Feb. 24, 1953 W. H. SMITH 2,629,324

APPARATUS FOR MAKING LITHOGRAPH BLANKETS

Original Filed Nov. 17, 1947 2 SHEETS—SHEET 1

Fig. 1.

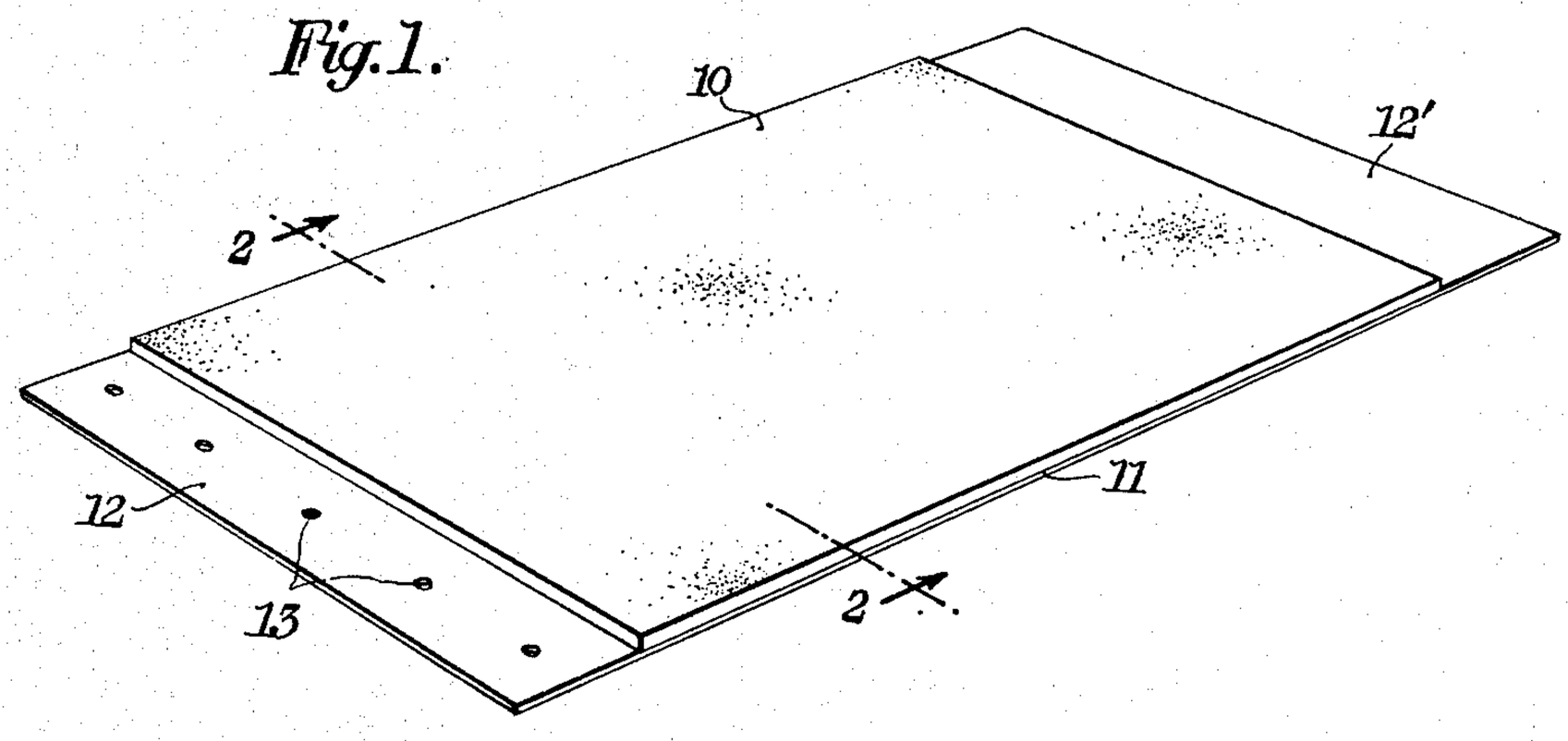


Fig. 2

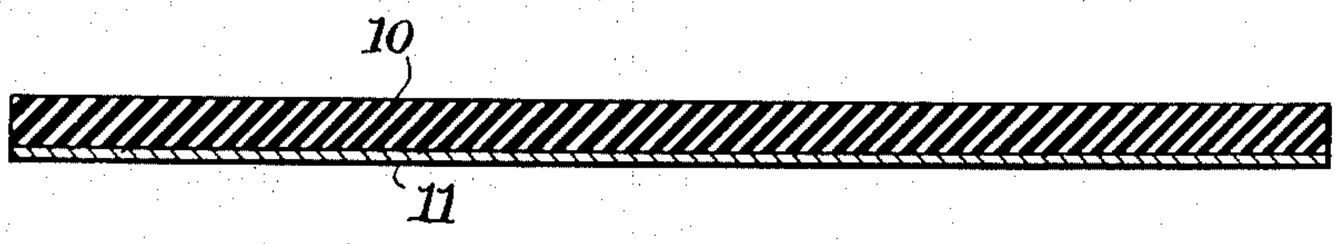
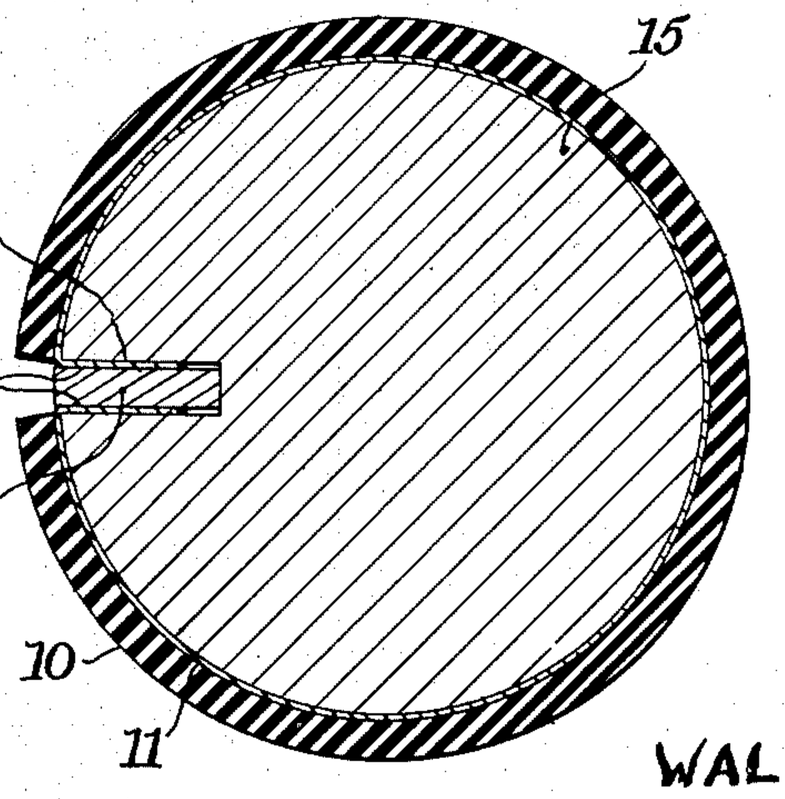


Fig. 3.



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APPARATUS FOR MAKING LITHOGRAPH BLANKETS

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Fig. 4.

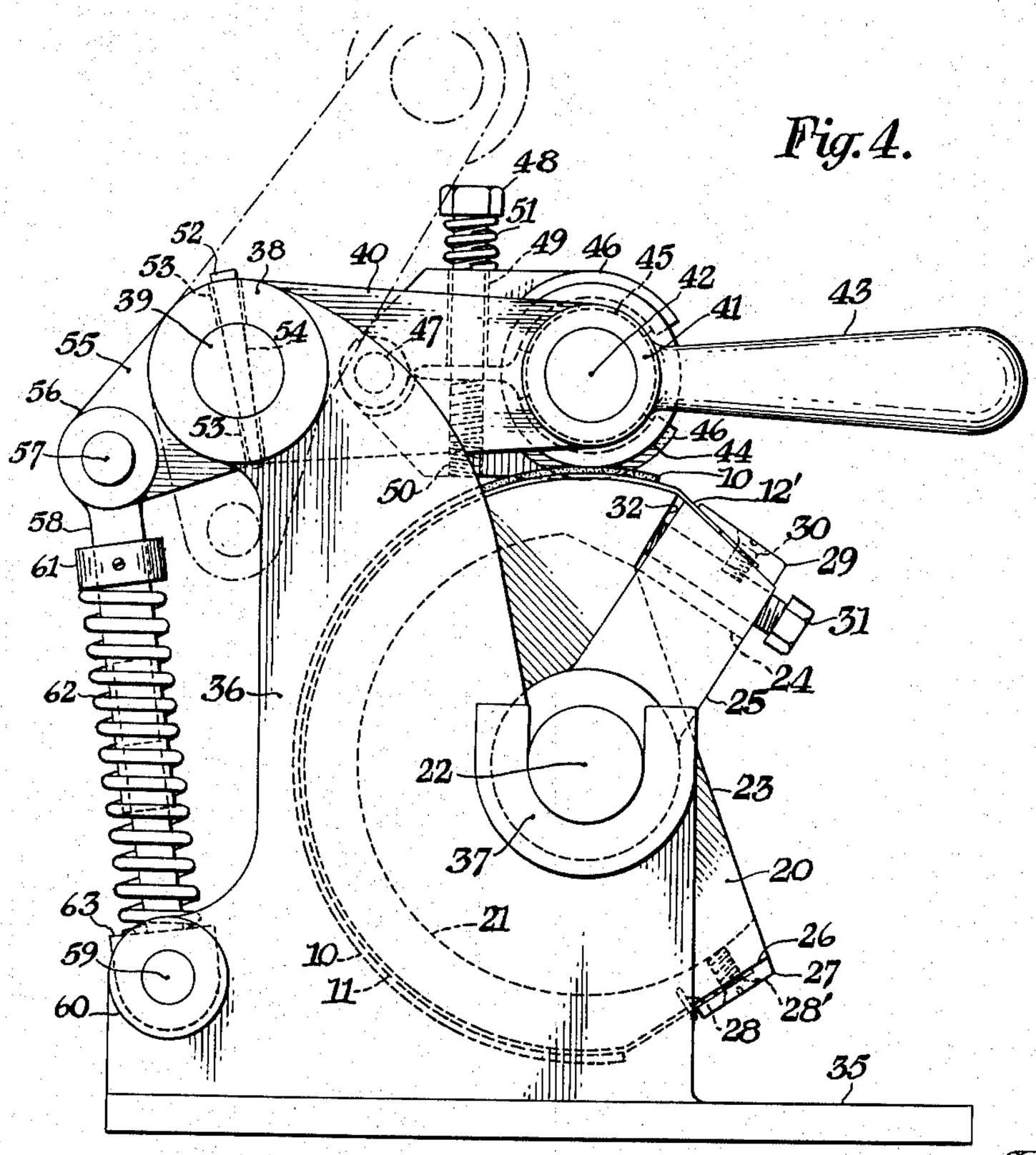
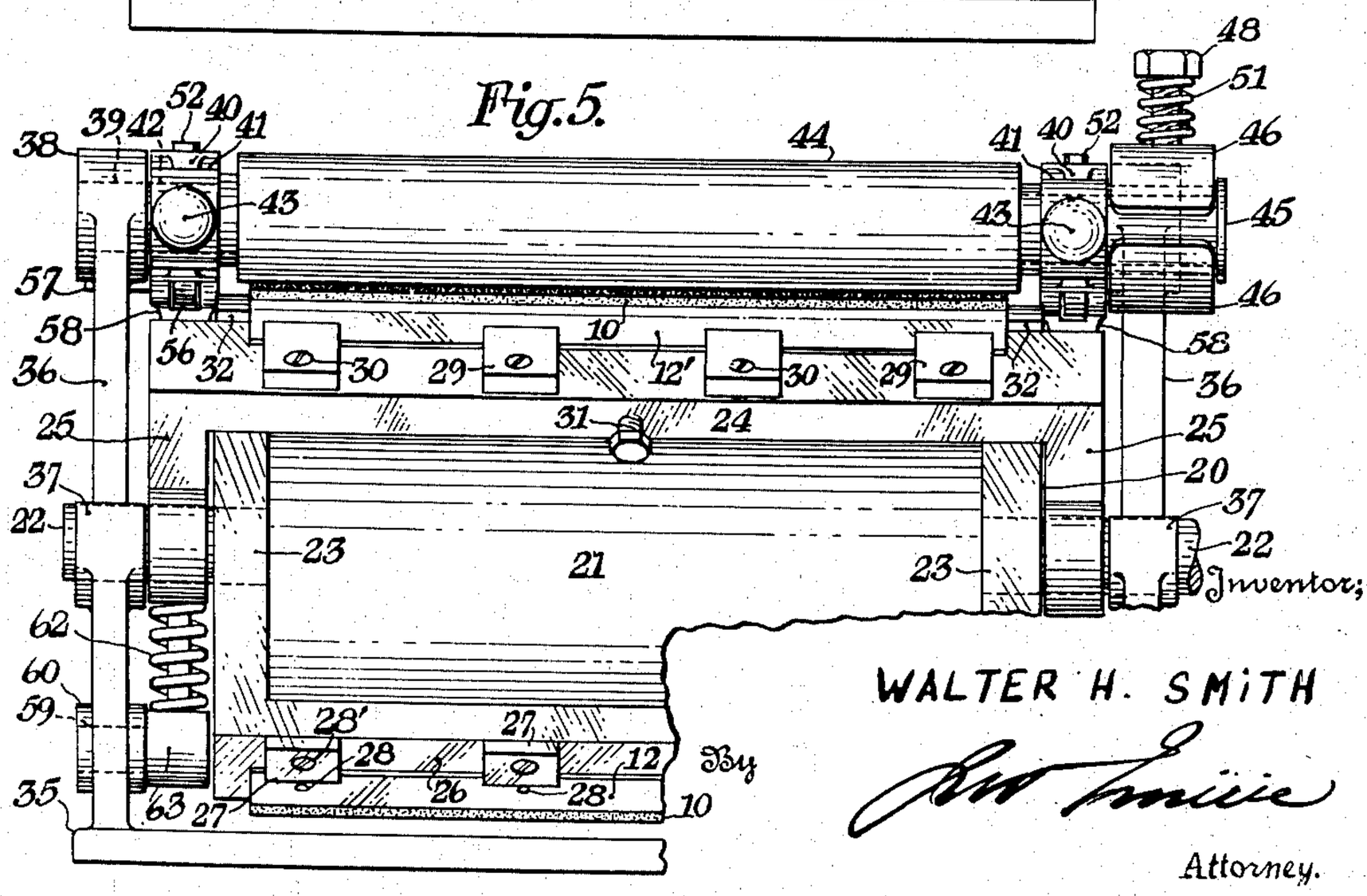


Fig. 5.



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2,629,324

UNITED STATES PATENT OFFICE

2,629,324

APPARATUS FOR MAKING LITHOGRAPH BLANKETS

Walter H. Smith, Toronto, Ontario, Canada; Mary Agnes Johnston, administratrix of said Walter H. Smith, deceased, assignor to Commercial Lithograph Company, Ltd., Toronto, Ontario, Canada

Original application November 17, 1947, Serial No. 786,519. Divided and this application April 23, 1949, Serial No. 89,261

8 Claims. (Cl. 101—415.1)

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This invention relates to lithograph blankets and to a method and means for making the blanket.

This application is divided out of application Serial No. 786,519, filed November 17, 1947, now Patent No. 2,525,003.

The present day lithograph blankets are all made of canvas-backed rubber sheeting. The thickness of these blankets is not uniform and furthermore, all of these blankets have a tendency to stretch so that they lack uniformity in use even though their thickness may be reasonably uniform.

In an effort to obtain uniformity in thickness it has been proposed that their surfaces be ground down so that they will be even.

To perform this grinding operation the blanket is normally positioned in a plane and a grinding tool passed thereover to remove the high spots on the surface. This method has proved ineffective, however, due to the elasticity of the rubber as the excess rubber in the high spots has a tendency to be pushed in front of the grinding tool and then snapped back beneath so that the resultant surface is uneven. Further, when a grinding wheel is employed, the pull of the wheel forces the rubber ahead of it for a short distance so that an uneven surface is created, even if it were not uneven in the beginning.

It is absolutely essential that a lithograph blanket have a substantially uniform thickness as this blanket is the actual printing member. In the usual offset lithograph press, a printing plate is wrapped around a printing cylinder, and the rubber lithograph blanket is wrapped around an impression cylinder which is juxtaposed relative to the printing cylinder, so as to transfer an image from the printing plate to the rubber surface of the blanket which in turn offsets or prints the received image on a sheet of paper or other sheet material such as tin, foil, and the like.

There can be no unnecessary pressure exerted between the blanket and either the printing plate or the paper sheet except for the mere pressure of contact that is necessary and which may be in the neighborhood of $\frac{2}{1000}$ of an inch squeeze. As the entire surface of the blanket must be pressed into contact with the sheet to be printed, any thickness, as a high spot in the rubber surface, would obviously be subject to a greater pressure than is required for printing and consequently must be compensated by building up the low portions thereof.

At the present time when installing a new blanket, it is first attached with any of the many

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well known methods of attaching, and stretched taut by the pressman. An impression is pulled between the plate, which for this purpose is inked solid all over the printing surface, and the rubber covered cylinder, using slightly less pressure during this operation than the required ultimate pressure in the regular printing operation. This results in only the high spots of the blanket becoming inked. The pressman then removes the blanket and with paste and thin paper, he pastes sufficient layers of paper under the low spots to bring them up to the high spots. This is known as "make ready" and requires considerable manual labor and time on a large press, as much as several hours when accurate color work is to be run. After several tests, all the low spots are built up so that there is an even inking of the blanket. Naturally, if there are no low spots this is eliminated.

Furthermore, the thickness of the prior art blankets occupies an undesirably large amount of space in being attached to certain types of impression cylinders, such as that disclosed in my Patent No. 1,949,132, so that the size of the actual printing surface is limited.

Having in mind the defects of the prior art lithograph blankets and methods for making such blankets, it is an object of the present invention to provide an absolutely non-stretchable rubber surfaced blanket.

It is another object of the invention to provide a rubber surfaced lithograph blanket of uniform thickness.

It is still another object of the invention to provide a lithograph blanket having a greater printing area for the given size of the blanket on certain types of impression cylinders as hereinbefore noted.

It is a further object of the invention to provide a method for producing a rubber surface lithograph blanket and for grinding the rubber surface of the blanket to uniformity. It is a further object of the invention to provide means for mounting and holding a rubber surfaced blanket upon an arbor or cylinder.

The foregoing objects, and others ancillary thereto which will become apparent from the following description, are preferably accomplished by a lithograph blanket comprising a rubber sheet secured to a thin sheet metal backing so that the metal backing will preclude the possibility of stretching and will occupy less space when mounted on an impression cylinder so as to provide a greater printing area for a given size of blanket. This blanket may be ground to absolute

uniform thickness by mounting tightly around a cylinder or arbor with the rubber facing outward. The arbor may then be mounted in any of the many grinding lathes or machines which can be used for grinding cylindrical surfaces. With the rubber held tightly on a cylindrical form it does not give or stretch in front of the grinding tool as is the case when it is flat. A device for mounting the blanket on the arbor may comprise a cylinder having means for gripping the ends of the metal backing, one of said means being movable relative to the other to pull the blanket tightly against the cylindrical surface. The arbor may be movably mounted in a standard including a friction roller for rubbing against the outer rubber surface of the blanket to pull it tightly on the cylinder as the cylinder is rotated. This friction roller may be movably mounted to and from the cylinder and have a clutch mechanism for adjusting the frictional resistance of the roller.

The novel features that are considered characteristic of the invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description of specific embodiments when read in connection with the accompanying drawings, wherein like reference characters indicate like parts throughout and in which:

Fig. 1 is a view in perspective of a lithograph blanket in accordance with the invention;

Fig. 2 is a cross-sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a cross-sectional view taken transversely through an impression cylinder having a lithograph blanket mounted thereon;

Fig. 4 is an end view and elevation of a device for mounting a blanket on a cylinder and pulling it tautly therearound; and

Fig. 5 is a front view and elevation of a device shown in Fig. 4.

Referring now to the drawings and specifically to Fig. 1, a lithograph blanket in accordance with the present invention comprises a rubber sheet 10 that is vulcanized to a thin metal sheet 11 which has its end portions 12 extending beyond the ends of the rubber sheet 10, at least one of said end portions 12, which forms the front end, having registering holes 13 for cooperation with registering pins on an impression cylinder or grinding mandrel, whereas the other end portion 12' need not have the registering holes 13, forming the back end.

The metal sheet 11 preferably comprises a copper or zinc copper plated sheet $\frac{5}{1000}$ of an inch thick. Whereas the rubber sheet 10 is of a thickness that will make the thickness of the entire blanket about equal or slightly thinner than the regular lithograph blanket. It is obvious that a blanket of this type is absolutely non-stretchable due to the metal backing and furthermore, it has the additional advantage of providing a greater printing area for a given size of the blanket due to the thinness of the metal backing.

As an example of this latter feature, reference will be made to the dimensions of a standard size of lithograph press which compresses an impression cylinder 15, as shown in Fig. 3, which has the blanket wrapped therearound with the metal backing 11 against the surface of the cylinder and the rubber sheet 10 to the outside. The cylinder is provided with a slot 16 to receive

the inturned end edges 12 of the metal backing 11, and which are retained in the slot by a wedge or bar 17.

In one standard size machine this impression cylinder with the blanket thereon has a total circumference of approximately $8\frac{1}{2}''$ whereas the actual printing surface around the cylinder is approximately $8\frac{1}{4}''$. In using the regular prior art canvas-backed blanket, the slot 16 had to be in the neighborhood of $\frac{17}{64}$ of an inch wide in order to receive the two ends of the blanket and a lock bar or wedge 17.

This regular blanket is in the neighborhood of $\frac{65}{1000}$ of an inch thick so that the two ends made a total of $\frac{130}{1000}''$ in all and the wedge or lock bar is in the neighborhood of $\frac{1}{8}$ of an inch thick making a total of $\frac{255}{1000}''$ as the minimum necessary width of the slot 16. In using a blanket of the present invention however the total thickness of the ends 12 and the bar 17 amounts to $\frac{135}{1000}''$ so that the slot 16 can be smaller and increase the printing circumference of the impression cylinder. Furthermore, the total thickness of the metal backing 11 and rubber sheet 10 need only be 40–45 thousandths of an inch thick so that the cylinder 15 may be 2.61 inches in diameter to bring the total diameter with the blanket thereon up to 2.7'', which is the diameter of the printing surface of the cylinder in this specific press. On the other hand, with the prior art blanket, which is $\frac{65}{1000}''$ in thickness, the cylinder had to be 2.57'' and the opening or slot 16, .270'' wide which reduced the effective printing area to less than 8'' at the edge of the rubber when clamped in place. Whereas the new metal backed blanket being cut back on each edge $\frac{39}{1000}''$ to provide clearness of the bends in the metal at each end, the printing surface results in an area of 8.168''. Thus it will be seen that the metal backing not only provides a non-stretchable blanket but permits a thinner blanket occupying less of the available cylindrical surface in being clamped to the impression cylinder and providing a larger actual printing area.

In order to obtain a blanket of absolutely uniform thickness it is necessary to grind the surface of the rubber sheet 10. Further, the grinding action of the surface creates a superior printing or transfer surface, for receiving and off-setting the image.

It has been found that superior results in the grinding operation are obtained by mounting the blanket on an arbor and grinding it in a lathe rather than grinding it in a plane. When the blanket is pulled taut around a cylindrical surface the rubber layer to the outside of the blanket is stretched slightly and positioned under substantially the same conditions as in use whereas when flat the rubber is not stretched and has greater elasticity, so that it tends slightly to be forced ahead of the grinding wheel particularly in the thicker spots. Obviously with the prior art offset blankets which are canvas-backed, they are not true in the first place and further, it is impossible to grind them accurately regardless of their being mounted cylindrically or on the flat as the thicker layer of rubber permits greater deformation during the grinding operation and the canvas-backing permits stretching to a sufficient degree to throw the entire blanket off.

In forming the present blanket, however, it is cut to the required size both as to the rubber printing sheet 10 and the metal backing 11 with

the projecting ends 12. The front or leading edge would be cut to provide the registering edge which is used to locate the blanket so that the ends would be correctly formed. It is obvious that these ends can be alike, as shown in Fig. 1 or may be flush with the rubber and used in the same manner as prior art blankets although the projecting metal ends are preferred.

To grind the blanket, it is mounted on a cylinder 20 which is best shown in Fig. 4. The cylinder 20 preferably comprises a cylindrical shell 21 mounted on a shaft 22 and having a cutaway open side 23 to accommodate a transversely extending bar 24 supported at its ends by radially extending arms 25 which are pivotally mounted on the shaft 22, beyond the ends of the cylindrical mandrel. One edge portion 26 of the cylindrical surface of the mandrel 21 is bevelled to accommodate clamps 27 within the circumference of the mandrel. The clamps 27 are for securing the front registering end 12 of the blanket to the cylinder and cooperate with pins 28 extending through the registering holes 13 for registering the front end of the metal backing sheet 11. The clamps 27 are secured by screws 28'.

When the blanket is wrapped around the mandrel 21, the opposite end portion 12' is located adjacent the other edge of the cutaway portion 23 and may be clamped to the transverse bar 24 by clamps 29 and screws 30. One or more bolts 31 are threaded through the bar 24 to abut the substantially radial edge 32 of the cutaway portion 23 of the cylinder 21, so that, after the blanket end 12 is clamped to the transverse bar 24, the bolt 31 may be screwed to bear against the bearing surface 32 to pull the blanket taut around the cylindrical mandrel 21.

In order to expedite the mounting of the blanket on the cylinder 21 and secure sufficient tautness thereon, the cylinder is preferably mounted in a stretching device comprising a base member 35 having upstanding side members 36 which are provided with U-shaped bearing brackets 37 for removably receiving the shaft ends 22. The side members 36 also include sleeve bearings 38 which receive a cross shaft 39 that carries, and is fixed to, a pair of arms 40 which are adapted to overlie the cylinder 21.

These arms 40 have bearings 41 for receiving and carrying a cross-shaft 42 and terminate in longitudinal extending handles 43. The shaft 42 carries a pressure roller 44 for bearing on the blanket as the cylinder 21 is rotated. The pressure roller 44 is frictionally restrained from rotation by a brake drum 45 carried by the shaft 42 at one end beyond one of the arms 40 as best shown in Fig. 5. A pair of arched brake shoes 46 straddle the drum 45 and are pivotally mounted on the adjacent arm 40 by a pin 47. The tension of the brake shoes 46 is regulated by a bolt 48 extending freely through a bore 49 in one of the shoe members and threading into a bore 50 in the other of the shoe members, a spring 51 being coiled about the bolt 48 between its head and the free shoe member so that, depending upon the threading of the bolt relative to the bore 50 of the shoe member, the tension of the spring 51 will be varied to regulate the pressure between the shoes 46 and the frictional resistance applied to the brake drum 45. Obviously, the drum 45 and/or the brake shoes 46 may be provided with suitable brake linings such as leather or the like.

The arms 40 are connected to the shaft 39 by a tapered pin 52 extending diametrically through pin holes 53 in the arms 40 and a pin hole 54 in

the shaft 39. The pin holes 53 of the arms 40 are slightly larger than the pin 52 to allow a slight play therebetween and to permit slight angular adjustment between the arms so that the pressure roller 44 will contact the blanket on the cylinder 21 regardless of any variations of thickness of the blanket between the sides thereof. The arms 40 terminate in extensions 55 having bearings 56 for receiving pins 57 which pivotally support telescoping rods 58 that are pivoted by pins 59, in bearings 60, to the side members 36. Each telescoping rod 58 has a collar 61, or other suitable stop member, on its upper portion and is surrounded by a helical spring 62 compressed between the collar 61 and a bearing portion 63 at its lower end so that the rod is resiliently biased in extended position to hold the arms 40 in their extreme positions but may be resiliently compressed to permit a pivoting of the arms 40 from one position to the other.

In mounting a blanket on the cylindrical mandrel 21, the arms 40 are swung to their upper positions shown in dotted line in Figure 4 and retained by the resilient telescoping rods 58. The mandrel 21 is mounted in the device by seating the trunnions 22 in the open bearings or sockets 37 with the clamping bar 27 adjacent the top position of the cylinder. The blanket is mounted on the mandrel 21, the end portion 12 being registered therewith by inserting the pins 28 of the mandrel in the holes 13 of the blanket and then securing the end portion 12 by the clamp 27.

The arms 40 are then swung down so that the pressure roller 44 engages the leading edge of the blanket adjacent the clamp 27, and the bolt 48 may be threaded to adjust the frictional tension between the brake shoes 46 and the drum 45. The cylinder 21 is then rotated while the pressure roller 44 bears against the blanket and irons it out by pulling the blanket tightly about the cylinder 21 due to its retarded rotation through its brake. The pressure roller 44 engages the surface of the blanket regardless of the variations in blanket thickness due to the limited play between the arms that is permitted by the enlarged pin holes 53, and the individual tension rods 58 of each of the arms.

When the cylinder 21 is rotated until the opposite end of the blanket is adjacent the pressure roller 44 the blanket is pulled taut around the drum and its opposite end 12' may be clamped to the cross bar 24, if it has not previously been clamped thereto. The one or more bolts 31 may then be threaded against the bearing surface 32, to space the bar 24 from the surface 32 and hold the blanket in taut position about the cylinder 21. The arms 40 may then be raised and the cylindrical mandrel 21 removed from the bearing sockets 37 and placed in a suitable lathe or grinding machine to grind the rubber surface of the blanket to uniformity.

Although a certain specific embodiment of the invention has been shown and described, it is obvious that many modifications thereof are possible. The invention, therefore, is not to be restricted except by the spirit of the appended claims.

What I claim as new, is:

1. A device for wrapping a blanket on a form and pulling said blanket taut thereon, which device comprises a support, a cylindrical form journalled on said support, means on said form for removably securing the ends of a blanket thereto, a pressure roller rotatably carried by said support, means for pressing said roller to-

ward said form for engaging a blanket on said form, and means for retarding rotation of said pressure roller to create a drag as well as a pressure for pulling said blanket taut as said roller moves relative to said blanket.

2. A device as set forth in claim 1 wherein said roller pressing means comprises resilient means individually creating a pressure on each end of said roller to accommodate variances in thickness of the blanket.

3. A device for wrapping a blanket on a form and pulling said blanket taut thereon, which device comprises a support, a cylindrical form journalled on said support, means on said form for removably securing the ends of a blanket thereto, a frame pivotally mounted on said support and having a free end movable to and from a position overlying said cylindrical form, a pressure roller rotatably supported by said free end, means for biasing said frame to its extreme positions so that when the free end thereof overlies said cylindrical form the roller thereon will press against a blanket mounted on said form, and a brake to retard rotation of said roller and thereby create a drag on the blanket as the form is rotated.

4. A device for wrapping a blanket on a form and pulling the blanket taut thereon, which device comprises a support, bearings on said support for rotatably journalling a cylindrical blanket carrying form, a pressure roller journalled on said support for rolling and pressing a blanket on the form, and means for retarding rotation of said pressure roller to create a drag for pulling the blanket taut as the roller moves relative to the blanket.

5. A device for wrapping a blanket on a form and pulling the blanket taut thereon, which device comprises a support adapted to rotatably support a cylindrical blanket carrying form, a frame pivotally mounted on said support and having a free end movable to and from a position overlying the position of the cylindrical form, a pressure roller rotatably supported by said free frame end, means biasing said frame to its extreme positions so that when the free end thereof overlies the cylindrical form said

roller will press against a blanket mounted on said form, the sides of said frame being independent and each said side being independently journalled and having a limited freedom of movement to permit angular variations of the axis of the roller whereby to accommodate variances in thickness of the blanket.

6. A device as set forth in claim 5, wherein said biasing means comprises resilient means biasing each side of said frame independently.

7. A device as set forth in claim 5, wherein the roller is provided with a brake to retard rotation thereon and create a drag on the blanket.

8. A device for wrapping a blanket on a form and pulling the blanket taut thereon, which device comprises a support adapted to rotatably support a cylindrical blanket carrying form, a frame pivotally mounted on said support and having a free end movable to and from a position overlying the position of the cylindrical form, a pressure roller rotatably supported by said free frame end, means biasing said frame to its extreme positions so that when the free end thereof overlies the cylindrical form said roller will press against a blanket mounted on said form, and a brake for said roller to retard rotation thereof and create a drag on the blanket.

WALTER H. SMITH.

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