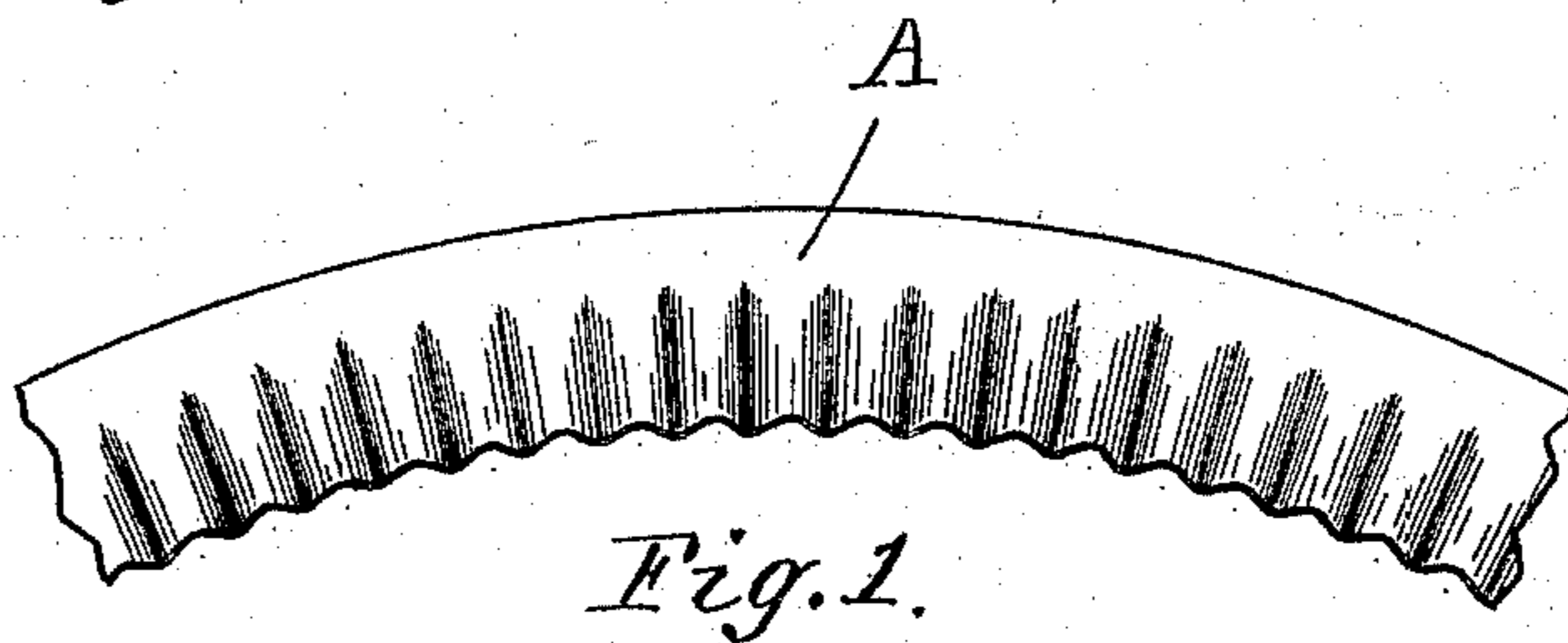
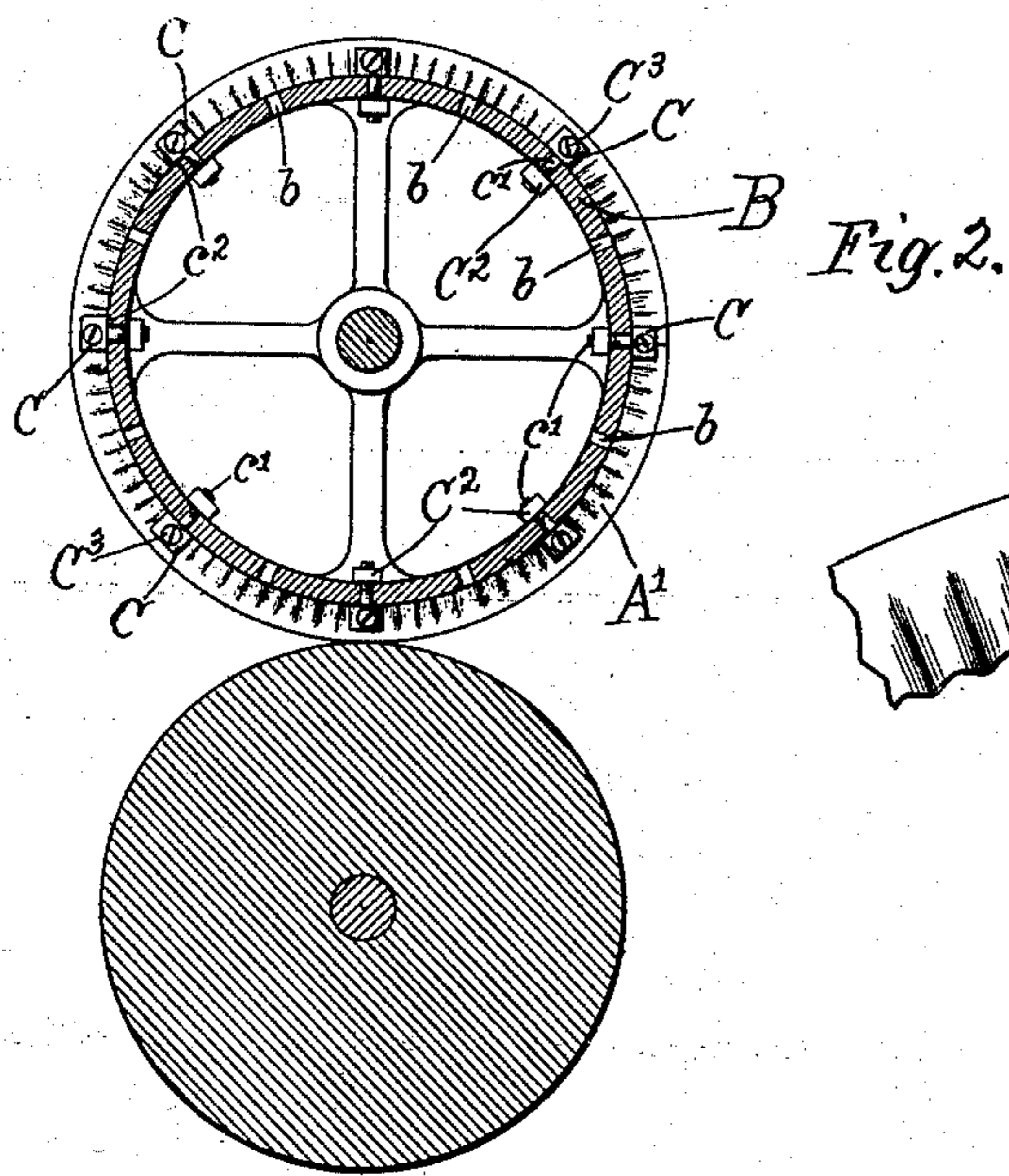
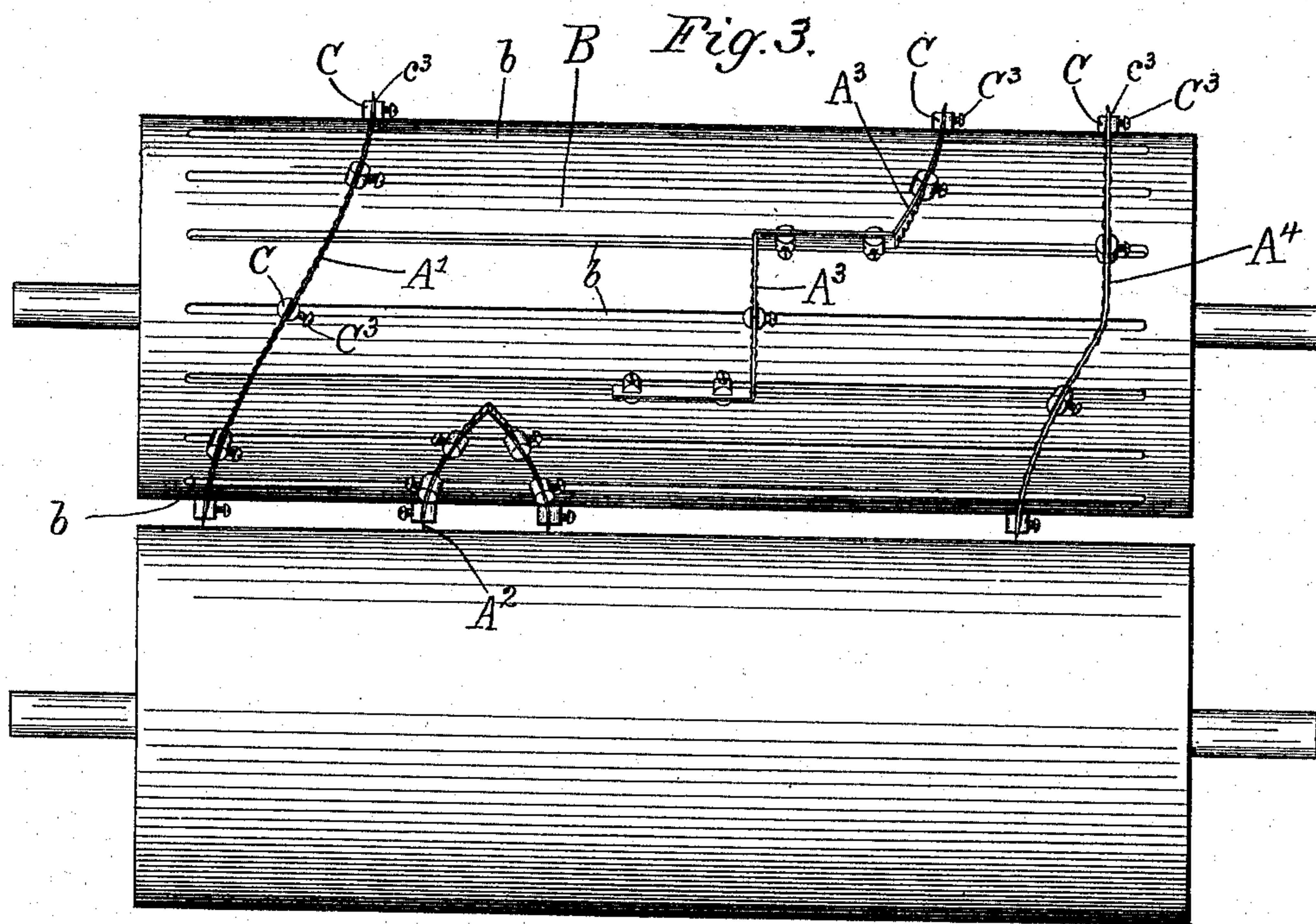


(No Model.)

F. O. CLIMER.  
FLEXIBLE BLADE.

No. 505,189.

Patented Sept. 19, 1893.



Witnesses.

E. J. Wray.  
Jean Elliott.

Inventor.

Frank O. Climer  
By Burton & Burton  
his attys.

# UNITED STATES PATENT OFFICE.

FRANK O. CLIMER, OF ANDERSON, INDIANA, ASSIGNOR OF ONE-HALF TO  
MOSES S. TOUSEY, OF SAME PLACE.

## FLEXIBLE BLADE.

SPECIFICATION forming part of Letters Patent No. 505,189, dated September 19, 1893.

Application filed January 9, 1893. Serial No. 457,721. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK O. CLIMER, a citizen of the United States, residing at Anderson, county of Madison, and State of Indiana, have invented certain new and useful Improvements in Flexible Blades, which are fully set forth in the following specification, reference being had to the accompanying drawings, forming a part thereof.

The specific purpose of this invention is to provide an improved form of blade to be used by a rotary cylinder or roll for cutting, scoring, marking or perforating sheet substance passed by the roll between it and an opposing roll or bed. The special advantage which I desire to obtain is making such blade susceptible of change of form to vary the outline which may be cut by it, as occasion requires. While this is the specific purpose of my invention, the blade which I have devised to accomplish this purpose has certain features which are applicable to blades, regardless of the form of the base to which they are attached, whether cylindrical or plane.

In the drawings:—Figure 1 is a perspective of a piece of blade constructed according to my invention and adapted for use upon a cylindrical base or roll. Fig. 2 is a section transverse to the axis through a roll having my improved blades mounted thereon, and adapted to revolve in opposition to a counter roll on which the blades operate. This representation is merely conventional as to the rolls and general arrangement, and is desirable merely to indicate the mode of use, but not of necessity, the details of fastening, &c. Fig. 3 is an elevation of the rolls shown in Fig. 2, designed to represent the various configurations which may be given to the blades mounted thereon.

A, A', A<sup>2</sup>, A<sup>3</sup>, A<sup>4</sup>, are several blades constructed according to my invention, and adapted to be mounted upon a cylinder B, and secured to it by any convenient means. I have represented, merely as a conventional means and not as a preferred or particularly desirable means, the slotted swivel posts C C CC, &c., having their stems c' inserted through longitudinal slots b in the cylinder, and stopped by the shoulders c<sup>2</sup> on the outer sur-

face of the cylinder, and secured by the nuts C<sup>2</sup> on the inner ends of the stems, the blades being lodged in the slots c<sup>3</sup>, and, if necessary, secured by clamp screws C<sup>3</sup>. The slots in the posts permit the blades to sink to the surface of the cylinder and to rest thereon. The peculiarity of these blades is most clearly seen in Fig. 1. They are made of metal sufficiently ductile, malleable or flexible to be crimped or corrugated at one edge, the crimp diminishing toward the other edge, which is to constitute the cutting, scoring, marking or perforating edge, according to the character given it, and which is therefore left free from the crimp. If the blades are made from strips originally straight, the degree of crimping which will determine the curvature, if made uniform throughout the extent of the blade, will adapt it to conform to the circumference in a direct transverse plane of a cylinder of proper diameter, on which the blades are designed to be mounted. If the blades are used in that position on the cylinder, as the latter rotates they will operate upon the substance exposed to their action as they rotate upon the opposing cylinder or bed, in straight lines parallel to the direction of feed,—that is directly longitudinally with respect to the strip, which is run through the rolls, to be cut. If the blade is set obliquely on the cylinder, but so that its entire extent is in the same plane oblique to the axis, in order that it may conform to the cylinder and rest firmly against it throughout its entire extent, it must be elliptical in curvature, and in order to give it this form, the crimp or corrugation will be flattened somewhat over the less curved sides of the ellipse, and increased somewhat at the ends of the ellipse, whereby the blade may be brought down to accurate contact with the cylinder through its entire oblique extent thereabout. If the blade is made to operate in any portion of its extent, at right angles to the length of the sheet, it may be bent sharply and the crimp entirely flattened out so that it will rest longitudinally upon the surface of the cylinder. If it is to operate a line of varying curvature, or of different obliquity at different parts, it will be bent according to those

varying forms in flowing curves or at sharp angles, and its crimp varied at different parts of its extent to bring it to perfect support upon the cylinder's surface, and cause it at  
5 every point to project radially therefrom, its oblique direction not causing it to lean at any part, as it would if cut out of flat metal in the necessary elliptical form.

In the drawings, I have represented in the  
10 several lines, A' A<sup>2</sup> A<sup>3</sup> A<sup>4</sup>, &c., different forms which may be given to blades, as above described, and it will be understood from these few specimen illustrations that such blades are adapted to an infinite variety of forms,  
15 and that, with any suitable tools for flattening and crimping they may be adjusted quickly from one form to another, as the exigencies of the use of the machine or character of the work require. Without regard to  
20 the adaptability of this crimped blade to the cylindrical surface of a roll in any direction by flattening or further crimping its crimped edge, as described, such a blade possesses the further advantage that it may be tempered  
25 to any degree without danger of distorting the operating edge by the varying contraction in cooling, the crimped portion yielding under the tension produced by cooling in tempering,

and thereby, as it were, absorbing the strain which would otherwise distort the blade. 30

I claim—

1. A blade in the form of a strip crimped at the back edge, such crimps diminishing toward the operating edge, as and for the purpose set forth. 35

2. A blade crimped at the back to give it convex curvature at the operating edge, and adapted to be flattened or further crimped to vary that curvature: substantially as set forth. 40

3. In combination with a revoluble cylinder, 40 a blade crimped at the back to conform to the cylindrical surface, and means for securing it upon such surface with its operating edge outward; such blade being adapted to be flattened and further crimped in varying degree at different parts of its extent, to cause it to conform to the cylindrical surface in varying directions: substantially as set forth. 45

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at 50 Anderson, Indiana, this 4th day of January, 1893.

FRANK O. CLIMER. -

Witnesses:

MARCELLUS A. CHIPMAN,  
C. EWING.