No. 720,098. PATENTED FEB. 10, 1903.

S. B. BAMFORD.

HAY TEDDER.

APPLICATION FILED DEC. 21, 1901.

NO MODEL.

6 SHEETS—SHEET 1.

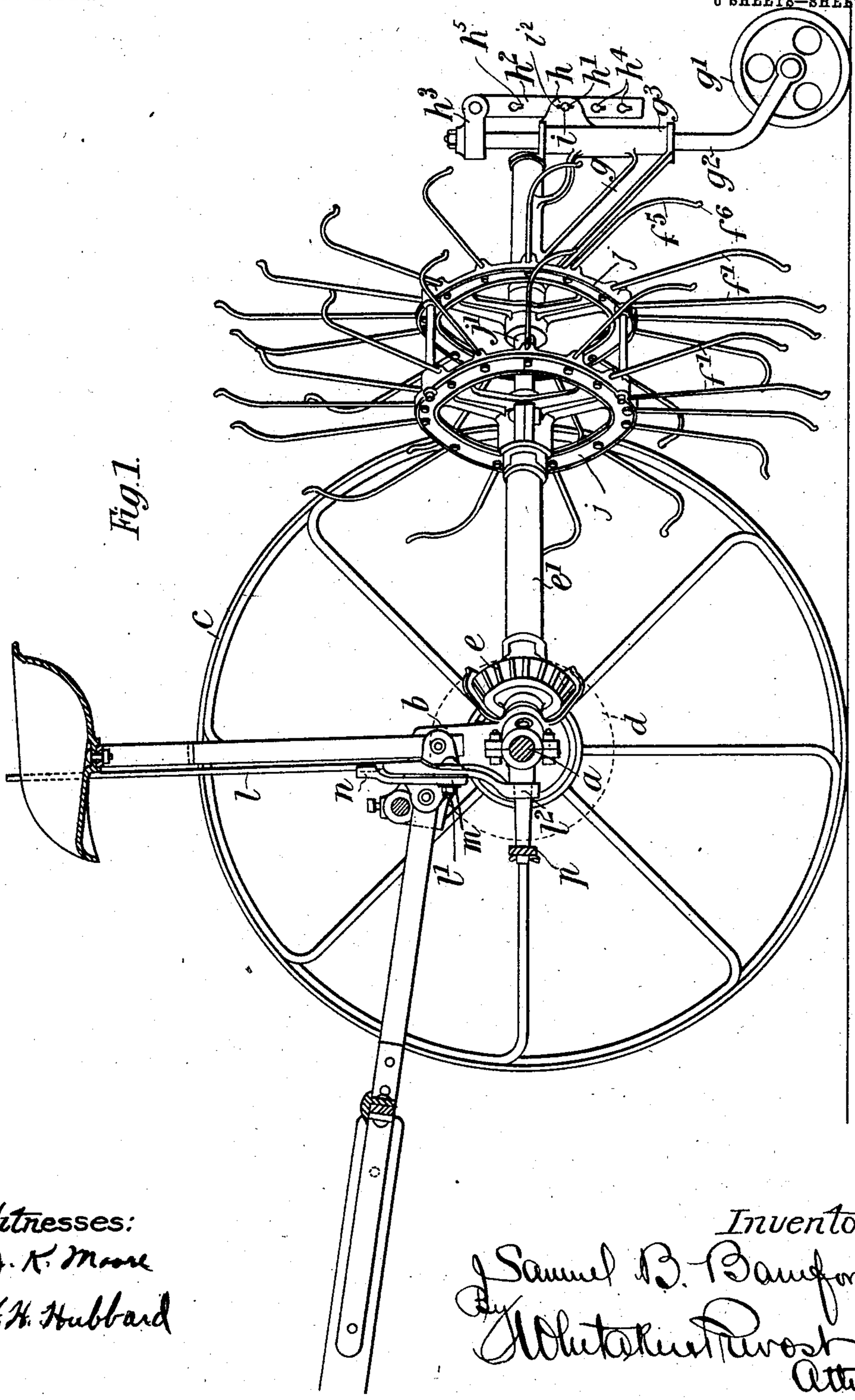

Fig. 1.

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NO MODEL. 6 SHEETS—SHEET 2.

Fig. 9

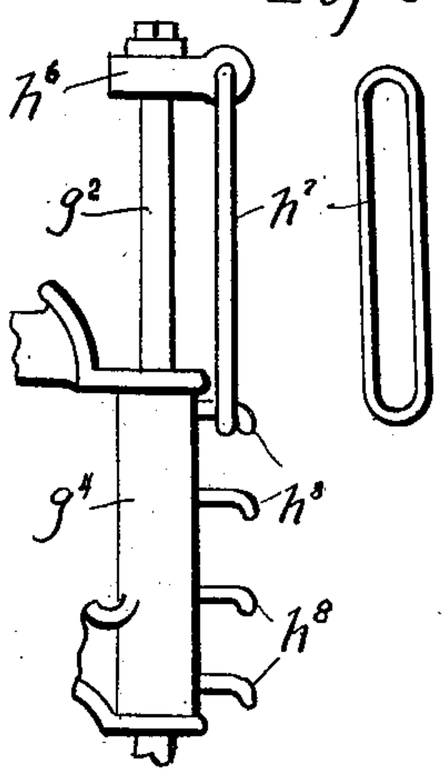


Fig. 10.

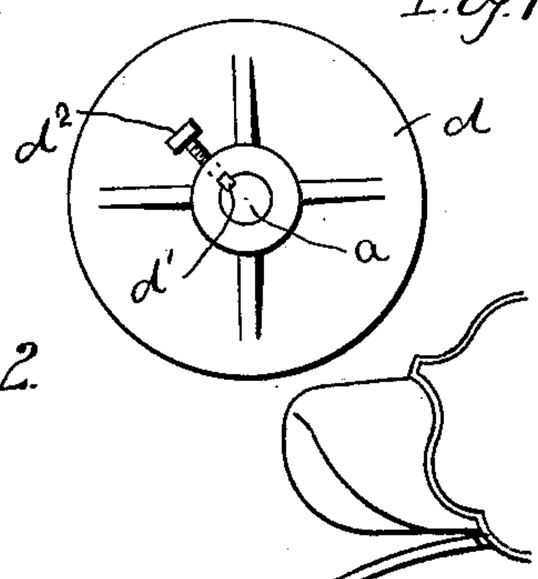
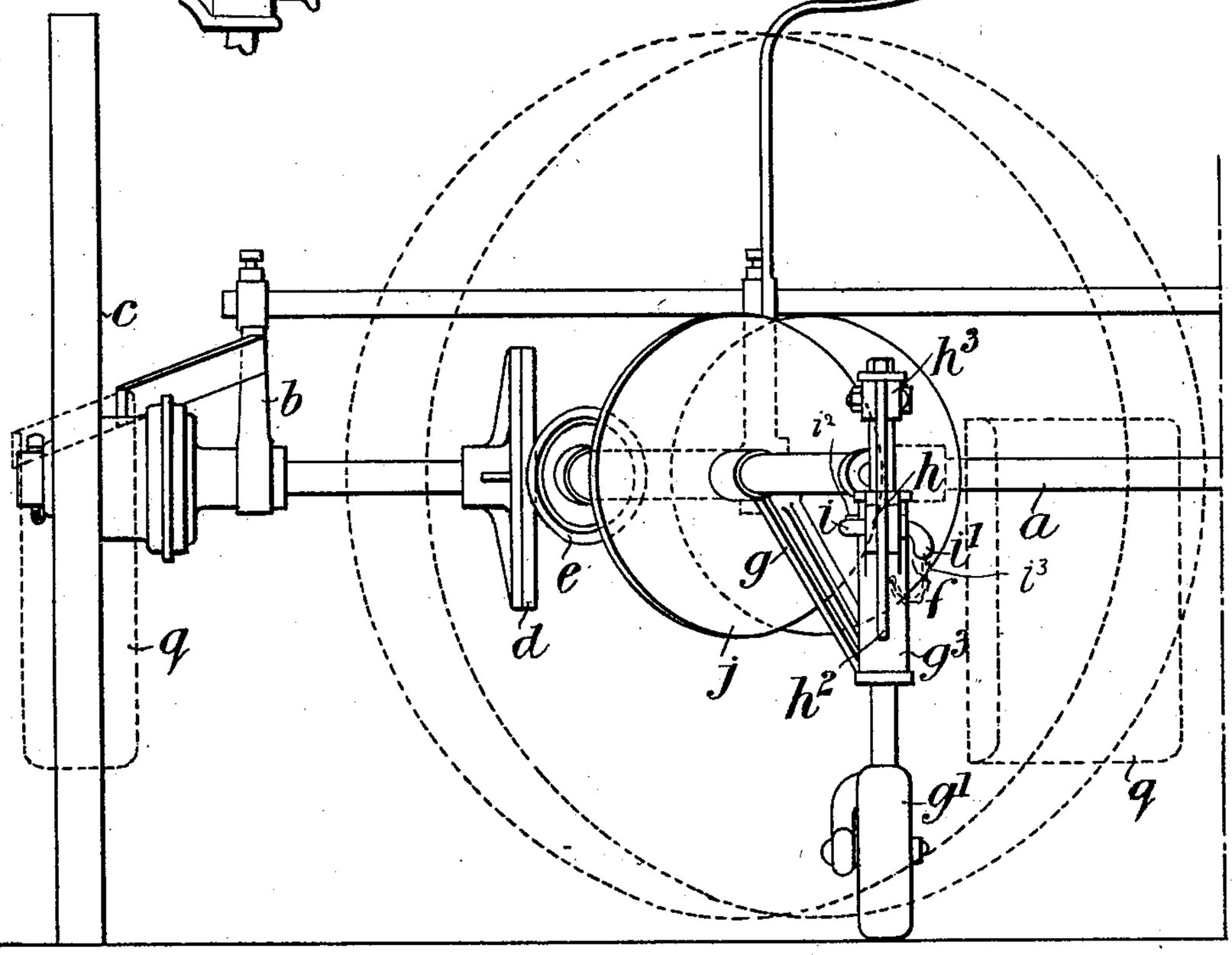


Fig. 2.



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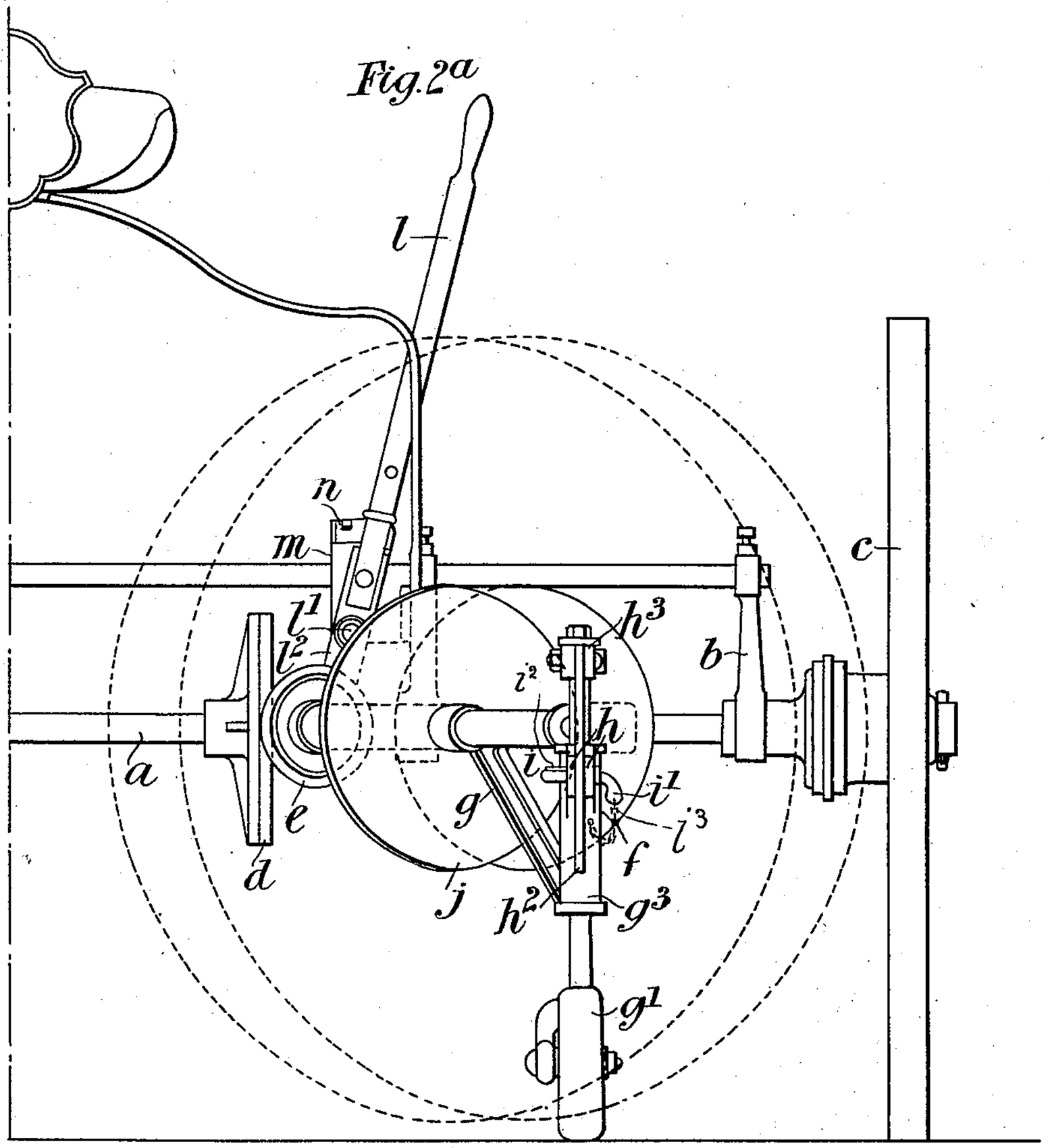
NO MODEL. 6 SHEETS—SHEET 3.

Fig. 2a



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NO MODEL. 6 SHEETS—SHEET 4.

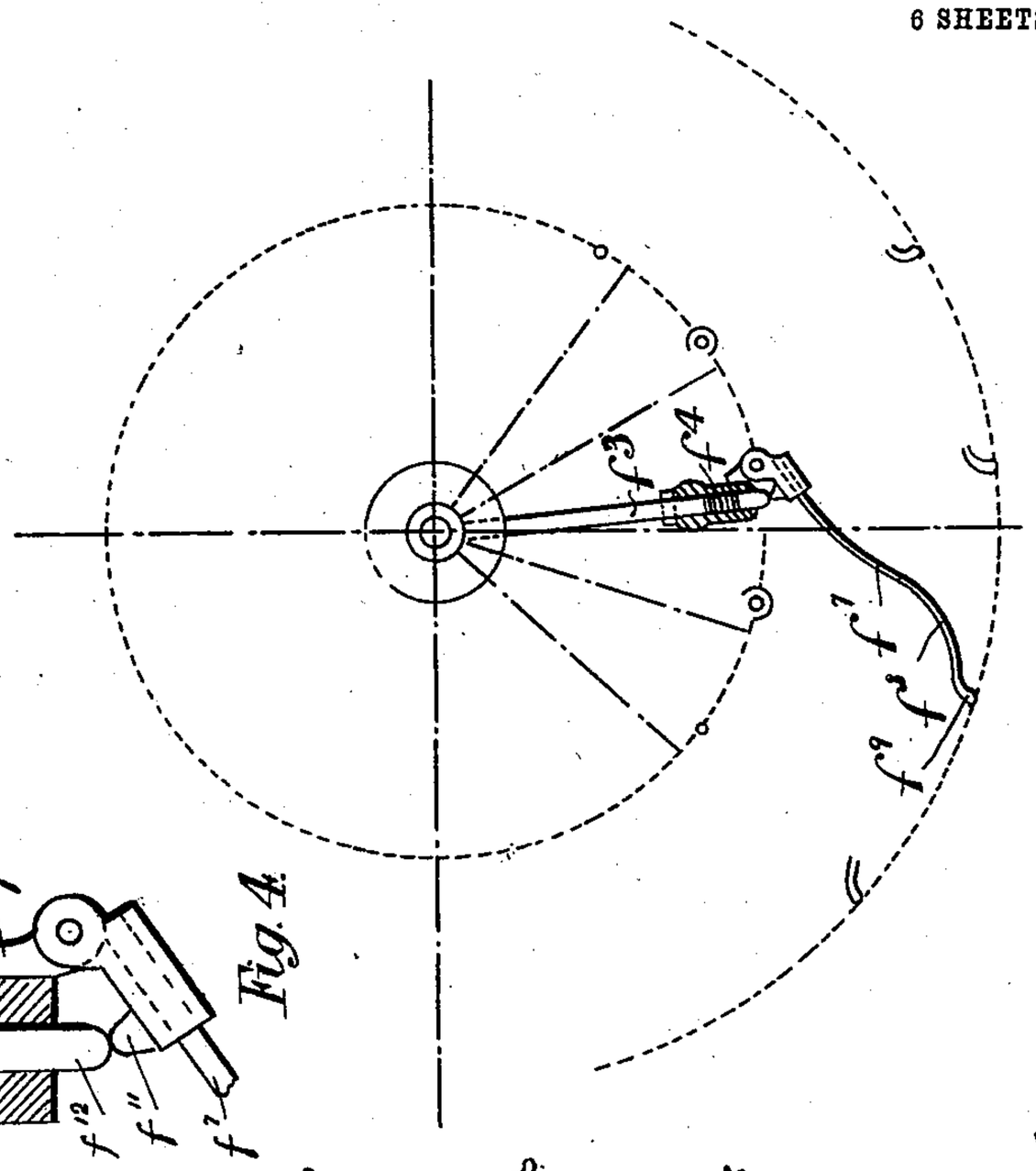

Fig. 4.

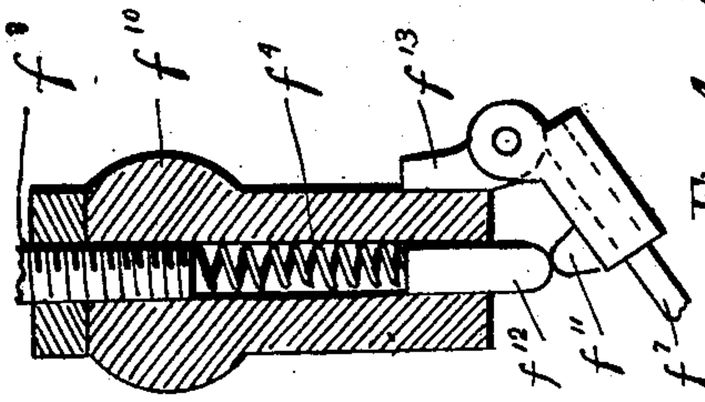

Fig. 4a.

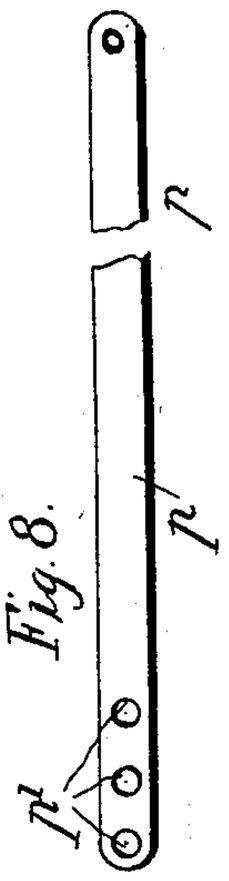

Fig. 8.

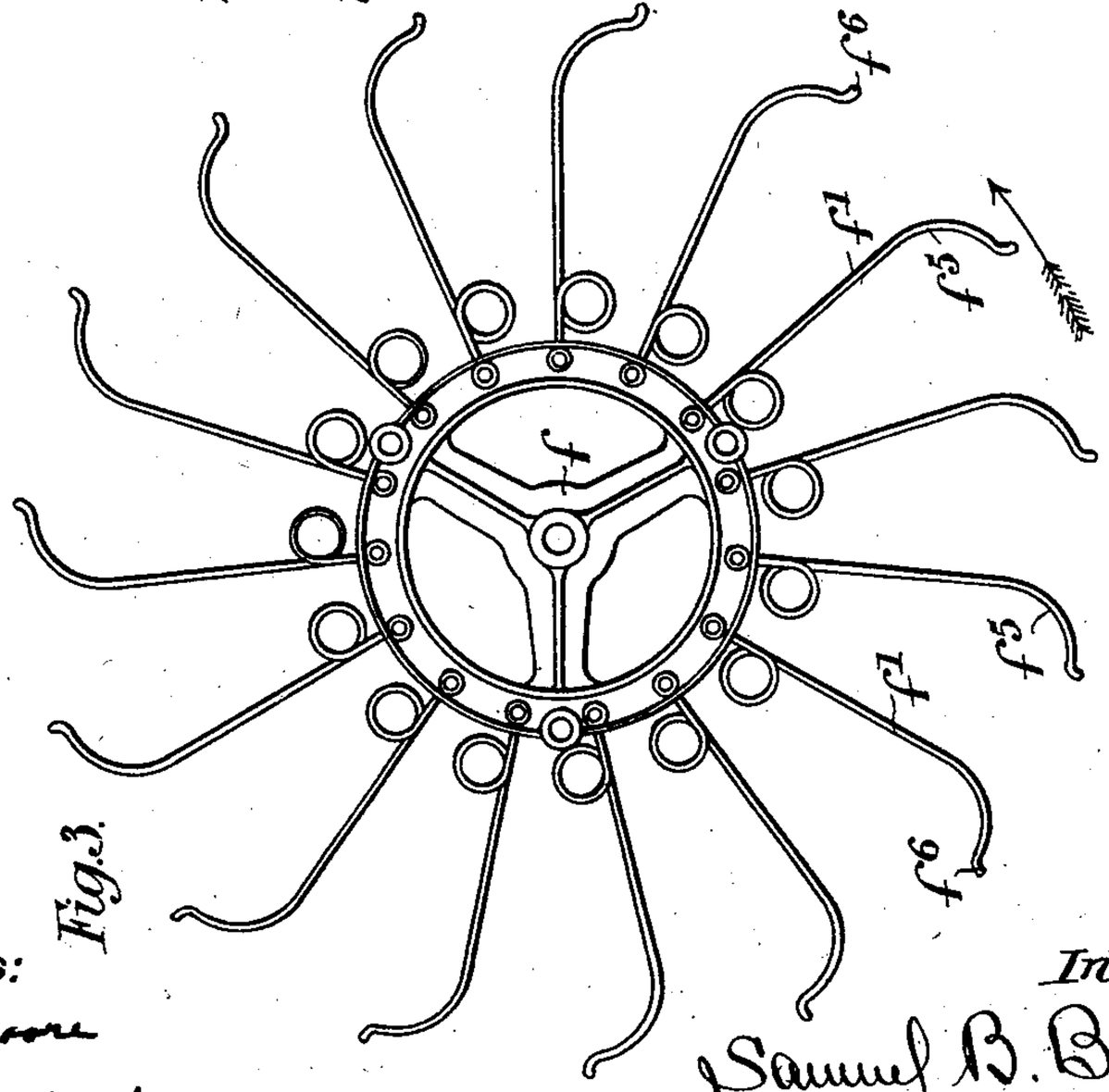

Fig. 3.

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NO MODEL. 6 SHEETS—SHEET 5.

Fig. 7.

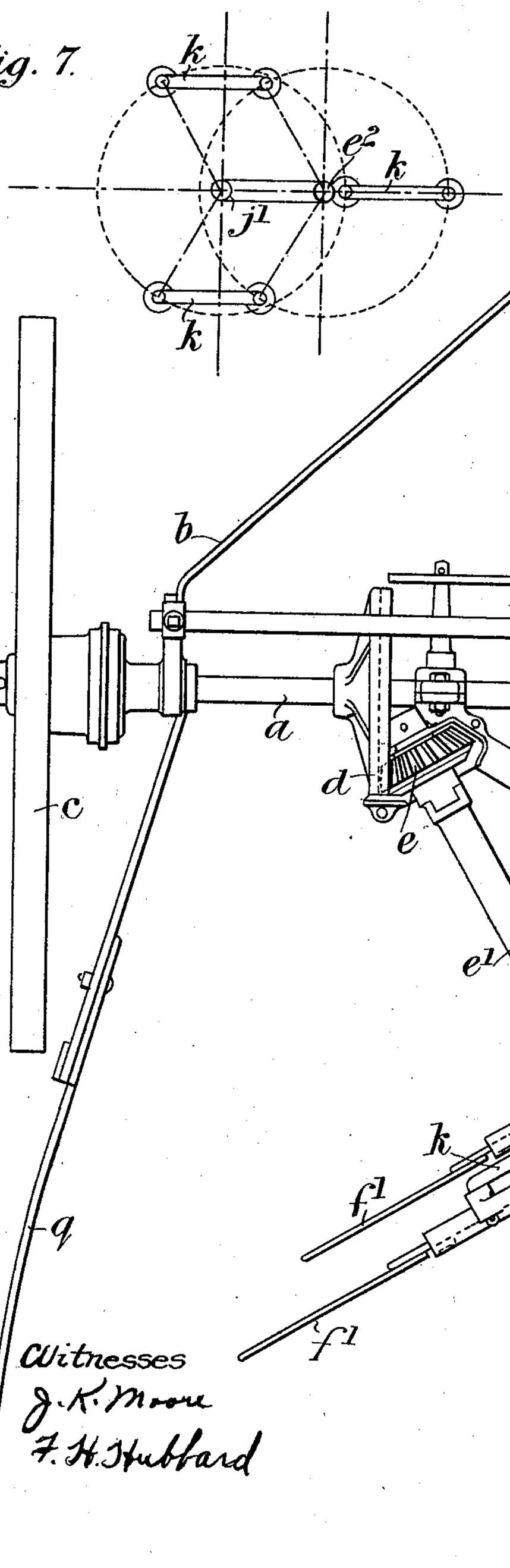
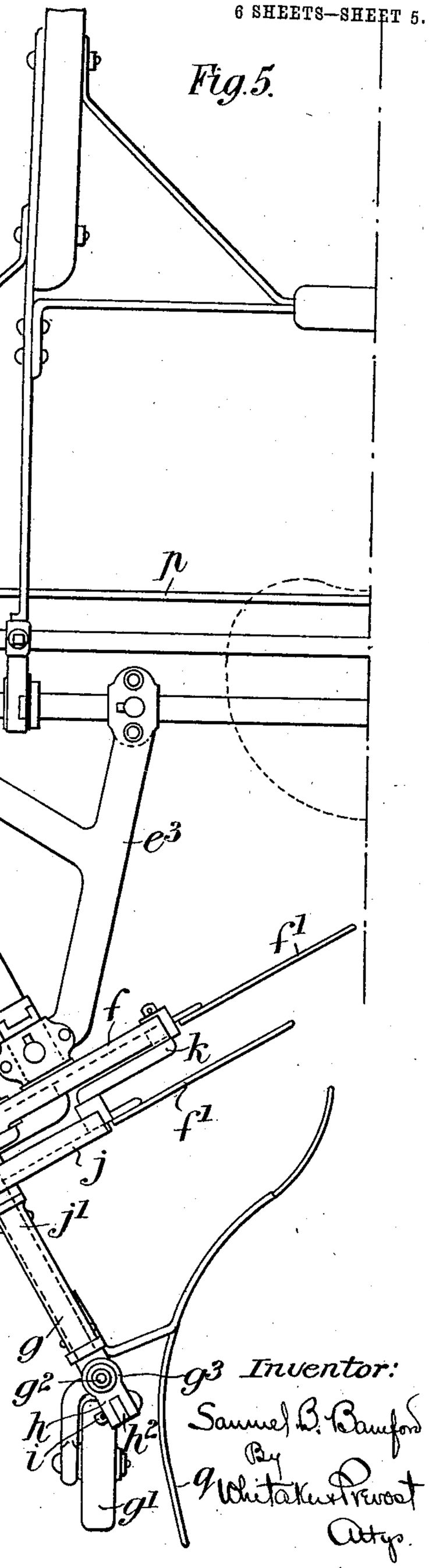


Fig. 5.



Witnesses
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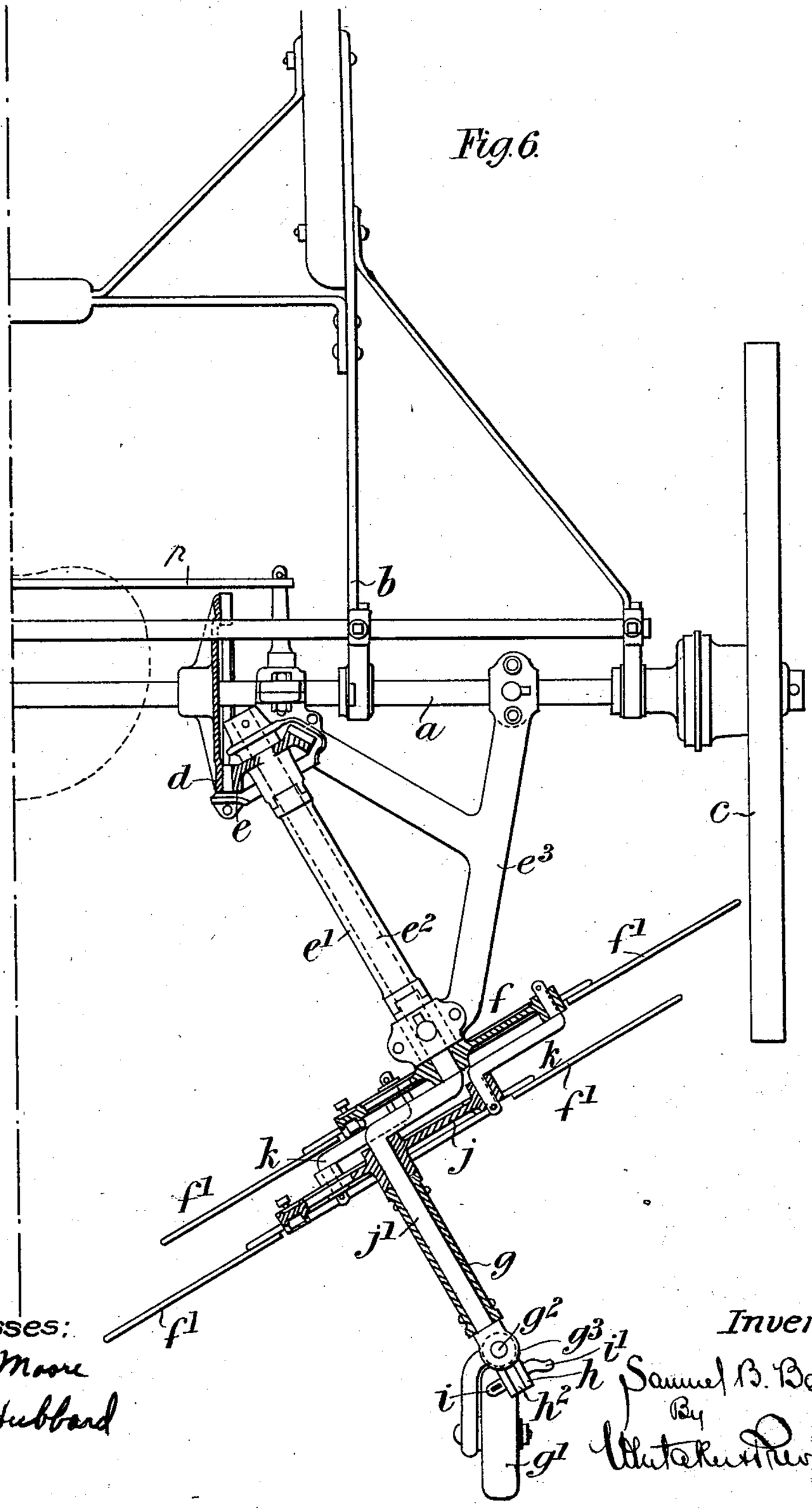
APPLICATION FILED DEC. 21, 1901.

NO MODEL. 6 SHEETS—SHEET 6.

Fig. 6.



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UNITED STATES PATENT OFFICE.

SAMUEL BRASSINGTON BAMFORD, OF UTTOXETER, ENGLAND.

HAY-TEDDER.

SPECIFICATION forming part of Letters Patent No. 720,098, dated February 10, 1903.

Application filed December 21, 1901. Serial No. 86,832. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL BRASSINGTON BAMFORD, a subject of the King of Great Britain, residing at Leighton Iron Works, Uttoxeter, in the county of Stafford, England, have invented new and useful Improvements in Hay-Tedders, of which the following is a specification.

My invention relates to machines for turning hay, clover, corn, or similar crops when lying in swaths or otherwise and comprises the improvements hereinafter described.

In the accompanying drawings, Figure 1 is a sectional side elevation of a crop-turning machine made according to the invention and shown adapted to turn two swaths. Fig. 2 is a rear elevation of one half of the machine, parts being removed for clearness and their location indicated by dotted lines. Fig. 2^a is a rear elevation, similar to Fig. 2, of the other half of the machine. Fig. 3 is a side elevation of one of the tine-wheels. Fig. 4 is a sectional view illustrating a modification of tine. Fig. 4^a is an enlarged view of a portion of Fig. 4. Fig. 5 is a top plan view of one half of the machine. Fig. 6 is a top plan view of the other half of the machine, parts being shown in section. Fig. 7 is a diagrammatic view illustrating the connection between the two rotary tine-carrying bosses carried by the inclined axles. Fig. 8 is a detail view of the adjustable connection between the brackets carrying the inclined axles. Fig. 9 is a detail of a slight modification of the adjusting device for the caster-wheels. Fig. 10 is a detail of a part of the mechanism.

a is the main axle of the machine, which is mounted in the carriage *b* and carries the two wheels *c c*. Upon this axle *a* are mounted two bevel-wheels *d d*, which gear with bevel-pinions *e e*, mounted upon hollow shafts *e' e'*, placed at a suitable distance apart, such as that shown in the drawings, and at an angle of about sixty degrees with the main axle *a*. To the said hollow shafts *e' e'* on the ends opposite those on which the bevel-pinions *e e* are fixed there are attached bosses or naves *f f*, (see Fig. 3,) having a number of tines *f' f'*, the said tines being made to spring and being arranged radially to the bosses *f f*, as shown in Figs. 1, 2, and 3, or approximately tangentially to the circle of revolution of the bosses to which they are attached, as shown in Fig. 4, and being adapted to act upon the crop to be turned and leave it lightly in rows, at the same time sweeping the ground clean between the rows. The hollow shafts *e' e'* revolve on axles e^2 e^2, held in brackets e^3 e^3, pivotally mounted upon the main axle *a*, so that the hollow shafts *e' e'* can rise and fall with the contour of the ground over which the wheels *c c* pass. The axles e^2 e^2, on which the hollow shafts *e'* revolve, are made adjustable to suit the width of the swath and are supported at their outer ends by brackets *g g*, carrying trailing or caster wheels *g' g'*, the standards g^2 of which are held in sockets g^3 g^3 in the said brackets *g g* and are provided with means by which they can be raised or lowered to the requisite height with the tines to turn over the crop. In the drawings the means shown comprise a slotted lug *h* upon the socket g^3, provided with holes *h' h'* and with the slot of which there engages a bar h^2, pivoted to a collar h^3, loose upon the upper part of the standard g^2 of the caster-wheel and having holes h^4, which can be brought into coincidence with the holes *h'* in the lug and be secured by a pin *i*, passing through the holes in the lug and bar. To prevent the pin *i* pulling out, I make each hole with a slot h^5 on the lower part and the pin with a small projecting nib i^2 to fit the slot. Thus when the pin is passed through the holes it can be turned until the projecting nib is clear of the slot, so that the pin is locked and cannot be withdrawn. To retain it in this position, I crank the head of the pin downward, as shown at *i'*, Figs. 2^a and 6. A chain i^3 can be attached to the cranked end *i'*, the weight of which chain keeps the crank in the downward position. When the pin is required to be withdrawn, the cranked end of the pin is lifted upward until the projecting nib on the pin coincides with the slots upon which the pin can be withdrawn and inserted in another set of holes.

Sometimes I pivotally connect a rectangular loop h^7 to the loose collar h^6 on the caster-wheel standard, and on the bracket g^4, carrying the caster-wheel standard, I make a series of projections or hooks h^8, pointing downward and placed one over the other vertically, as shown in Fig. 9. To raise or lower the tines, the lower end of the rectangular loop is in-

serted in one of the projecting hooks, according to the height required. In this way the height of the revolving tines from the ground can be adjusted. Where spring-tines f' f' are employed, I preferably make each with a coil or loop at the inner end—that is to say, the ends nearest the bosses f f—thus increasing their elasticity. This arrangement is illustrated clearly in Fig. 3. In lieu of the spring-tines f' f' I can use spokes f^3 f^3, having the jointed tines f^7 f^7 attached near their outer ends, as clearly shown in Fig. 4. Each of these jointed tines is provided with a spring f^4 at the joint to allow the ends of the tines to give way when touching the ground and afterward return to their original positions. Such construction is illustrated on a large scale in Fig. 4ª, in which the spoke f^3 is screwed into the boss f^{10}, the latter being bored out to receive a spiral spring f^4. The tine is pivoted to the boss and is provided with a lug f^{11} to engage a plunger f^{12}, inserted in the boss and working therein against one end of the spring f^4. The tine is provided adjacent to its pivotal connection with the boss with a lug f^{13} to limit the movement of the tine under the influence of the spring. Whatever the construction of the tines, however, I curve them near the ends, as shown at f^5 f^8, so that they do not strike the ground abruptly when rotating in the direction of the arrow, Fig. 3. The extreme end of each tine is also turned back, as clearly shown in Figs. 3 and 4 at f^6 f^9, in order that they may pick up or turn over the crop without sliding over it.

The above description has referred to a single tine-wheel mounted upon each axle; but in order that a broad space of ground can be cleared without the tines pressing unduly upon it I can make use of two tine-wheels upon each of the axles e^2, and this arrangement is illustrated in the drawings. The second tine-wheel j on each axle is mounted upon the cranked end j' of this axle, the cranked portion being parallel with the main portion. The cranks are made of such a length as to keep the tine-wheels f and j the right distance apart to sweep the ground the proper width required. In order that the second tine-wheel of each pair of wheels may be rotated, the said two wheels are coupled together by means of connecting-rods k k, which are pivotally attached equidistantly around the circumference of a circle (see Fig. 7) to the bosses or spokes of each of the tine-wheels, the said rods acting similarly to the connecting-rods on locomotive road-vehicles. With this arrangement one wheel drives the other without the use of chains or gear-wheels.

For the purpose of throwing the machine in or out of gear I pivot a lever l at l' to a bracket m on one side of the main frame above the axle, a quadrant-plate and catch n being provided in connection with the lever. The upper portion of the lever l can be moved and the lever fixed by the catch in the notches of the quadrant-plate in the usual manner by the driver from his seat on the machine. The lower or short end of the lever below the fulcrum l' has a forked end l^2, and the two brackets e^3 e^3 are connected by the bar p, adapted to be reciprocated by the forked lever and which engages a stud on the sliding bracket adjacent to it. Thus when the hand-lever l is moved motion is also communicated to the two brackets e^3, carrying the bevel-pinions e e, which are moved along the main axle in or out of gear with the bevel-wheels d d. In order to adjust the distance between the second-motion hollow shafts e', I make the bar p with a series of holes p' p', (shown in Fig. 8,) with any one of which the bracket e^3 at this end can be engaged. The bevel or crown wheel d at this end is also made adjustable on the main axle as well as the pinion. To this end it is fixed on the main axle by a set-screw d^2 in the boss of the wheel. This set-screw presses on a loose feather-key d' in a sunk keyway on the main axle. When the set-screw is loosened, the wheel is free to slide on the main axle, as shown in Fig. 10, together with the feather-key, and can be fixed where required. Both the second-motion shafts in their new position can be thrown in or out of gear by means of the hand-lever and connecting-bar, as before.

q q are guards for keeping the rows of hay or the like separate from one another.

Although I have shown and described an implement having two inclined axles e^2, it will be obvious that an implement can be made having only one such axle and tine-wheel or pair of tine-wheels.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. The combination with the main frame and its supporting-wheels, of a spindle extending rearwardly from the main frame and arranged obliquely to the line of draft, a rotary series of crop-engaging devices disposed perpendicularly to and carried by said spindle, a second rotary series of crop-engaging devices carried by said spindle adjacent to but eccentric to the first series, and mechanism for rotating both series of said crop-engaging devices simultaneously as the machine is drawn along, substantially as described.

2. The combination with the main frame and its supporting-wheels, of a spindle extending rearwardly from the main frame, and arranged obliquely to the line of draft, a rotary device on said spindle provided with a series of crop-engaging devices, a second rotary device carried by said spindle adjacent to but eccentric to said first-named device and provided with a series of crop-engaging devices, connections between said rotary devices for securing their simultaneous rotation and mechanism for driving said rotary devices from the supporting-wheels of the main frame, substantially as described.

3. The combination with the main frame

and its supporting-wheels, of a spindle extending rearwardly from the main frame, and arranged obliquely to the line of draft, a rotary device on said spindle provided with a series of crop-engaging devices, a second rotary device carried by said spindle adjacent to but eccentric to said first-named device and provided with a series of crop-engaging devices, links pivotally connected to each of said rotary devices and connecting the same for joint rotation and mechanism interposed between said rotary devices and the supporting-wheels of the main frame for driving said rotary devices, substantially as described.

4. The combination with the main frame, and its supporting-wheels, of a pair of spindles extending rearwardly from the main frame and arranged obliquely to the line of draft, a rotary series of crop-engaging devices carried by each of said spindles, mechanism for driving said crop-engaging devices from the supporting-wheels, and devices for adjusting said spindles laterally with respect to the frame, substantially as described.

5. The combination with the main frame, provided with an axle and supporting-wheels, of a pair of spindles extending rearwardly from said axle, arranged obliquely to the line of draft, supports for the front ends of said spindles pivotally engaging said axle, driving-wheels secured to said axle adjacent to said spindles, a rotary device carried by each of said spindles and provided with a series of crop-engaging devices, mechanism carried by each spindle for driving one of said rotary devices, said mechanism having a part adapted to engage one of the driving-wheels on said axle and mechanism for moving said spindles laterally with respect to the axle to throw said rotary devices into and out of operation, means for adjusting one of said driving-wheels longitudinally on said axle, and means for adjusting its corresponding spindle laterally, substantially as described.

6. The combination with the main frame and its supporting-wheels, of a spindle extending rearwardly therefrom, arranged obliquely to the line of draft, and provided with portions eccentric to each other, a rotary device mounted on each of said eccentric portions of said spindle and provided with a series of crop-engaging devices, links connecting said rotary devices for joint rotation and mechanism for driving one of said rotary devices from the supporting-wheels substantially as described.

7. The combination with the main frame and its supporting-wheels, of a spindle extending rearwardly from the main frame, a rotary series of crop-engaging devices carried by said spindle, a vertical sleeve secured to the rear end of said spindle, a caster-wheel provided with a standard engaging said sleeve, a link secured to said standard and adjustably secured to said sleeve, substantially as described.

8. The combination with the main frame and its supporting-wheels, of a spindle extending rearwardly from the main frame, a rotary series of crop-engaging devices carried by said spindle, a vertical sleeve secured to the rear end of said spindle, a caster-wheel provided with a standard engaging said sleeve, a link secured to said standard, and provided with a series of apertures, and a pin engaging said sleeve and adapted to engage one of the apertures in said link, substantially as described.

9. The combination with the main frame and its supporting-wheels, of a spindle extending rearwardly from the main frame, a rotary series of crop-engaging devices carried by said spindle, a vertical sleeve secured to the rear end of said spindle, a caster-wheel provided with a standard engaging said sleeve, a link secured to said standard and provided with a series of slotted apertures, a pin engaging said sleeve and adapted to engage one of said apertures in said link, said pin having a locking-nib and a cranked portion to prevent it from becoming accidentally displaced, substantially as described.

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