the other end portion, and means including a sheet holding member extending longitudinally of the core and a pair of coacting wedges extend-

ing longitudinally of the core and associated with said other end portion for directing tightening strains thereagainst to move said other end portion toward the relatively fixed end portion.

7. A printing roller of the character described comprising in combination a cylindrical core, a thin and flexible sheet around the core, the core having a longitudinal recess in its peripheral surface, the ends of the sheet being bent over and projecting into said recess, means including a plurality of projecting substantially circumferentially directed studs adapted to engage one bent-over end portion for holding the same in a substantially relatively-fixed position to withstand tightening strains directed against the other bent-over end portion, and means including a plurality of substantially circumferentially directed studs adapted to engage said other bent-over end portion for holding said other end portion and forcing it toward the substantially fixed bent-over portion.

8. A printing roller of the character described comprising in combination a cylindrical core, a thin and flexible sheet around the core, the core having a recess in its peripheral surface, end members on the ends of the sheet respectively, said end members projecting into said recess, and means including oppositely-disposed substantially circumferentially directed studs passing respectively through both end members in said recess for drawing one end member toward the other thereof to bind the sheet tightly upon the core.

THEODORE REGENSTEINER.