(No Model.) 2 Sheets—Sheet 1.

J. MACPHAIL.

BUTT ADJUSTER FOR GRAIN BINDERS.

No. 596,603. Patented Jan. 4, 1898.

Fig 1

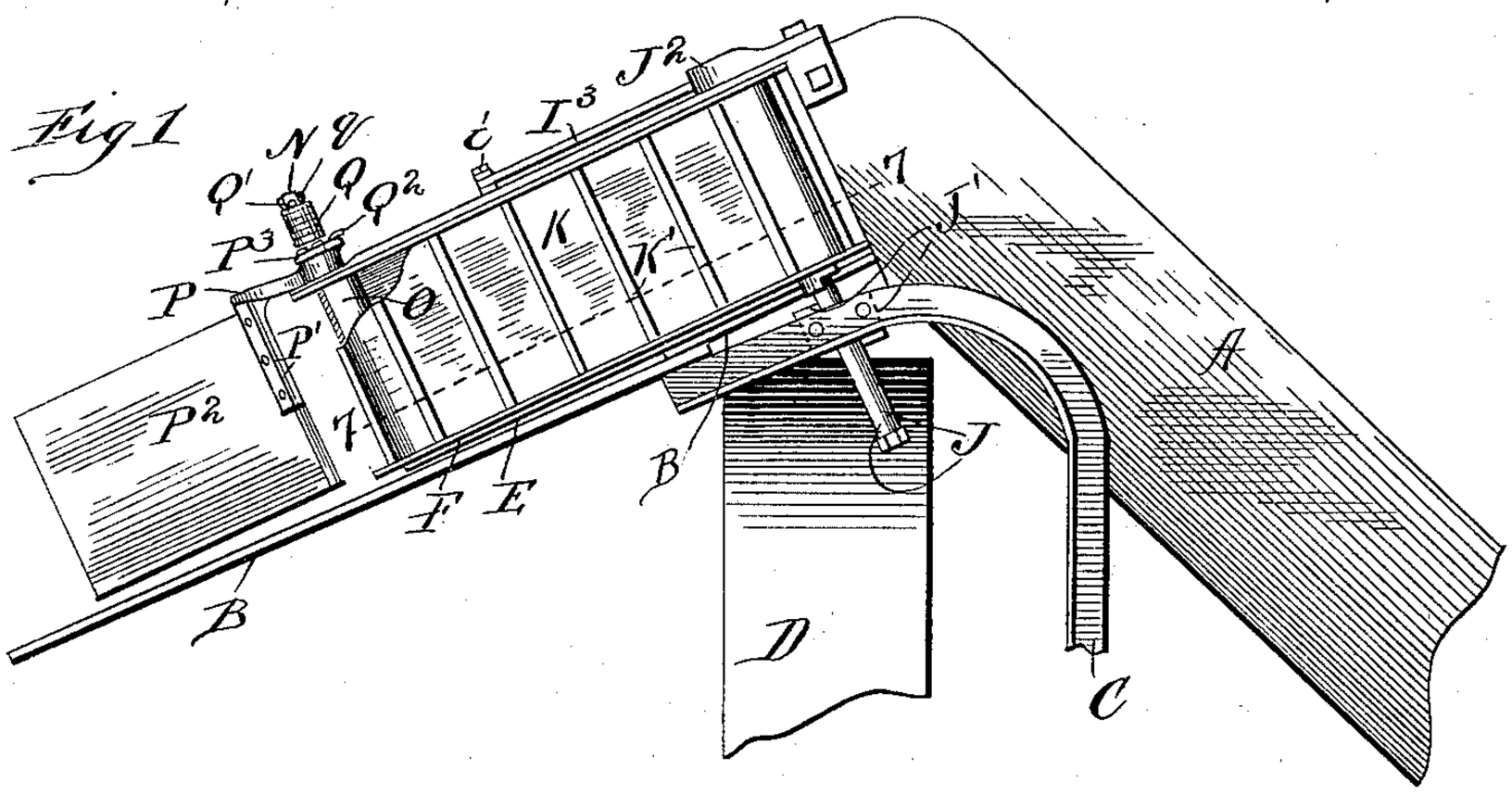


Fig 2

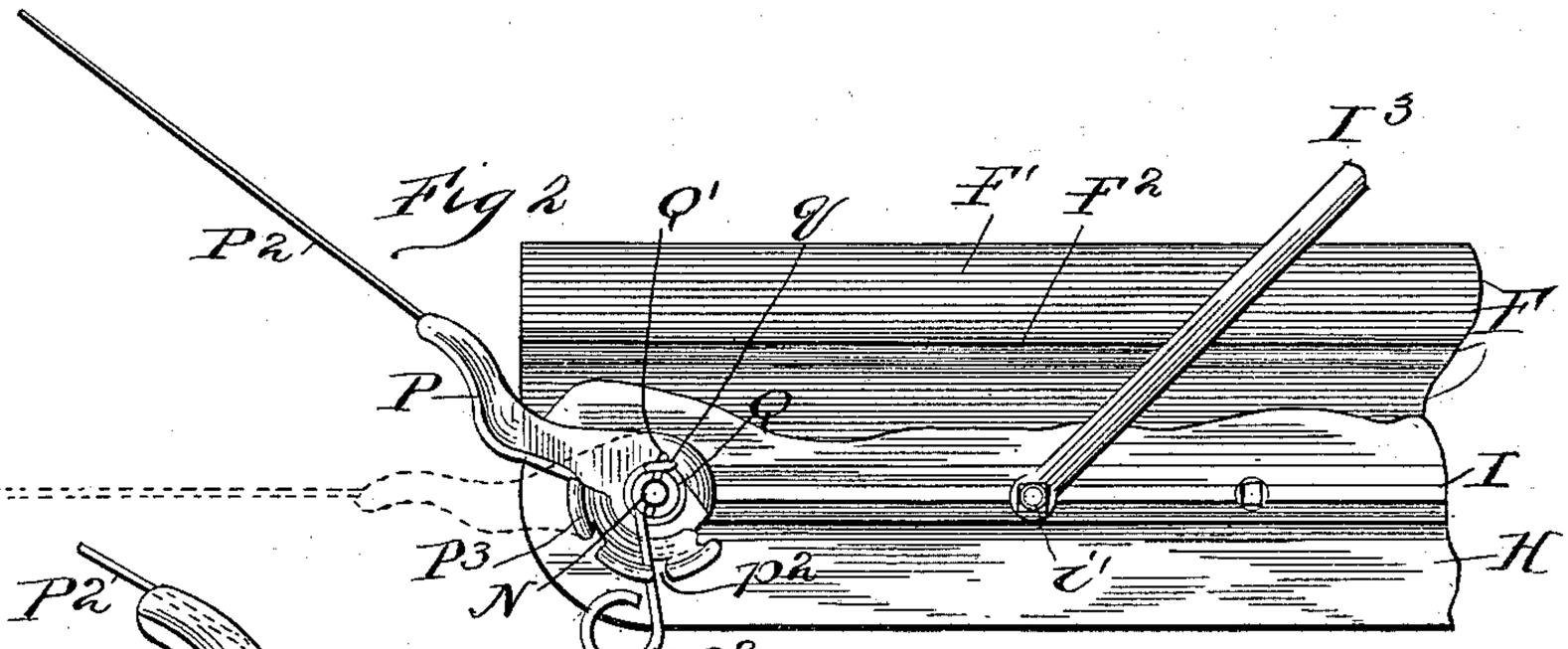


Fig 3

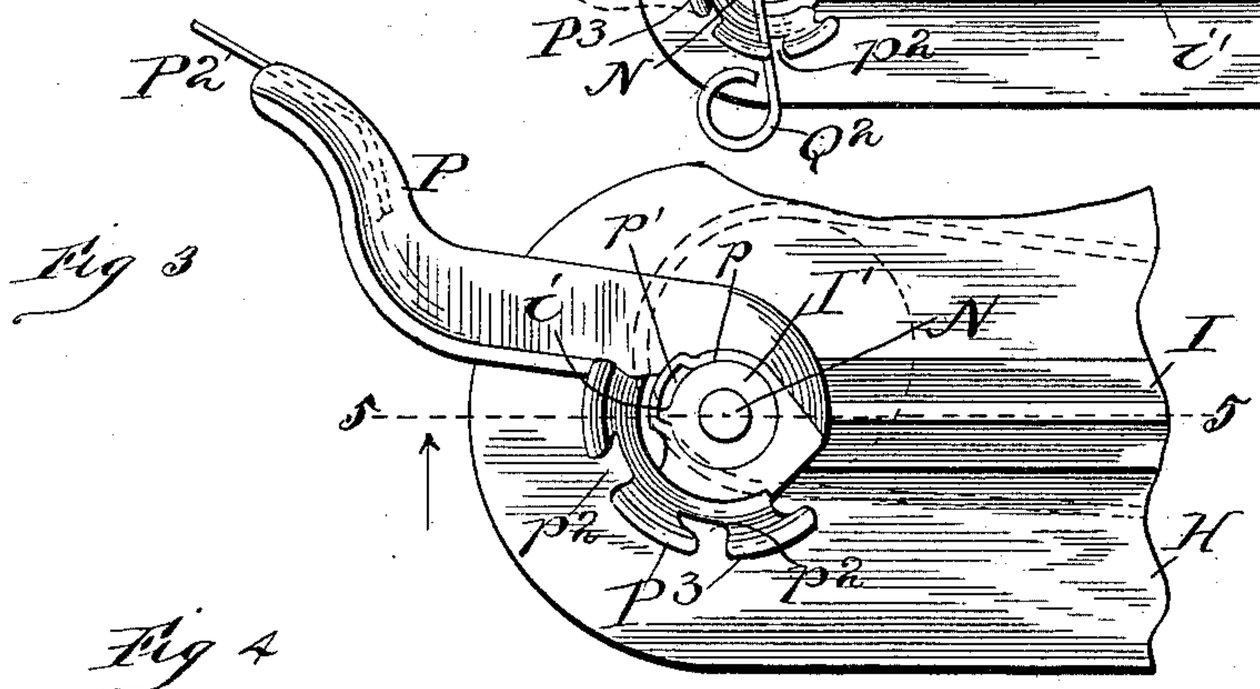
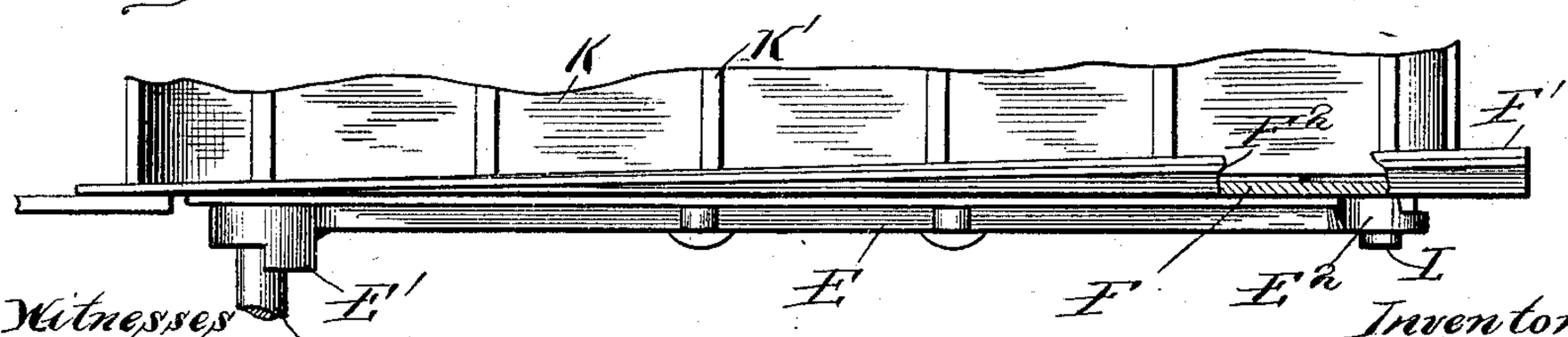


Fig 4



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(No Model.) 2 Sheets—Sheet 2.

J. MACPHAIL.

BUTT ADJUSTER FOR GRAIN BINDERS.

No. 596,603. Patented Jan. 4, 1898.

Fig 5

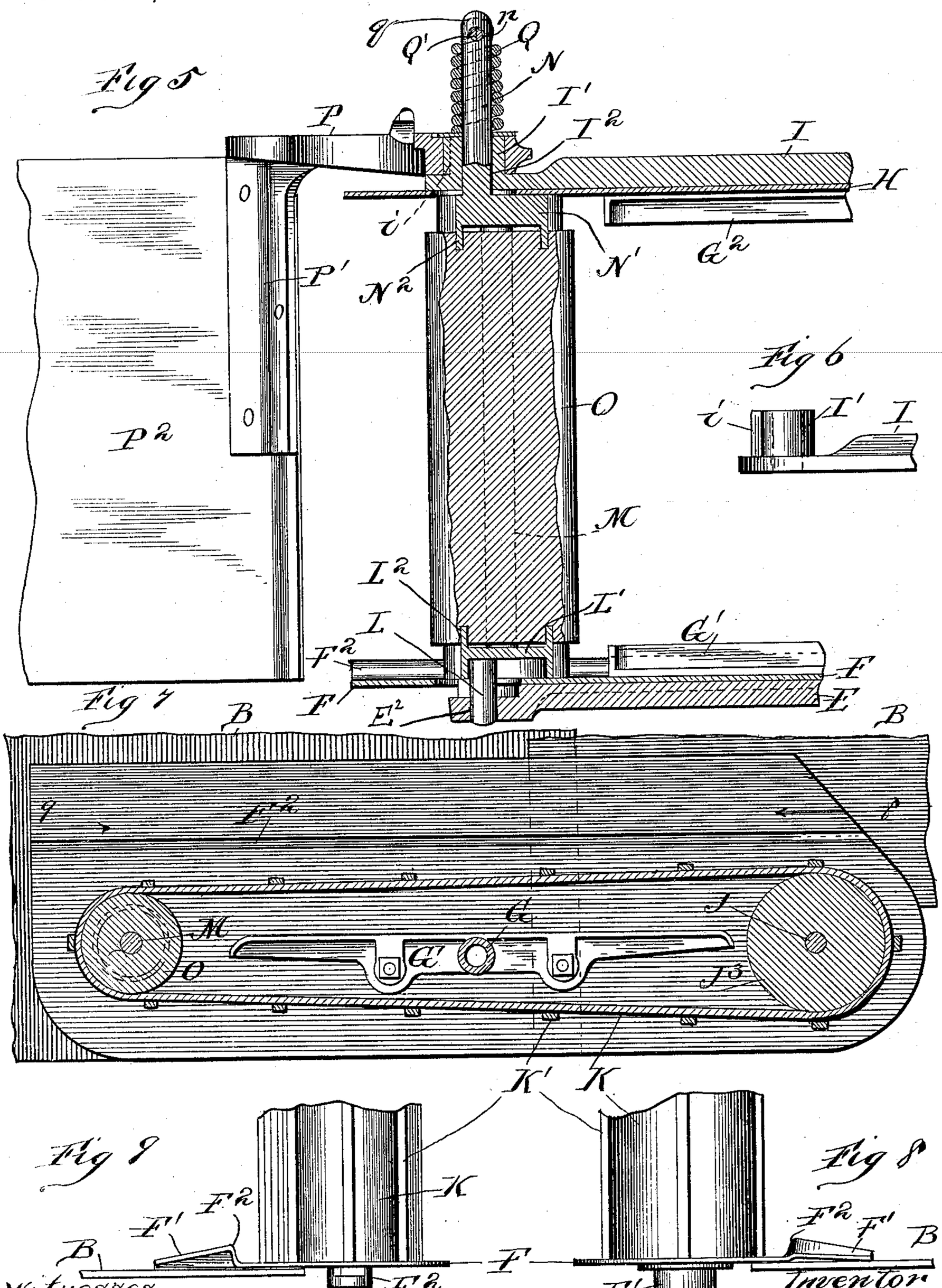

Fig 6

Fig 7

Fig 9

Fig 8

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UNITED STATES PATENT OFFICE.

JAMES MACPHAIL, OF BLUE ISLAND, ILLINOIS, ASSIGNOR TO THE PLANO MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS.

BUTT-ADJUSTER FOR GRAIN-BINDERS.

SPECIFICATION forming part of Letters Patent No. 596,603, dated January 4, 1898.

Application filed March 3, 1897. Serial No. 625,813. (No model.)

To all whom it may concern:

Be it known that I, JAMES MACPHAIL, a citizen of the United States, residing at Blue Island, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Butt-Adjusters for Grain-Binders, which is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a butt-adjuster constructed according to my invention, looking from the front toward the rear of the machine and showing parts of the elevator, &c. Fig. 2 is a plan view, with parts broken away, of the lower portion of my butt-adjuster. Fig. 3 is a similar plan view, enlarged, of a portion of Fig. 2 with the adjusting-spring removed. Fig. 4 is a side elevation of the lower portion of my butt-adjuster, looking from the rear to the front of the machine. Fig. 5 is a vertical section on the line 5 5 of Fig. 3. Fig. 6 is a detail view of part of the mounting of the lower roller. Fig. 7 is an approximately horizontal section on the line 7 7 of Fig. 1. Fig. 8 is an end elevation of the lower portion of my butt-adjuster, taken in the direction of the arrow 8 of Fig. 7. Fig. 9 is a similar view taken in the opposite direction—that of the arrow 9 of Fig. 7.

My invention relates to butt-adjusters such as are commonly used upon grain-binding harvesters, and particularly to such butt-adjusters as employ a positively-driven apron one of the rollers of which is yieldingly mounted to adjust longitudinally of the apron.

My invention has for its principal objects to provide mechanism for accommodating the tension of the apron to the varying pressure of the grain and to render the adjuster as a whole less liable to clogging from engagement with the straw than heretofore.

Referring to the drawings by letter, A designates the elevator or A-frame; B, the binding-deck; C, one of the frame-uprights supporting both of these, and D a portion of the bull-wheel. The framework of the butt-adjuster proper comprises a longitudinal bar-casting E, at the upper end of which is provided a bearing E′, at the lower end thereof a bearing E^2. Above the bar E is disposed a shield or plate F, which is usually made flat throughout and is provided with apertures over the bearings E′ and E^2. According to my invention, however, upon its inner side the plate F is constructed with a tapering deflecting-strip F′, which is made by forming in the plate F a shoulder F^2, increasing in height from the upper toward the lower end of the plate, and in slanting the said plate downward from the shoulder F^2 to the binding-deck B. Fig. 8 shows this deflecting-strip F′ looked at from its upper end. Fig. 9 shows the same looked at from its lower end.

On top of the plate F is mounted an I-casting comprising a vertical post G and the lower and upper horizontal pieces G′ and G^2, respectively, the piece G′ being disposed above and secured through the plate F to the bar E. Upon the upper horizontal frame-piece G^2 is disposed the upper shield or plate H, provided with apertures in a similar manner to plate F, and on top of the plate H there is mounted and through it secured to the frame-piece G^2 a second and upper bar I, corresponding to the lower bar E. The bar I is provided at its lower end with the stud I′, in which is formed a vertical bearing I^2. The stud I′ is further provided with a lug or spline *i*, preferably upon the lower side thereof. The entire framework of the butt-adjuster, pivoted as later described, is moved upon such pivotal point by the rod I^3, pivotally connected with the adjuster-frame, as at *i*′.

The shaft J, the lower end of which is adapted to be driven by the movement of the machine through mechanism of ordinary construction and not here shown, is mounted in suitable bearings J′ and J^2, formed upon the frame-upright C and the elevator-frame A, respectively. The said shaft further has bearings in the upper and lower frame-bars E and I, respectively, of the butt-adjuster, one of which bearings E′ is shown and has been described. By this means the whole framework of the butt-adjuster is pivotally mounted upon the said shaft and can be swung thereon by the rod I^3, hereinabove referred to.

Upon the shaft J is keyed the roller J^3, which drives the apron K, provided with slats K′ in the ordinary manner. In the bearings E^2 of the frame-bar E is mounted a stub rock-shaft L, upon the upper end of which is eccentric-

ally mounted a disk L′, provided with an upright peripheral rim or flange L^2. Upon the center of the disk L′ is mounted the upright axle M.

In the bearings I^2 is mounted a second stub rock-shaft N, provided at its upper end with a perforation *n*. On the lower end of the said rock-shaft is eccentrically mounted a second disk N′, corresponding to the disk L′ and provided with a similar rim or flange N^2. The axle M is secured to the center of the disk N′ as it is to the center of the disk L′.

Upon the stud I′ as an axle is rotatably mounted an arm P, provided with the downward extension P′, to which is secured the vertical guide-board P^2. In the bearing *p*, by which the arm P is mounted upon the stud I′, is formed a recess *p*′, adapted to inclose the spline or lug *i*, carried by the said stud I′. The said recess is considerably greater in width than the spline, and thus permits the rocking of the arm to a limited degree upon the said axle. The arm P adjacent to its bearing is further provided with a segmental flange P^3, in which is formed a series of notches p^2. A coiled spring Q surrounds the upper end of the stub rock-shaft N. A pin Q′ passes through an eye *q* and through the perforation *n* in the end of the said rock-shaft, thereby securing the said spring to the said rock-shaft. The spring at its lower end terminates in an outwardly-extending branch Q^2, which engages with one of the notches p^2, according to the degree of tension desired.

In the operation of the machine the arm P and guide-board P^2 normally stand in some such position as that indicated in full lines in Figs. 2 and 3. As the pressure of the grain increases upon the butt-adjuster it bears against the apron K to an increased degree. It is desirable, therefore, to have the tension of the apron correspondingly augmented to meet this increase of work, preventing slipping of the apron, &c. This increase of tension of the apron is automatically accomplished, in that the grain presses not only against the apron but against the guide-board P^2 and tends to rotate the same into the position shown in dotted lines in Fig. 2. The result of this is to increase the tension of the spring Q, the lower end of which is engaged with the arm P and the upper end thereof with the rock-shaft N, as above described. This increase of tension of the spring Q tends to rotate the rock-shaft N and so both the eccentrics N′ and L′, which are connected by the axle M. The axle M and the roller O, which it carries, are thereby moved slightly in the direction of the length of the apron, with the result that the tension of the apron is increased to meet the increased work caused by the heavy grain. It results, therefore, from this construction that the increase of weight of the grain itself automatically acts upon the butt-adjuster to accommodate the latter to this increase of weight of the grain and of work resulting therefrom, this automatic adjustment being equally operative with small changes in the pressure of grain or with greater changes. The spline *i*, playing in the recess *p*′, limits the rotation of the arm P and so the movement of the guide-board P^2. The tension of the spring Q may obviously be adjusted to suit the requirement of the machine.

A preventive against clogging of the butt-adjuster from the butts of the grain, and constituting a part of my improvement, is provided in the deflecting-strip F′. It will be readily seen that as the butts of the grain move downward past the butt-adjuster the butts are gradually elevated by the said deflecting-strip and thereby lifted above the plane of contact of the apron with the plate F, thus preventing the entrance of the butts under the edge of the apron and obviating the clogging that frequently results therefrom.

While I have shown and described but one specific construction for carrying out my invention, my said invention is not limited to the precise form or arrangement shown, and many changes in the details may be made without departing from the principles of my said invention.

What I claim, therefore, and desire to secure by Letters Patent, is—

1. In a butt-adjuster, a driving-roller; a second roller adapted to be moved toward and from the driving-roller; an endless apron passing about the two said rollers; a spring device adapted to force the second roller away from the driving-roller; a guide-board movably mounted upon the butt-adjuster frame; and connections between the guide-board and the spring device adapted to increase or decrease the tension of the latter according to the movement of the guide-board.

2. In a butt-adjuster, a driving-roller; a second roller mounted upon eccentric devices; an endless apron passing about the two said rollers; a spring adapted to rotate the eccentric devices and force the second roller away from the driving-roller; a guide-board rotatably mounted upon the butt-adjuster frame; and connections between the guide-board and the spring device adapted to increase or decrease the tension of the latter as the former moves upon its bearing.

3. In a butt-adjuster, a main frame; a driving-roller mounted in the upper end thereof; stub rock-shafts mounted in the lower end thereof, provided with eccentric disks; an axle connecting and carried by the said disks; a second roller mounted upon the axle; a spring adapted to rotate the stub rock-shafts; a guide-board rotatably mounted upon the butt-adjuster frame; and connections between the guide-board and the spring device adapted to increase or decrease the tension of the latter as the former moves upon its bearing.

4. In a butt-adjuster, a driving-roller; a second roller adapted to be moved toward and from the driving-roller; an endless apron

passing about the two said rollers; a spring device adapted to force the second roller away from the driving-roller; a guide-board movably mounted upon the butt-adjuster frame, provided with stops adapted to limit the said movement of the guide-board; and connections between the guide-board and the spring device adapted to increase or decrease the tension of the latter according to the movement of the guide-board.

5. In a butt-adjuster, a main frame; a stud I′ provided with a spline *i;* a guide-board P^2 mounted upon an arm; the arm P pivoted upon the stud *i′*, and provided with a recess *p′;* the stub rock-shaft N; a roller O adapted to be moved laterally by the rotation of the rock-shaft; and a spring connection between the arm P and the rock-shaft N.

6. In a butt-adjuster, a main frame; a driving-roller; a stud I′ mounted upon the main frame, provided with the bearing I^2; the rock-shaft N mounted in the bearing, and provided with the eccentric disk N′; the rock-shaft L mounted in the main frame, provided with an eccentric disk L′; the axle M centrally mounted upon the said disks; the roller O mounted upon the said axle; an apron K passing over the two said rollers; the arm P rotatably mounted upon the stud I′; the guide-board P^2 carried by the said arm; and a spring connection between the arm P and the rock-shaft N.

7. In a butt-adjuster, a main frame; a driving-roller; a stud I′ mounted upon the said frame, provided with the bearing I^2 and with a spline *i;* the rock-shaft N mounted in the bearing and provided with the eccentric disk N′; the rock-shaft L mounted in the main frame, provided with an eccentric disk L′; the axle M centrally mounted upon the said disks; the roller O mounted upon the said axle; an apron K passing over the two said rollers; the arm P rotatably mounted upon the stud I′, and provided with a recess *p′* inclosing the spline *i;* the guide-board P^2 carried by the said arm; and a coiled spring Q surrounding the rock-shaft I and engaging therewith and with the arm P.

8. In a butt-adjuster, a driving-roller; a second roller adapted to be moved toward and from the driving-roller; an endless apron passing about the two said rollers; a spring device adapted to force the second roller away from the driving-roller; means adapted to adjust the normal tension of the said spring; a guide-board movably mounted upon the butt-adjuster frame; and connections between the guide-board and the spring device adapted to increase or decrease the tension of the latter according to the movement of the guide-board.

9. In a butt-adjuster, a main frame; a driving-roller; a stud I′ mounted upon the said frame, provided with the bearing I^2 and with a spline *i;* the rock-shaft N mounted in the bearing and provided with the eccentric disk N′; the rock-shaft L mounted in the main frame, provided with an eccentric disk L′; the axle M centrally mounted upon the said disks; the roller O mounted upon the said axle; an apron K passing over the two said rollers; the arm P rotatably mounted upon the stud I′, and provided with a recess *p′* inclosing the spline *i*, and with the notches p^2; the guide-board P^2 carried by the said arm; and a coiled spring Q surrounding the rock-shaft I and engaging therewith and with any given notch p^2.

10. In a butt-adjuster, a main frame pivoted at its upper end to the body of the machine; means adapted to swing the butt-adjuster upon its pivotal mounting laterally of the binding-deck; a driving-roller mounted in the said frame; a second roller adapted to be moved toward and from the driving-roller; an endless apron passing about the two said rollers; a spring device adapted to force the second roller away from the driving-roller; a guide-board movably mounted upon the butt-adjuster frame; and connections between the guide-board and the spring device adapted to increase or decrease the tension of the latter according to the movement of the guide-board.

11. In a butt-adjuster, a frame; rollers mounted therein; an apron passing over the said rollers; and a deflecting-strip secured to the frame upon the inside and bottom portion thereof and having its upper edge projecting above the lower edge of the apron, so as to elevate the butts of the grain above the bottom of the apron.

12. In a butt-adjuster, a frame; rollers mounted therein; an apron passing over the said rollers; and a deflecting-strip F′ secured to the frame upon the inside and bottom portion thereof, tapering upward from the upper to the lower end of the butt-adjuster, and having its upper edge projecting above the lower edge of the apron, so as to elevate the butts of the grain above the bottom of the apron.

13. In a butt-adjuster, a main frame; a bottom plate F provided with the upward-tapering shoulder F^2, forming a deflecting-strip F′ adapted to elevate the butts of the grain above the plane of contact of the apron with the said plate F; rollers mounted in the said frame; and an apron passing over the said rollers.

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