

(No Model.)

4 Sheets—Sheet 1.

J. G. GILMER.
BINDING ATTACHMENT FOR HARVESTERS.

No. 441,297.

Patented Nov. 25, 1890.

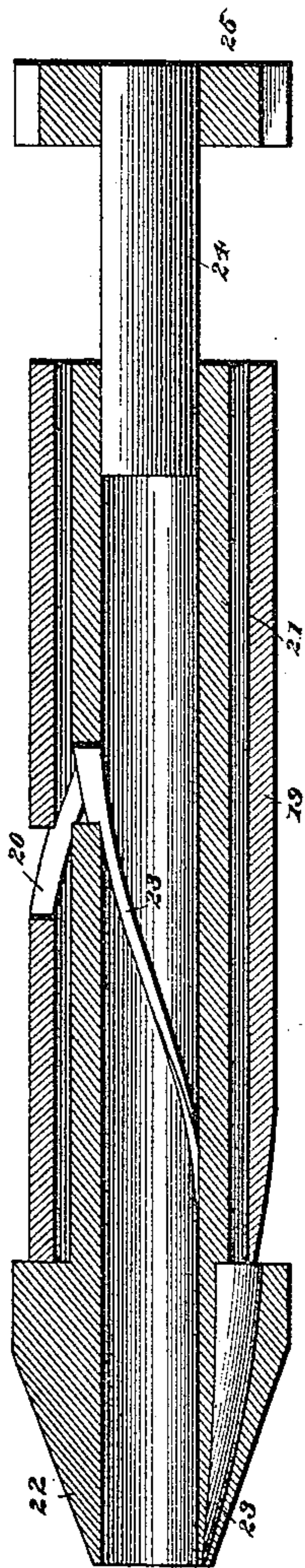


Fig. 8.

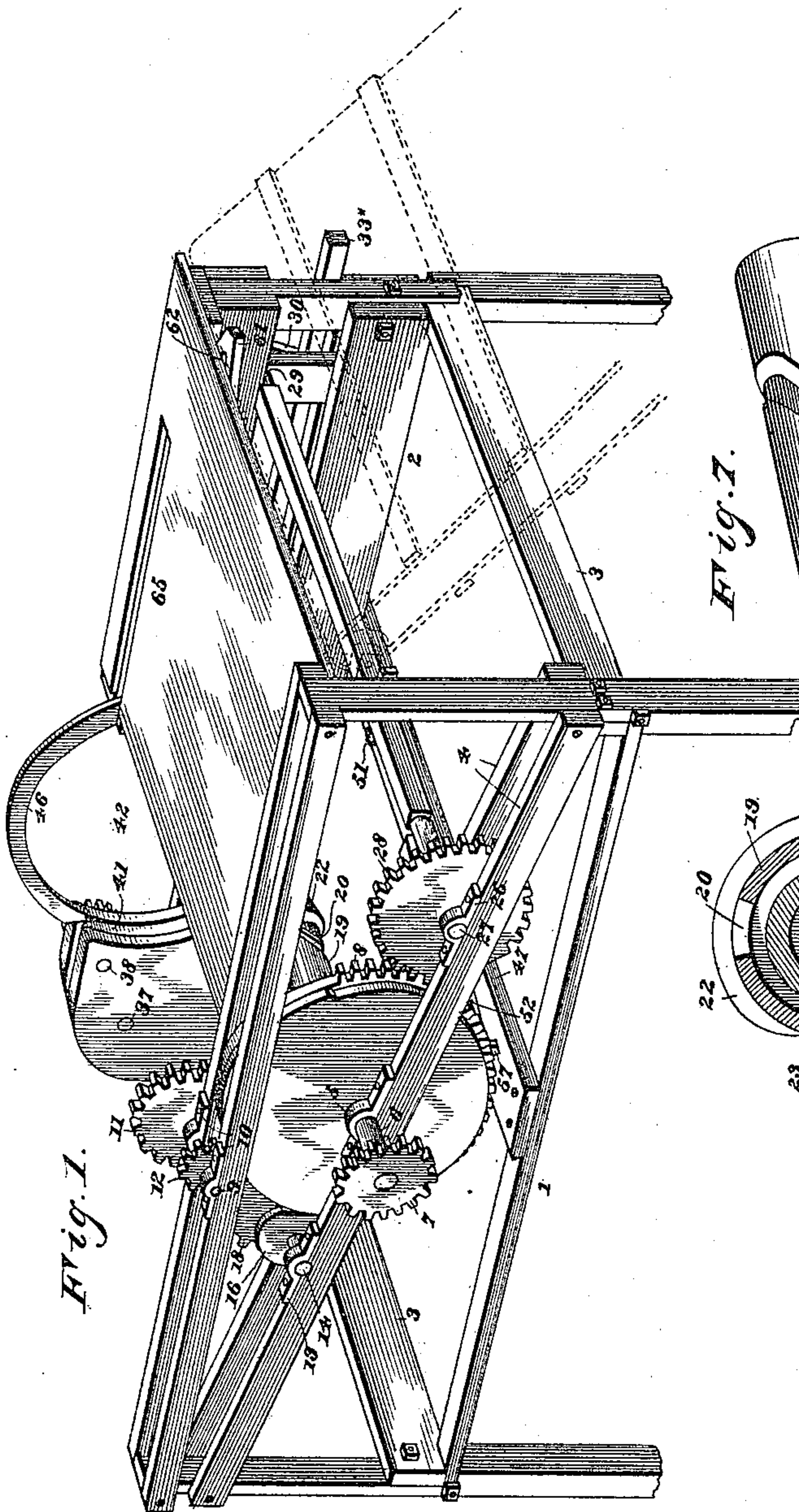


Fig. 1.

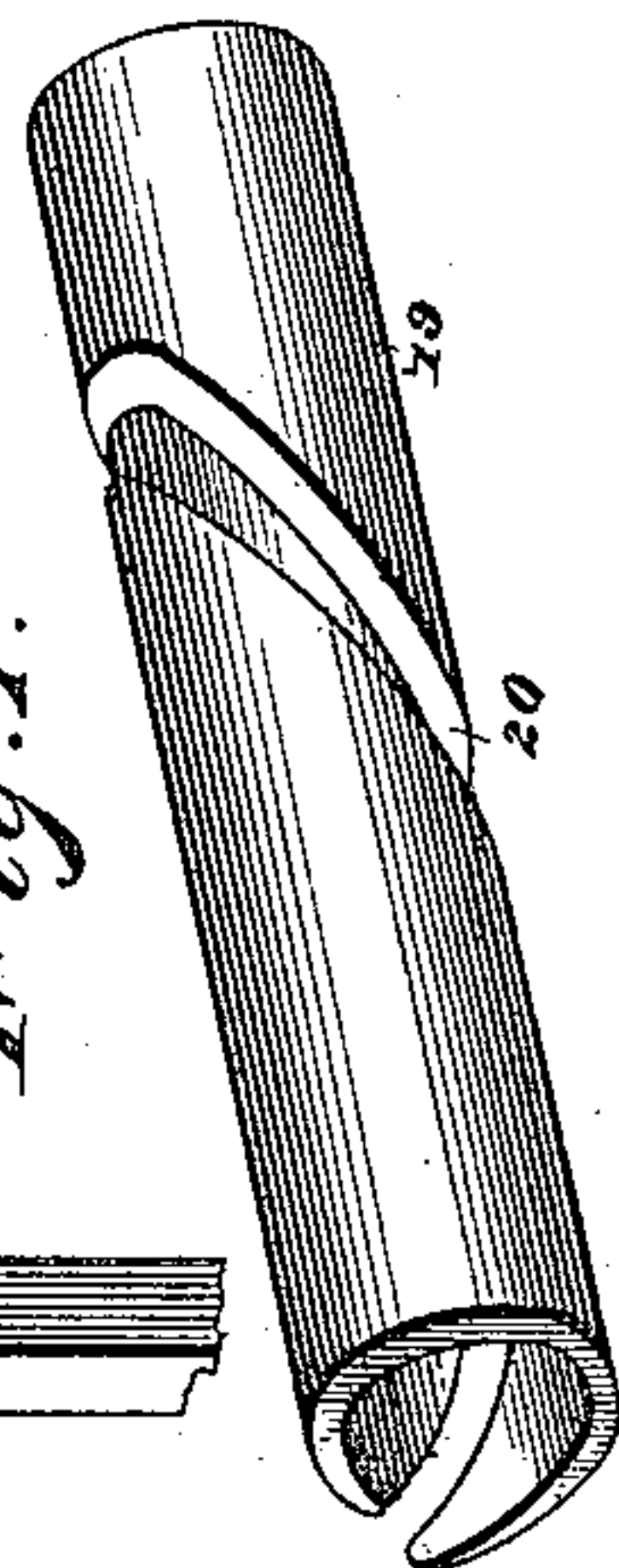


Fig. 7.

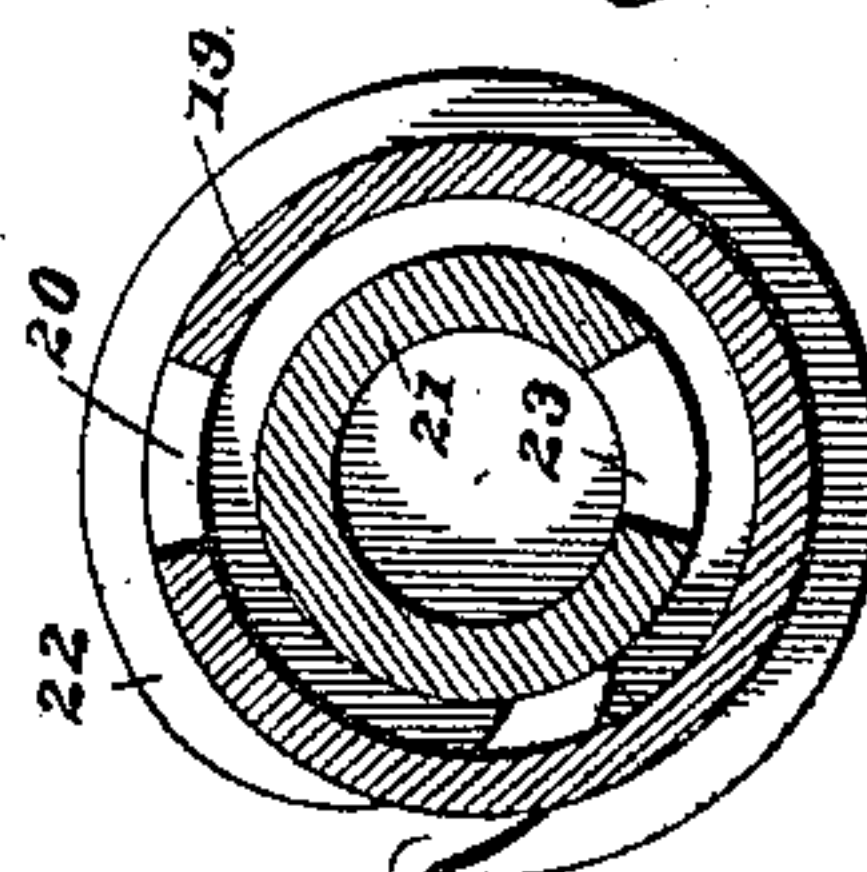


Fig. 9.

Witnesses:

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By *his* Attorneys,

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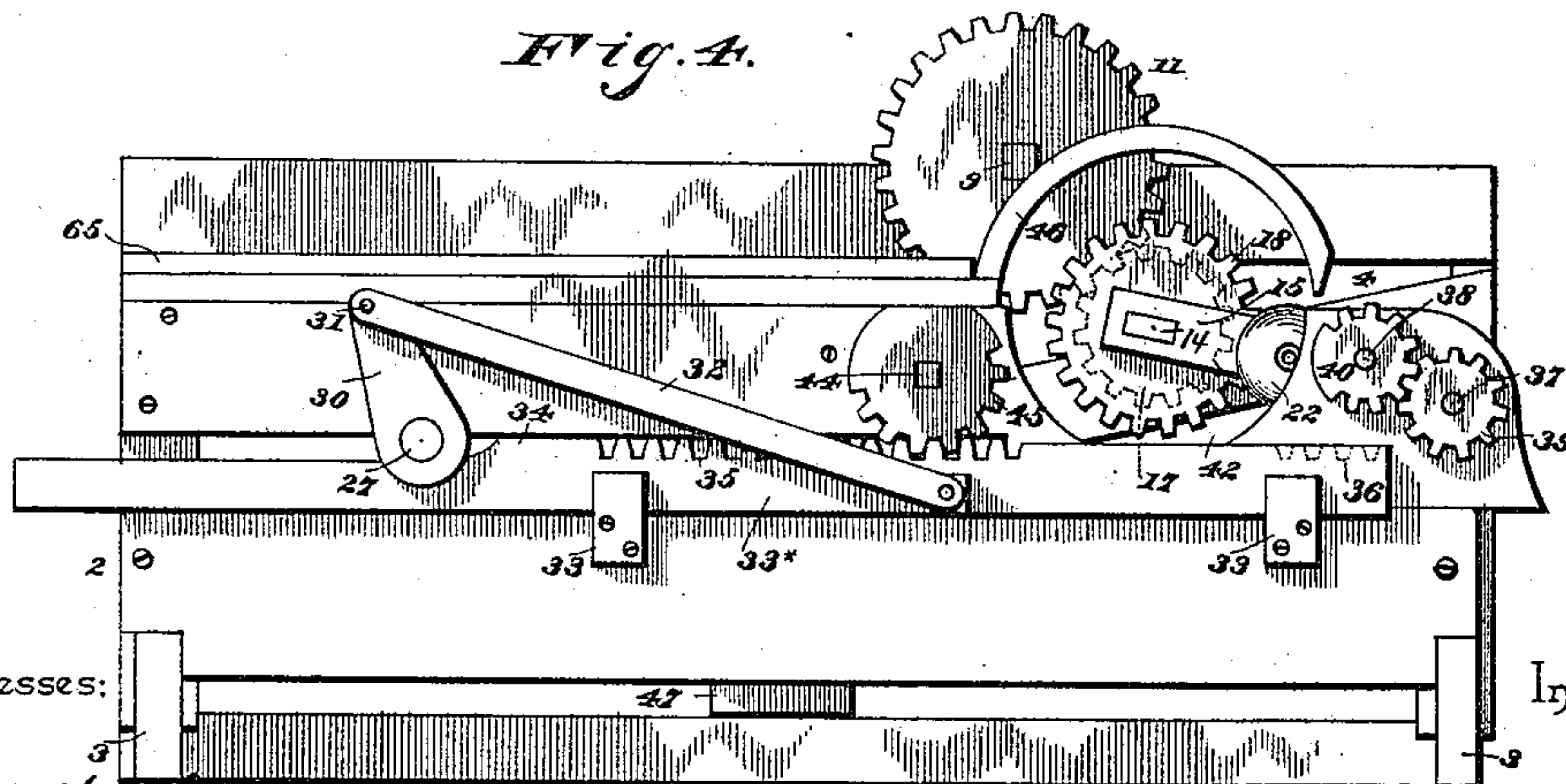
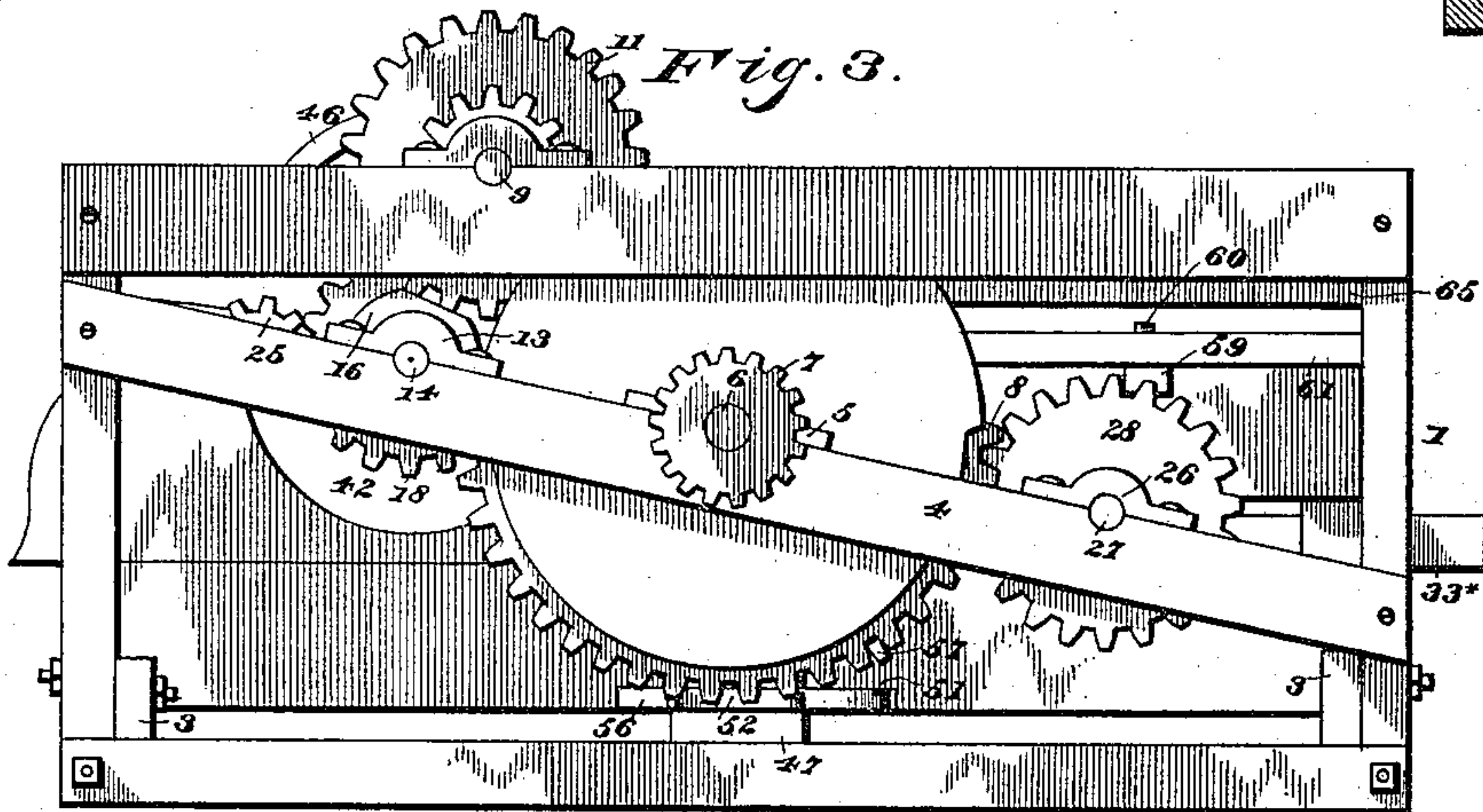
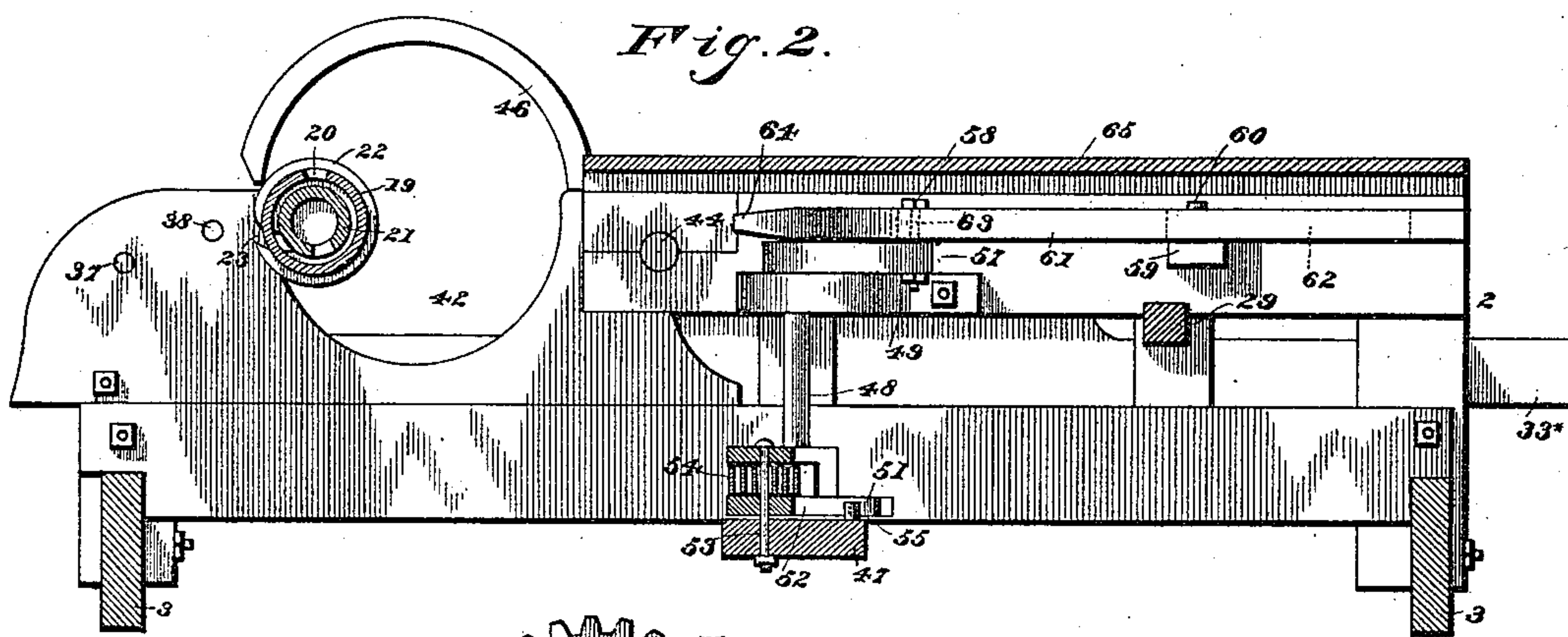
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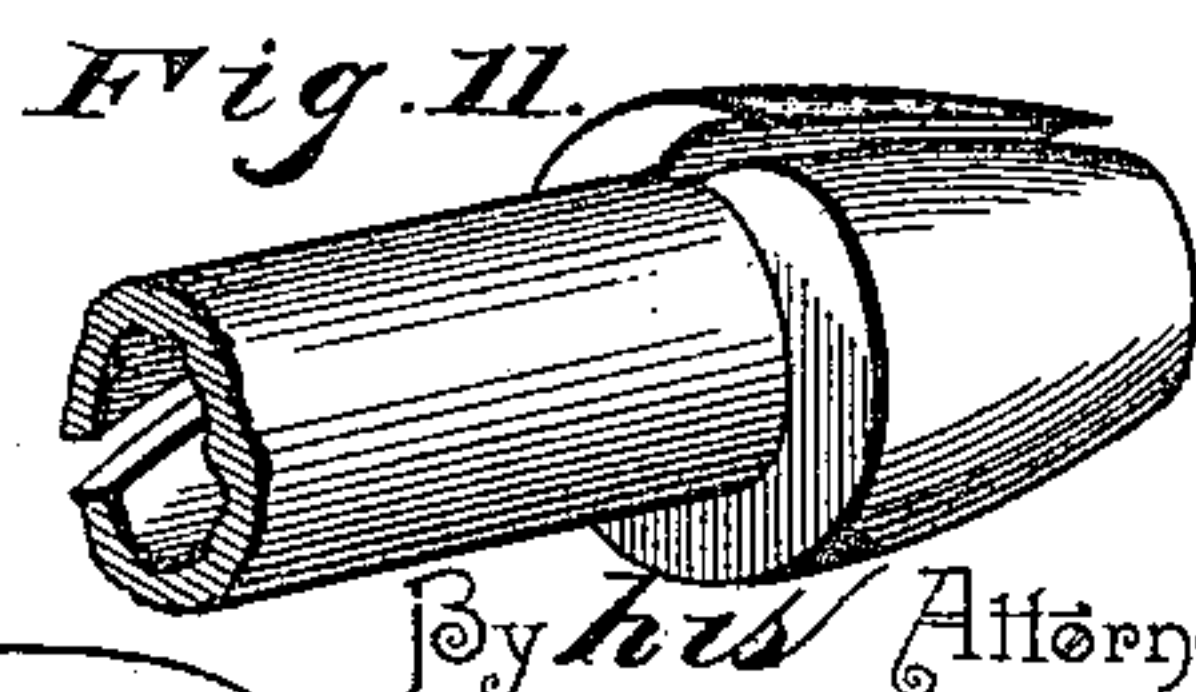
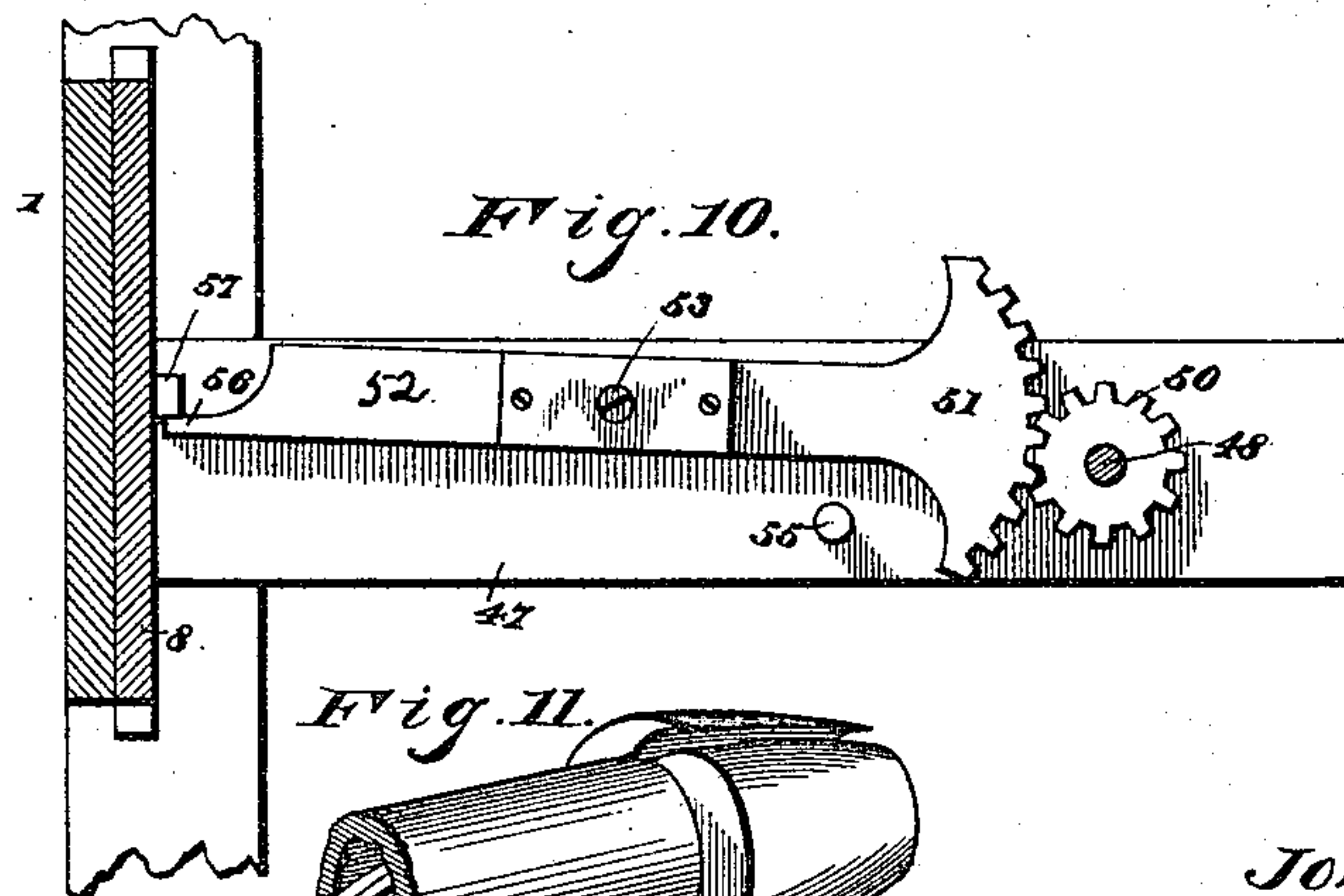
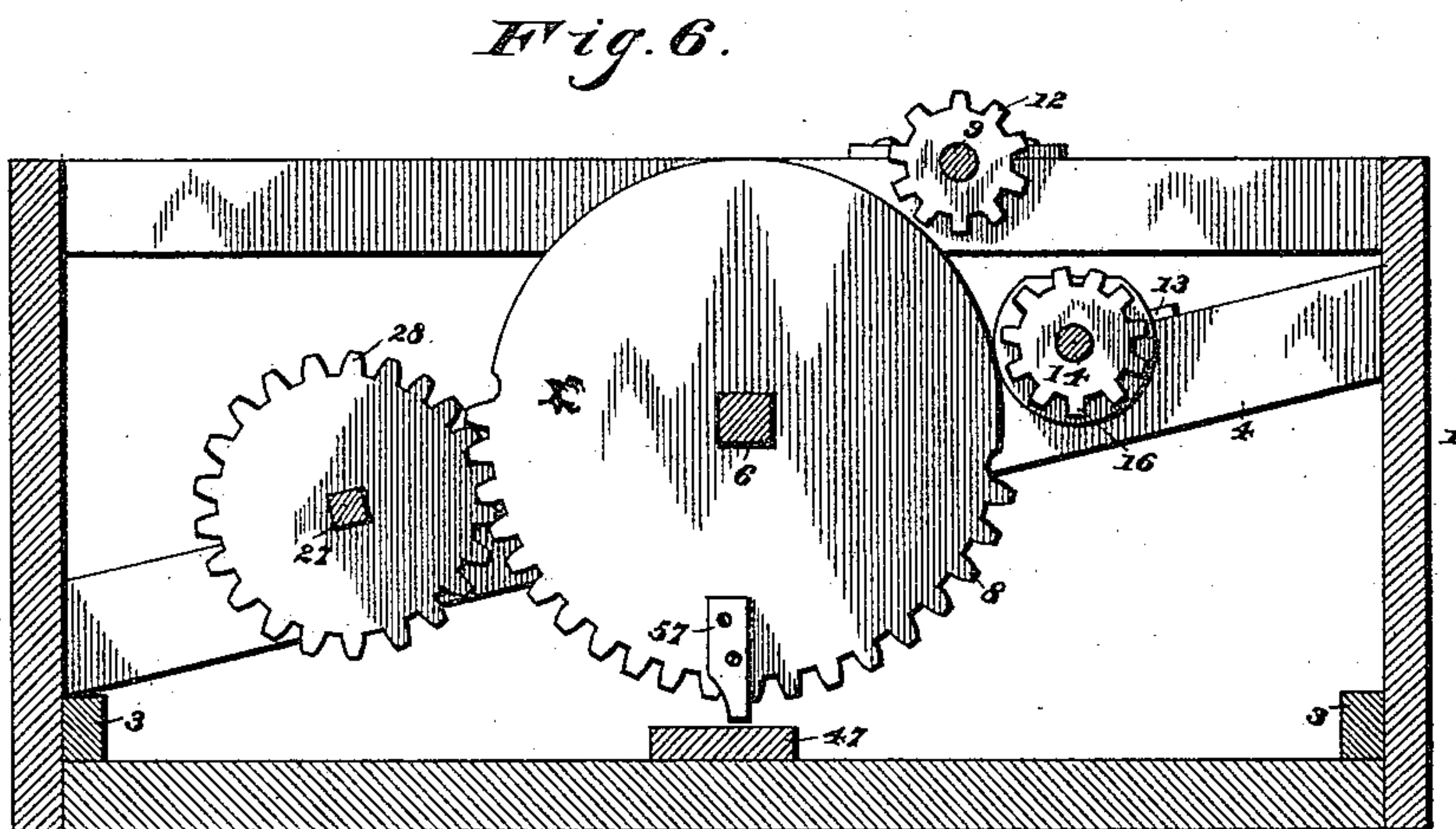
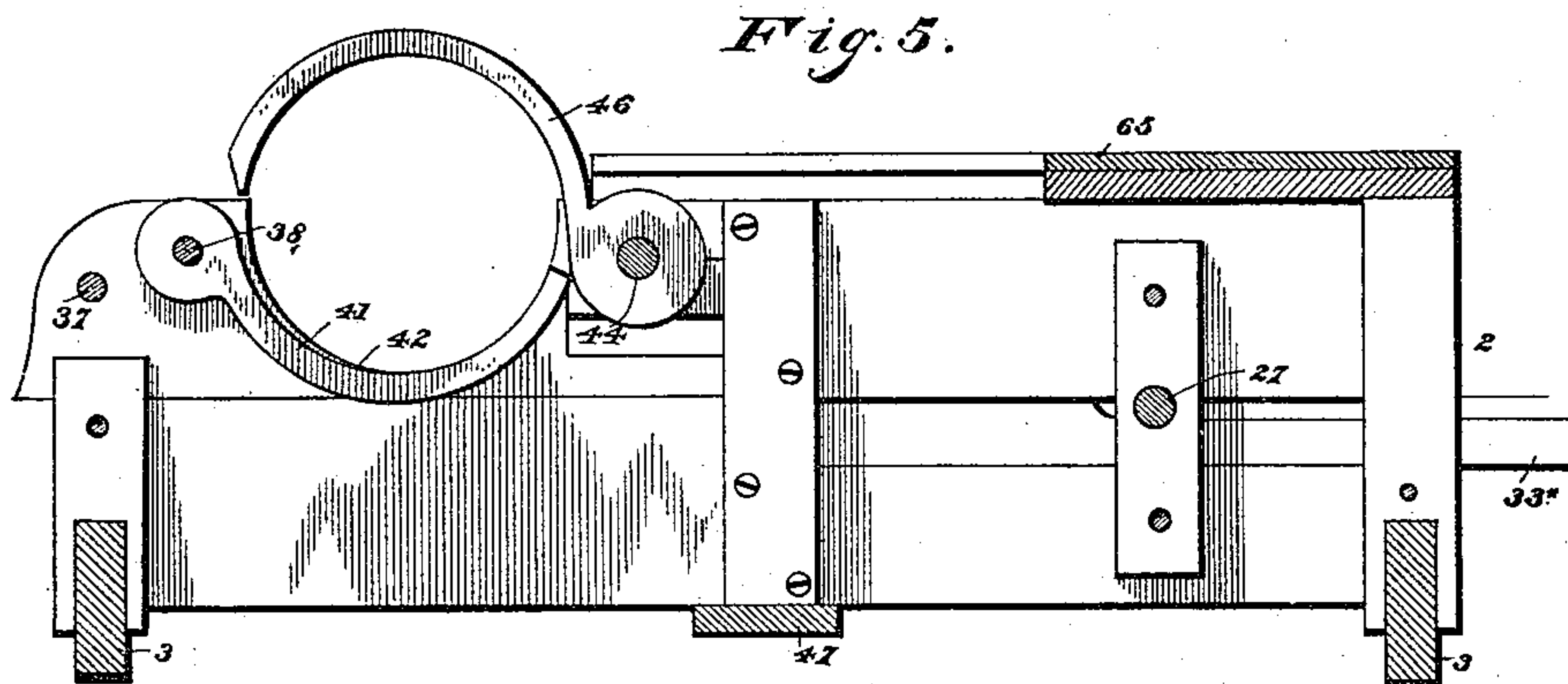
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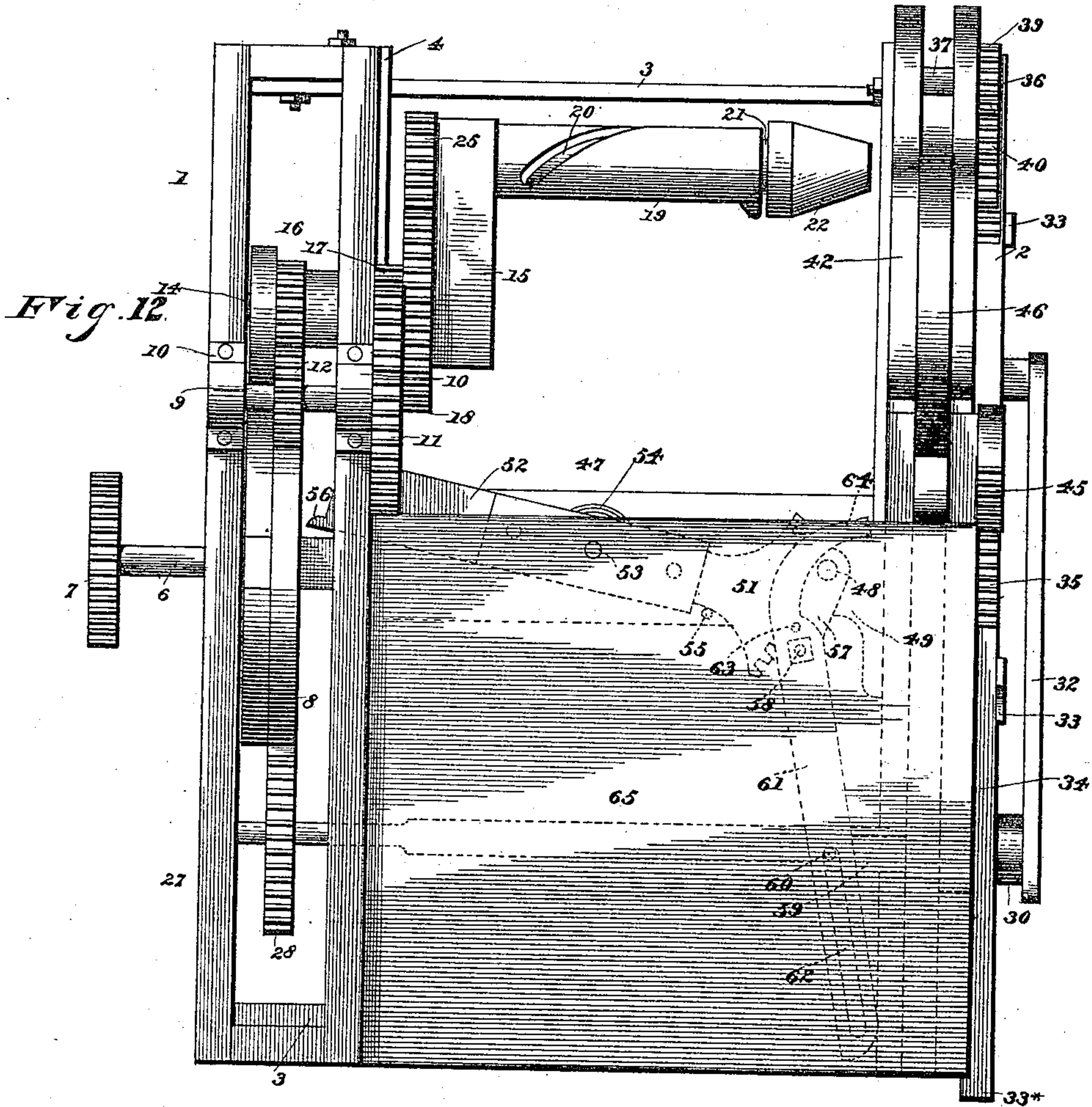
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BINDING ATTACHMENT FOR HARVESTERS.

SPECIFICATION forming part of Letters Patent No. 441,297, dated November 25, 1890.

Application filed June 5, 1890. Serial No. 354,372. (No model.)

To all whom it may concern:

Be it known that I, JOHN G. GILMER, a citizen of the United States, residing at Oxford, in the county of Sumter and State of Florida, have invented a new and useful Binding Attachment for Harvesters, of which the following is a specification.

This invention has relation to binding attachments for harvesters.

The objects of the invention are to provide an extremely cheap and simple attachment and one which is adapted for rapidly and efficiently forming the band and applying the same around the gavel.

Various other objects and advantages of the invention will hereinafter appear and the novel features thereof will be particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a perspective of a grain-binding attachment constructed in accordance with my invention, the same being shown in position upon the upper portion of the harvester. Fig. 2 is a longitudinal vertical section. Fig. 3 is a side elevation. Fig. 4 is a similar view taken at the opposite side of the machine; Fig. 5, a vertical longitudinal section taken between the side walls, in which is located the cradle; Fig. 6, a similar view taken between the side walls, in which is located the twisting-mechanism operating-gears. Fig. 7 is a perspective in detail of the twister-arm. Fig. 8 is a longitudinal section of the arm and shaft; Fig. 9, a transverse section. Fig. 10 is a horizontal section showing the arrangement of the sector-lever. Fig. 11 is a detail in perspective of the end of the twister-arm. Fig. 12 is a plan of the binding attachment.

Like numerals of reference indicate like parts in all the figures.

In constructing my binder attachment I provide two opposite longitudinal side frames 1 and 2. These side frames 1 and 2 will, for convenience, be designated as the "gear-side frame" 1 and the "cradle-side frame" 2.

The attachment is designed for use upon any ordinary reaper or mower, and the mechanism herein described for imparting motion to the various parts of the machine is therefore subject to slight changes and modifications necessary to form the train of gearing for operating the elements, and I therefore do

not limit my invention with regard to the details of construction herein set forth.

The side frames 1 and 2 are connected by suitable cross-bars 3, and the side frames 1 are preferably open to lend lightness to the structure.

4 designates a pair of inclined bars which form a part of the gear side 1 of the attachment, and upon the central upper edges of said bars there is formed a bearing 5, in which is mounted for rotation the power-shaft 6, said shaft being provided outside of its bearings and at one end with a gear 7, engaged and operated by a suitable train of gearing connected with the motive power of the harvester. Between the bearings the shaft is provided with a master-gear 8, which gear has one-half of its circumference left plain or untoothed.

In the upper side bars of the gear-side frame is mounted a shaft 9 in bearings 10, which shaft beyond its inner bearing carries a gear-wheel 11 and between its bearings a small pinion 12, the teeth of the latter being designed to engage the teeth of the master-gear 8. Below the shaft 9 there is journaled in bearings 13 upon the side bars 4 a crank-shaft 14, the crank 15 of which is upon the inner side of the gear-frame. The crank-shaft between its bearings is provided with a small gear 16, and between the crank-arm and the inner bearing said shaft has mounted loosely thereon a small pinion 17 and a larger gear 18, the gear and pinion being fast to each other, and therefore adapted to rotate together, and the small pinion being engaged by the teeth of the gear-wheel 11.

Projecting from the free end of the crank-arm is a tubular shaft 19, provided with a spiral slot 20 extending throughout its length, said shaft projecting laterally or across the frame to a point near the opposite side of said frame.

Mounted loosely and adapted for rotation in the tubular shaft 19 is a tubular spindle 21, provided at its outer end with a conical head 22, through which the bore of the spindle extends. The head and spindle are spirally slotted, as at 23, the slot being disposed in a direction opposite to that of the slot 20 of the shaft 19. The rear end of the spindle is connected or made fast to a short shaft

24, which passes transversely through the free end of the crank-arm 15, and has mounted thereon a small pinion 25. This comprises the twisting mechanism, and by the operation of the same, as I will now proceed to describe, the band is formed from the gavel.

Motion being imparted to the master-gear, said gear rotates during one-half of its revolution the shaft 9 through the medium of the pinion 12, and also rotates the gear 11. The gear 11 rapidly rotates the small pinion 17 and gear 18, which are loose upon the crank-shaft 14. This rotation is imparted to the small pinion 25, which is rapidly revolved by the relative sizes of gears, irrespective of the rotations of the tubular shaft 19. The master-gear 8 during a portion of its revolution rotates the small pinion 16 and with it the shaft 14 and the crank-arm 15, which revolves carrying the laterally-disposed tubular shaft 19, which, it will be observed, travels in a path opposite to the direction of rotation of the tubular spindle.

In bearings 26, located upon the inclined bars 4 in rear of the master-gear, there is journaled a transverse shaft 27, which between the side bars 4 carries a gear 28, a small portion of the surface of which is plain or untoothed and adapted to ride over the plain portion of the gear 8, by which it is driven during a portion of the revolution of said gear 8. The opposite end of the shaft 27 passes through the cradle-side frame 2, and is mounted in bearings 29, formed in said side frame. A crank-arm 30 is mounted upon the last-mentioned end of the shaft 27, and has pivoted, as at 31, to said arm a link 32. Guides 33 are secured or formed upon the outer side of the side frame 2, and in said guides there is mounted for reciprocation a rack-bar 33*, a portion of the surface of which is plain, as at 34, leaving toothed portions 35 in rear thereof and 36 at the front end thereof. A shaft 37 is journaled in the side frame 2, and at an inclination above the same there is journaled a second shaft 38. Upon the shaft 37, outside of the wall, is mounted a loose pinion 39, which is engaged and operated by the toothed portion of the rack-bar.

40 represents a half-pinion mounted upon the shaft 38 and rigid therewith, said pinion being engaged and driven by the pinion 39. The shaft 37 is a fixed shaft, while the shaft 38 is movable, and within the frame said shaft 38 has fixed thereto a curved arm 41.

The side frame 2 is provided with a semicircular opening or cradle 42, concentric with the shaft 14 of the opposite frame; and the curved arm 41, which is for ejecting the sheaf, is concentric with the opening or cradle and adapted to take below the same within the frame. At the opposite side of the opening or cradle is journaled a shaft 44, which at its outer end carries a small pinion 45, one-half of the periphery of which is plain or untoothed, the teeth of said pinion being engaged by the toothed portion 35 of the rack-bar.

Between the sections of the frame 2 there is fixed upon the shaft 44 the gathering and binding arm 46 of semicircular shape and adapted to span the cradle to complete the circle formed by the same and the cradle.

In a transverse bar 47 connecting the two side frames 1 and 2 there is stepped a short vertical shaft 48, the upper end of the shaft having bearing in a bearing-bracket 49 secured to the inner side of the frame 2. The shaft 48 is provided at its lower end with a small pinion 50, the teeth of which are engaged by a toothed sector 51 formed at the front end of a pivoted sector-lever 52. A bolt 53 serves as the pivot for said lever, and coiled about the bolt is a convolute spring 54, one end of which is made fast to the shaft and the other to the lever, so that said lever is actuated or maintained by the spring in a rearwardly-disposed position against the stop 55. The rear end of the lever is provided with an extension or tail 56, which terminates in the path of a trip-lug 57 formed upon the inner side of the master-gear 8, so that once during a revolution of said master-gear the sector is oscillated against the spring in one direction and by the spring retracted. The upper end of the short vertical shaft 48 carries a crank-arm 57, at the outer end of which is located a bearing-stud 58, which arm, it will be apparent, is oscillated by the sector during every revolution of the master-gear. A bracket 59 projects from the frame 2 opposite the bracket 49, and is provided with a bearing-stud or guide 60.

61 designates an arm longitudinally slotted, as at 62, for the reception of the stud 60, and pivoted near its front end to the bearing-stud 58, for which purpose it is provided with a series of adjusting-holes 63, any one of which is adapted to receive the bearing 58. The front end of the arm terminates in a hook 64. This completes the construction of my attachment, with the exception of a platform 65 mounted upon the side frame 2 and secured to the under side of the upper rail of the side frame 1, so that said upper rail serves the function of an abutment or header for heading up the grain previous to its formation into the gavel, and upon said platform is delivered in the usual manner the grain from the harvesting mechanism. The grain falls upon the table, the butts being disposed toward the side frame 1, against which, as before stated, they are headed. By reason of the gearing specified the gathering and binding arm 46 will be rapidly oscillated from under the platform or table through the same and over the cradle. At each forward movement of the arm all grain upon the table is brought over and delivered within the cradle and tightly squeezed to form the gavel. During the squeezing process the crank-shaft 15, the tubular shaft 19, and the tubular spindle 21 are being revolved, the tubular shaft passing twice around the gavel or bundle, while the tu-

bular spindle is making a number of rapid revolutions. At each revolution of the tubular spindle the conical head thereof takes within its slot a series of straws, which are engaged and taken into the hollow spindle and by the rapid rotations of the same twisted into a rope or band, which is drawn out as the tubular shaft 19 comparatively slowly revolves around the sheaf. The revolutions of the twisting cone-shaped head continue to add the straw, so that the rope or band is continuous until the last quarter of the revolution of the tubular shaft, when, by reason of the peculiar gearing hereinbefore mentioned, said tubular shaft stops and the arm 61 is thrust forward against the band as its terminal comes from the cone, and after such movement the tubular shaft continues its revolution. In the forward thrust or reciprocation of the arm 61 the hook 64 at the front end of the same passes underneath the band already drawn around the sheaf and, forcing the terminal of the band under the band, thus fastens and prevents it from coming loose. After forming the connection the master-wheel has passed a sufficient distance to bring its tripping-lug out of contact with the vibrating sector-arm, and the latter is by its spring immediately retracted. When this operation is taking place it will be apparent that the gavel has been transformed into a sheaf, and at this moment the shaft 27 is rotated and through the medium of the crank-arm 30 and connecting-rod 32 the rack-bar 33 is moved forward and back again and during its forward movement suddenly elevates the curved ejecting-arm 41 and throws the sheaf from the cradle.

By the term "revolving," as applied to the motion given to the part 19, I mean moving in a circular path around an imaginary center, and by the term "rotating," as applied to the part 21, I mean turning within or upon an axle, similar to the movement of a wheel. Thus these commonly synonymous terms are employed in contradistinction to each other.

Having described my invention, what I claim is—

1. In a grain-binding attachment, the combination, with a gavel-holding cradle, of a revolving tubular shaft, and a rotating tubular spindle mounted in the shaft, the shaft and spindle being spirally slotted in opposite directions, and mechanism for operating the shaft and spindle in opposite directions, substantially as specified.

2. In a grain-binding attachment, the combination, with a cradle, of a revolving tubular shaft, and a rotating tubular spindle mounted in the shaft and terminating at its front end beyond the shaft in a conical head, the shaft and spindle with its head being provided with oppositely-disposed spiral slots, and mechanism for revolving the shaft in one direction and the spindle in an opposite direction, substantially as specified.

3. In a grain-binding attachment, the com-

bination, with a cradle or gavel-folding mechanism, of a revoluble tubular shaft longitudinally slotted, and a rotatable tubular spindle longitudinally slotted, and mechanism for revolving the shaft and the spindle at different speeds of rotation and in reversed directions, substantially as specified.

4. In a grain-binding attachment, the combination, with a gathering and binding arm, a cradle, at one side of which the arm is pivoted, and mechanism for intermittently operating said arm in the manner described, of a revoluble tubular shaft longitudinally and spirally slotted, a tubular spindle mounted for rotation in the shaft and terminating beyond the same in a conical head, the head and spindle being provided with a longitudinal spiral slot oppositely disposed to that of the shaft, and means for operating the shaft and spindle in reversed directions, substantially as specified.

5. In a grain-binding attachment, the combination, with a cradle and pivoted binding and gathering arm, the two combined to form a circle for holding the gavel of grain, of a crank shaft journaled in the opposite side of the frame concentric with the circle formed by the cradle and arm, a tubular spirally-slotted shaft mounted on the outer end of a crank-arm secured to the shaft, said tubular shaft being adapted for revolving around the gavel-holding devices, a spirally-slotted tubular spindle mounted in the tubular shaft and having its slot oppositely disposed to that of the tubular shaft and terminating outside of the shaft in a conical slotted head, and mechanism for intermittently operating the tubular shaft and the crank-shaft and in reverse directions, substantially as specified.

6. In a grain-binder, the combination, with a cradle, a binding and gathering arm pivoted at one side of the same, and an ejecting-arm pivoted at the opposite side thereof and adapted to take below the cradle, and means for alternately operating these arms, of a twisting device, and mechanism for operating the same located at one side of the cradle, a hook-shaped tucking-arm mounted for reciprocation at the side of the cradle, and mechanism for reciprocating the arm and operating the twisting devices, substantially as specified.

7. In a grain-binder attachment, the combination, with the semicircular cradle formed in one of the side walls thereof, a gathering and binding arm, and a shaft of the same journaled at one side of the cradle and carrying a gear, a shaft journaled at the opposite side of the cradle, a semicircular ejecting-arm rigid with the same and taking below the cradle, a pinion mounted on the shaft, a shaft located at one side of the last-mentioned shaft and provided with a pinion engaging and driving the last-mentioned pinion, of a rack-bar mounted for reciprocation under and adapted to engage the last and first mentioned pinions, and mechanism for

operating said master-gear at intervals, substantially as specified.

8. In a grain-binder, the combination, with the cradle and band-twisting devices, of a
5 vertical crank-shaft, and a guide-bracket having a guide-stud located at one side of the same, a longitudinal slotted arm mounted on the guide-stud pivoted to the crank-arm and terminating at its front end in a hook for
10 tucking the band, a master-gear, a spring-pressed vibrating sector-lever, a lug formed on the gear for actuating the lever against the spring, and a pinion mounted on the crank-shaft and actuated by the teeth of the
15 sector-lever, substantially as specified.

9. In a grain-binding attachment, the combination, with the gavel-holding device, of a master-gear mounted at the opposite side of the machine and provided with a plain circumferential portion, a crank-shaft journaled
20 at the side of the gear, a pinion rigid upon

the shaft and engaging the gear, a large and small pinion fast to each other and loose upon the shaft, a short shaft journaled at one side of the crank-shaft and having a small
25 pinion engaging the master-gear and a large pinion engaging the aforesaid small loose pinion of the crank-shaft, a tubular slotted shaft mounted at the free end of the crank-arm, a
30 tubular slotted spindle mounted in the shaft, a shaft projecting from the rear end of said spindle through the crank-arm, and a small pinion mounted on the same and engaged and driven by the loose large gear before mentioned, substantially as specified. 35

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

JOHN G. GILMER.

Witnesses:

JAS. F. SUMMERVILLE,
T. B. BROWN.