(No Model.) 2 Sheets—Sheet 1.

B. F. WHITE.

EXTENSION CAM.

No. 477,978. Patented June 28, 1892.

Fig. 2.

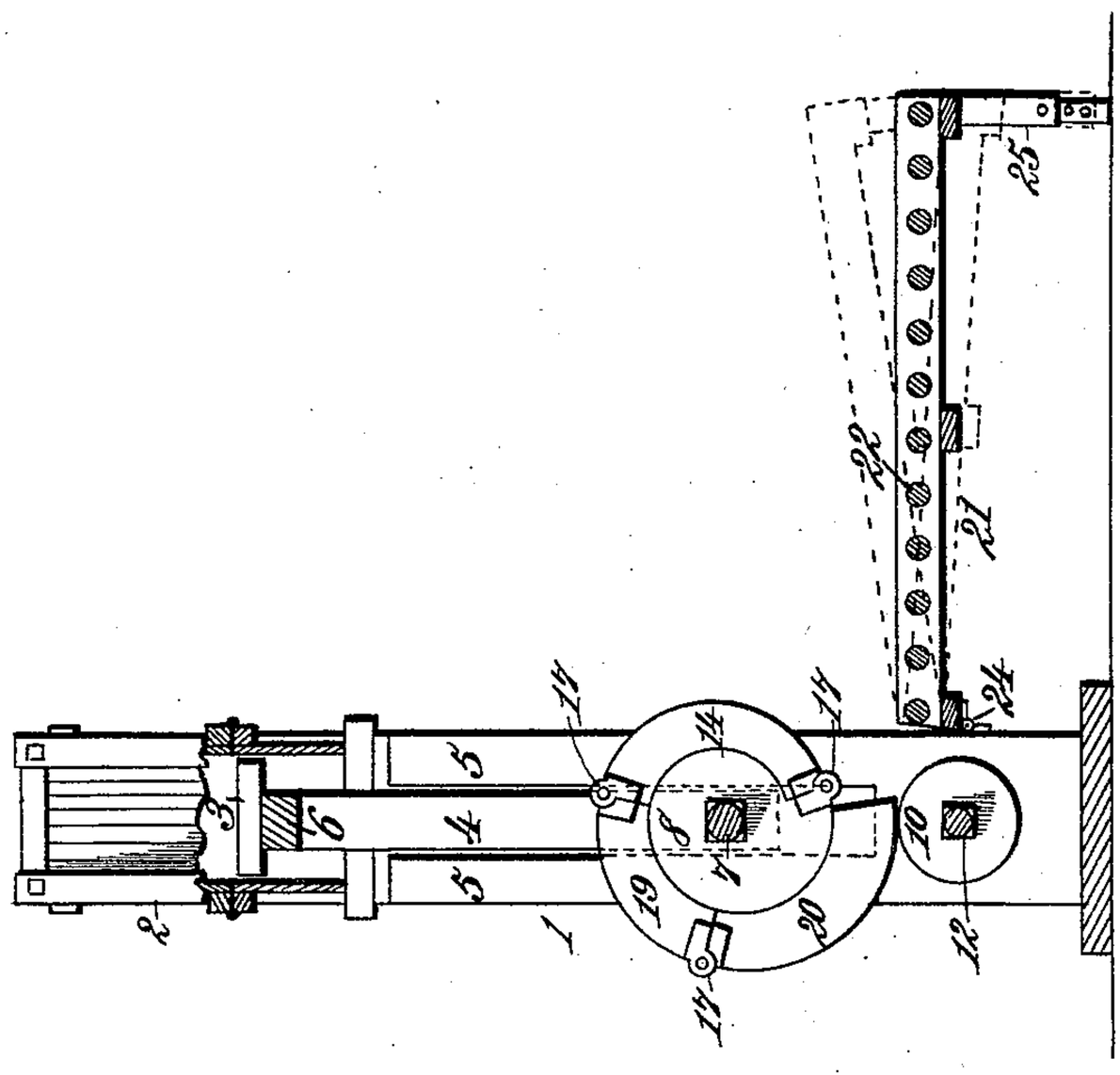
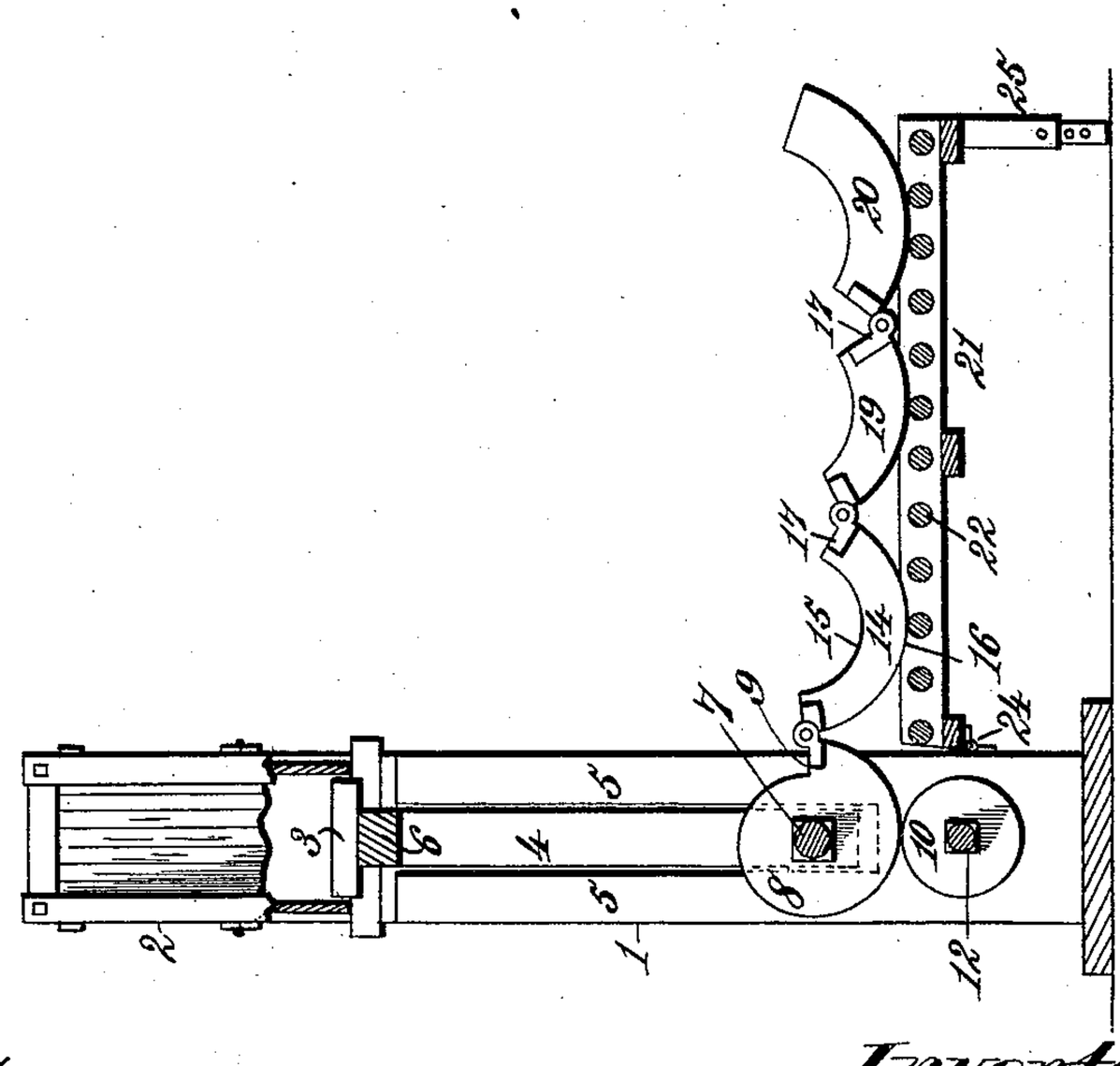


Fig. 1.



Witnesses.
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Inventor:
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By James L. Norris.
Atty.

(No Model.) 2 Sheets—Sheet 2.

B. F. WHITE.

EXTENSION CAM.

No. 477,978. Patented June 28, 1892.

Fig. 3.

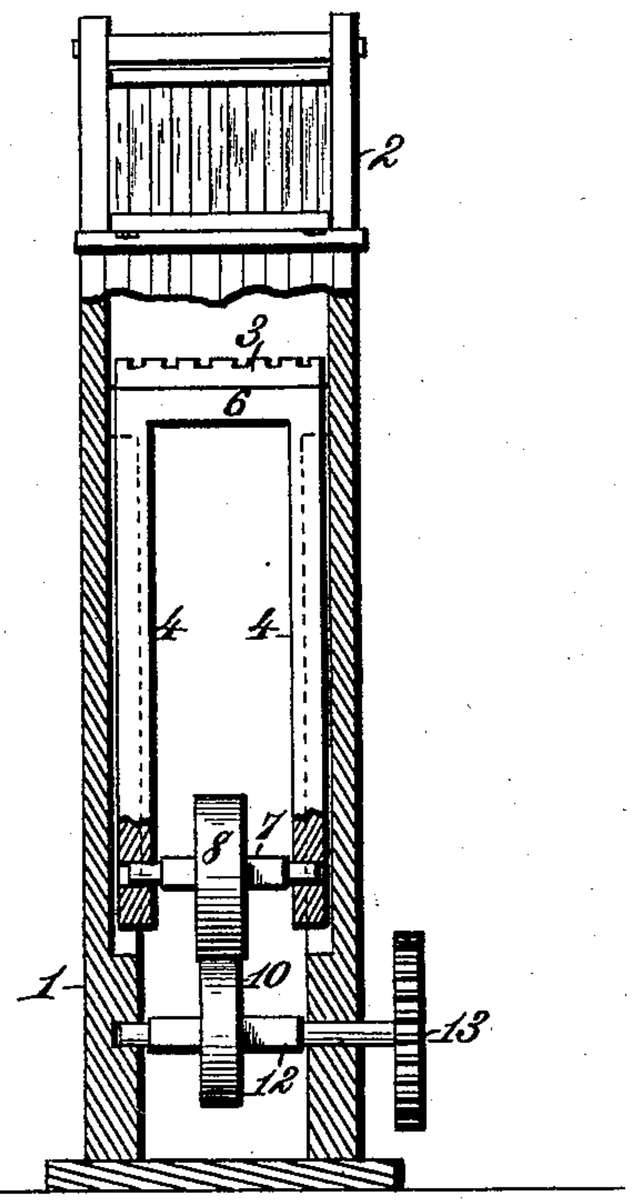


Fig. 4.

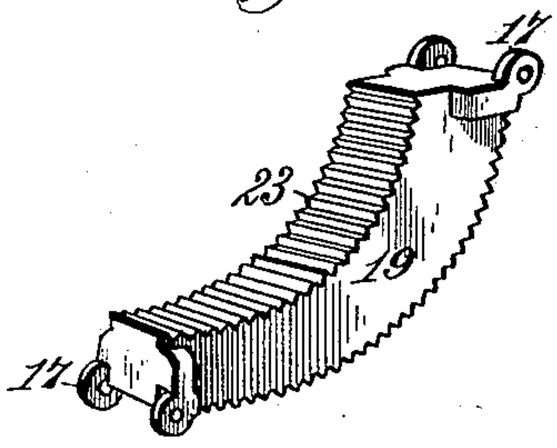
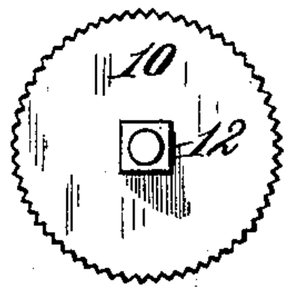


Fig. 5.



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UNITED STATES PATENT OFFICE.

BENJAMIN F. WHITE, OF MONROE, LOUISIANA.

EXTENSION-CAM.

SPECIFICATION forming part of Letters Patent No. 477,978, dated June 28, 1892.

Application filed October 21, 1891. Serial No. 409,444. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. WHITE, a citizen of the United States, residing at Monroe, in the parish of Ouachita and State of Louisiana, have invented new and useful Improvements in Multiple-Face or Extension Cams or Eccentrics, of which the following is a specification.

My invention has relation to that type of mechanical powers generally known as the "cam," by which term I include the various forms of eccentrics. It is my purpose to provide a mechanical device of this character having one or a plurality of connected sections which may be drawn upon the cam or eccentric to extend its throw or thrown off the same to permit the restoration of the part operated by the cam to its original position. It is my purpose, in other words, to provide a multiple-face or extension cam or eccentric of any preferred form, having a construction by which it may be rendered operative during a continuous movement of the cam-shaft through more than one complete revolution, the continuous rotary motion being converted into continuous rectilinear motion of any desired extent.

To this end my invention comprises all the various constructions by which a cam or eccentric is provided with one or more peripheral extensions articulated to the cam or to the cam and to each other and capable of being automatically applied or drawn upon the face of the continuously-revolving cam to extend the throw to any desired extent and to be withdrawn from the same to restore or permit the restoration of the part to which motion is given by the cam.

It is a further purpose of my invention to provide a suitable form of anti-friction support for the articulated parts drawn upon the cam or thrown off the same and to improve the construction and operation of the several mechanical elements employed.

To enable others to understand and to make, construct, and use my said invention, I will now describe the same in detail, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical section, partly in elevation, of one form of mechanical structure or apparatus to which my invention is applicable. Fig. 2 is a similar view showing the same parts with the cam at the maximum limit of its throw. Fig. 3 is a sectional elevation of the same mechanism, the vertical section plane being substantially coincident with the axis of the cam-shaft. Fig. 4 is a detail perspective of one of the peripheral extensions of the cam, showing a slight modification in construction. Fig. 5 is a slight elevation of the operating-pulley having a construction adapted to the modified form illustrated in Fig. 4.

It should be noted that in the drawings accompanying this specification I have shown my invention applied to a cotton-press, which I have selected as a convenient means of illustration and explanation. I do not, however, limit or restrict said invention to cotton or other presses, as it is equally applicable to a wide range of apparatus, many varieties being different in organization, operation, and result from any form of press.

The reference-numeral 1 in said drawings indicates a press-frame arranged vertically, as shown, but capable of being placed in any desired position. At the upper portion of the frame 1 is a press-box 2 of any familiar form, suitable for the compression of cotton, hay, or other substances. Between the uprights or parallel members of the press-frame is arranged the platen 3 of the press, which is formed or, if preferred, mounted upon a yoke-frame composed of two parallel portions 4, which are connected to the press-frame in any suitable manner to permit the longitudinal movement of the yoke-frame—as, for example, by a tongue upon one of the parts engaging a groove in the other. The parallel members of the yoke-frame are connected by a cross-bar 6, which forms the support for the press-platen when the latter is separately constructed instead of forming an integral portion of the cross-bar. Journaled in the parallel members of the yoke-frame is a shaft 7, upon which is mounted a cam 8, preferably of scroll form, its face approximating the curvature of an involute of the shaft. The working face of the cam, in other words, has an eccentricity which increases constantly through a complete circle, the lowest and highest points of the face being separated by a shoulder 9. The cam-face rests upon a

pulley 10, carried by a shaft 12, journaled at its ends in the uprights or parallel members of the press-frame. This shaft 12 is operated by any suitable means and by any power—as, for example, by a pinion gearing with a spur or other gear 13 on said shaft.

To the highest point of the cam, at the outer angle of its working face and the shoulder 9, is pivoted or articulated a peripheral cam extension 14, consisting, substantially, of a curved plate, preferably of the same thickness as the cam, and provided with a concave face 15, which corresponds in curvature with a portion of the face of the cam, and an outer convex face 16, which is preferably struck or described from a different center, and in such manner that the width of one end of said extension-plate shall be greater than that of the other end. The cam-extension plate is connected at its narrower end to the cam by side lugs 17, arranged at the angle formed by the face of the cam at its highest point, and the shonlder 9. The width of the narrower end of the cam-extension plate is such that when turned over upon the face of the cam, its concave face lying on the working face, its end will fill the space between the highest and lowest points of the cam, while its periphery or working face will form a substantially flush continuation of the cam-face. The length of the cam extension may be varied; but I have found that good results are obtainable by giving them such length as to cover about one hundred and twenty degrees of arc, or thereabout, or, in other words, about one-third of the working face of the cam.

The cam-extension piece usually has a constant increase in width which substantially corresponds with the constant by which the eccentricity of the cam-face increases from its lowest toward its highest point. The broader end is provided with lugs 17, having bearings for the pivotal axis, which is substantially coincident with the angle formed by the convex or working face of the extension-piece and its wider end. A second extension-piece 19 of similar construction is articulated at its narrowest end to the broad end of the first extension-piece, and in like manner a third extension-piece 20 is articulated to the second. These three pieces form a complete peripheral extension of the cam, as shown in Fig. 2.

In operating the cam it is desirable to provide a construction by which the cam-extensions may be drawn upon the cam automatically by the continuous revolution of the latter. I have therefore provided an anti-friction support, which consists in one form of a frame 21, arranged in the plane of contact between the cam and the pulley on which it rests. In this frame at suitable intervals are arranged anti-friction rolls 22, upon which the cam-extension pieces may ride as they are drawn toward or pushed away from the cam. As the cam revolves, its working face riding upon the pulley 10 from a lower toward a higher point on said face, the extension-pieces will be drawn toward the cam, and as the highest point of its face reaches the pulley 10 the end of the first extension-piece will have been drawn easily and naturally upon the cam. In like manner the second and third members of the series will follow until the parts assume the position shown in Fig. 2, and this multiplication of parts may proceed until the extension-pieces envelop the cam more than once. By reversing the direction of revolution of the pulley 10 the extension-pieces will be run in succession back upon the anti-friction support, the end of the third extension-piece dropping from the cam by its own gravity and the piece being pushed away from the cam by the second extension-piece, to the end of which it is pivoted or articulated. To so organize and combine the parts that the extension-pieces shall have aid from gravity in being drawn on and thrown off the cam, eccentric, or disk, as well as in order to assist the operation of the mechanism and enable the cam, eccentric, or disk 7 to draw the extension-pieces upon its periphery and throw them off with the minimum effort on the part of the shaft, I propose to give such inclination to the anti-friction support that gravity will aid both operations. To this end the frame 21 is hinged to the press-frame at 24 and the leg-support 25, is rendered adjustable in length, or a support giving opposite inclination is substituted for said leg-support. The two inclined positions are shown in the drawings by dotted lines in Fig. 2. This inclination may be at any angle required.

In some cases where for any cause slipping of the cam may occur or when desired for other reasons I may roughen or corrugate the working faces of the extension-pieces in any suitable manner. For example, transverse corrugations 23 may be formed thereon, as shown in Fig. 4, and these may be of such form as to resemble the teeth of a spur-gear. It will be preferable in such cases to apply a similar construction to both faces of each extension-piece and to the working face of the cam and of the pulley 10, the latter being shown in Fig. 5.

I have described the cam-extension pieces as having a constantly-increasing width; but it is evident that this matter is subject to considerable variation. The increase need not be constant, but may be constantly less, either throughout the whole or throughout any portion of the extension of the cam. Thus, for example, the eccentricity may increase very gradually as the highest point of the extension-face is approached, thereby affording a constantly-increasing force with a constant power applied to the shaft 12. Moreover, in some cases it may be desirable that one or more parts of the cam-face shall be concentric with the axis of rotation to enable the cam to hold the part to which movement is applied without motion at one or more points. My invention comprises all these, as well as many other obvious variations. It should be noted,

also, that by slightly varying the working face of the cam or eccentric I may obtain the same results by using extension-pieces of equal width throughout. Thus if the working-face has a constantly-increasing eccentricity, the extension-pieces may be of equal width at both ends without producing any difference in operation. Moreover, it is important to note that I may use a disk in place of a cam, making the extension-pieces of increasing width throughout the series. When a disk is used, the first extension-piece will be pivotally connected or articulated to the disk at one end, which is tapered or narrowed to an edge, or nearly so.

What I claim is—

1. A multiple-face or extension cam or eccentric consisting of a rotary support and one or more curved extension-pieces pivotally connected or articulated to the rotary support, substantially as described.

2. A multiple-face or extension cam or eccentric consisting of a rotary support and one or more curved extension-pieces connected or articulated to the rotary support, in combination with an anti-friction support, substantially as described.

3. A multiple-face or extension cam or eccentric consisting of a rotary support having an eccentric working face and a series of extension-pieces connected or articulated to the highest point of the working face of the support and to each other, substantially as described.

4. A pulley or roll having a rigid journal-support, a cam or eccentric resting on said pulley or roll and having a movable journal-support, and a series of extension-pieces pivotally connected or articulated to each other and to the cam or eccentric, in combination with an anti-friction support for said extension-pieces, substantially as described.

5. The combination, with two shafts, of a pulley mounted on one, a cam or eccentric mounted on the other, a series of extension-pieces pivoted or articulated to each other end to end and one of the series having a similar attachment to the highest point of the cam or eccentric, and means for operating the pulley, substantially as described.

6. The combination of two shafts, one having a rigid and the other a movable journal-support, a pulley mounted on one shaft and a cam or eccentric on the other, and a series of extension-pieces consisting of curved plates of increasing width from end to end, one of said plates being pivoted or articulated by its narrow end to the highest point of the cam or eccentric and the others similarly connected to each other and to the first extension-piece, substantially as described.

7. A multiple-face cam or eccentric consisting of a rotary support and a series of connected extension-pieces connected to the rotary support at one end of the series, in combination with an anti-friction support upon which the extension-pieces move, said support being capable of inclination to aid the movement of the parts by gravity, substantially as described.

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

BENJAMIN F. WHITE. [L. S.]

Witnesses:
JAMES L. NORRIS,
JAMES A. RUTHERFORD.