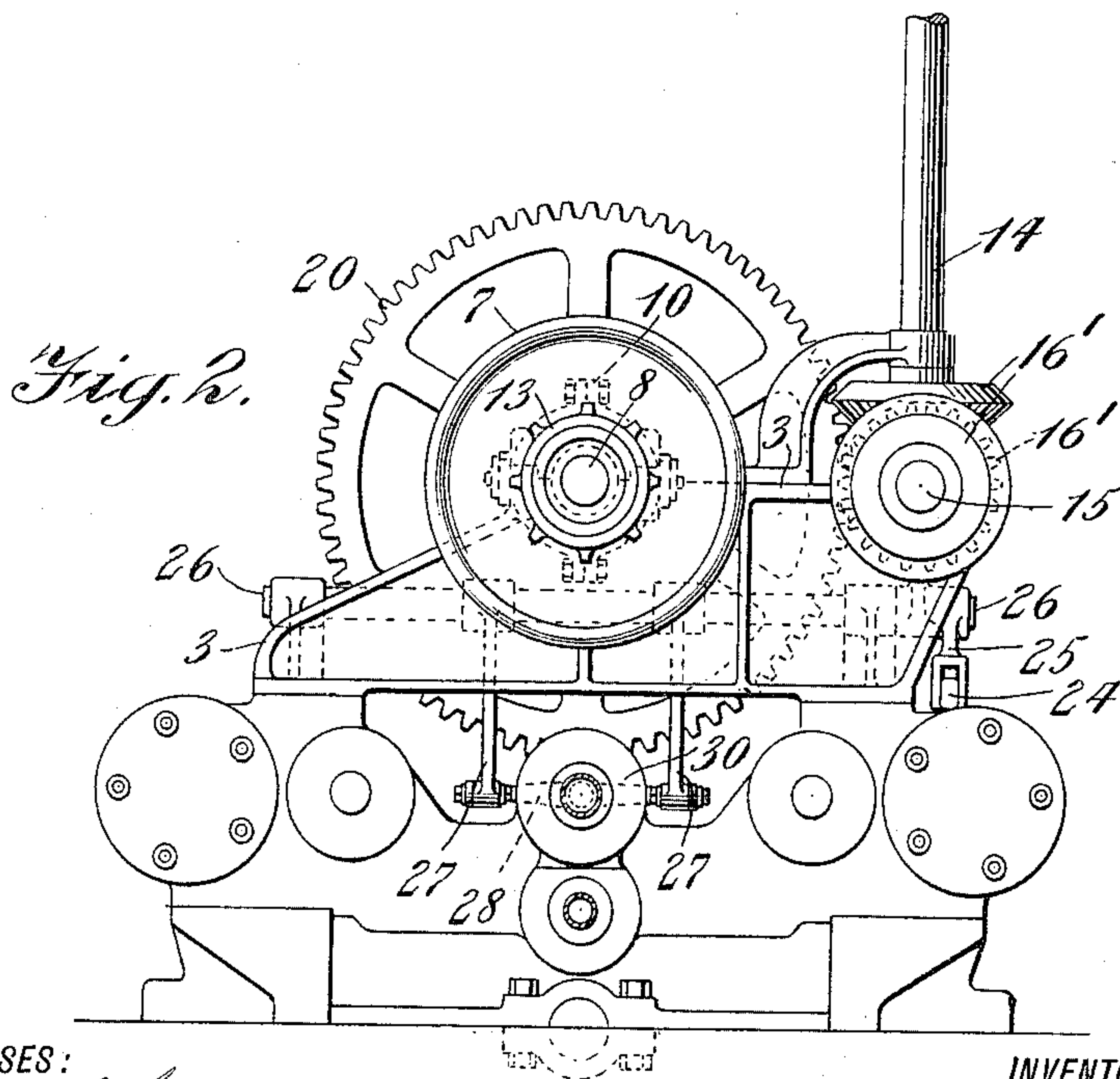
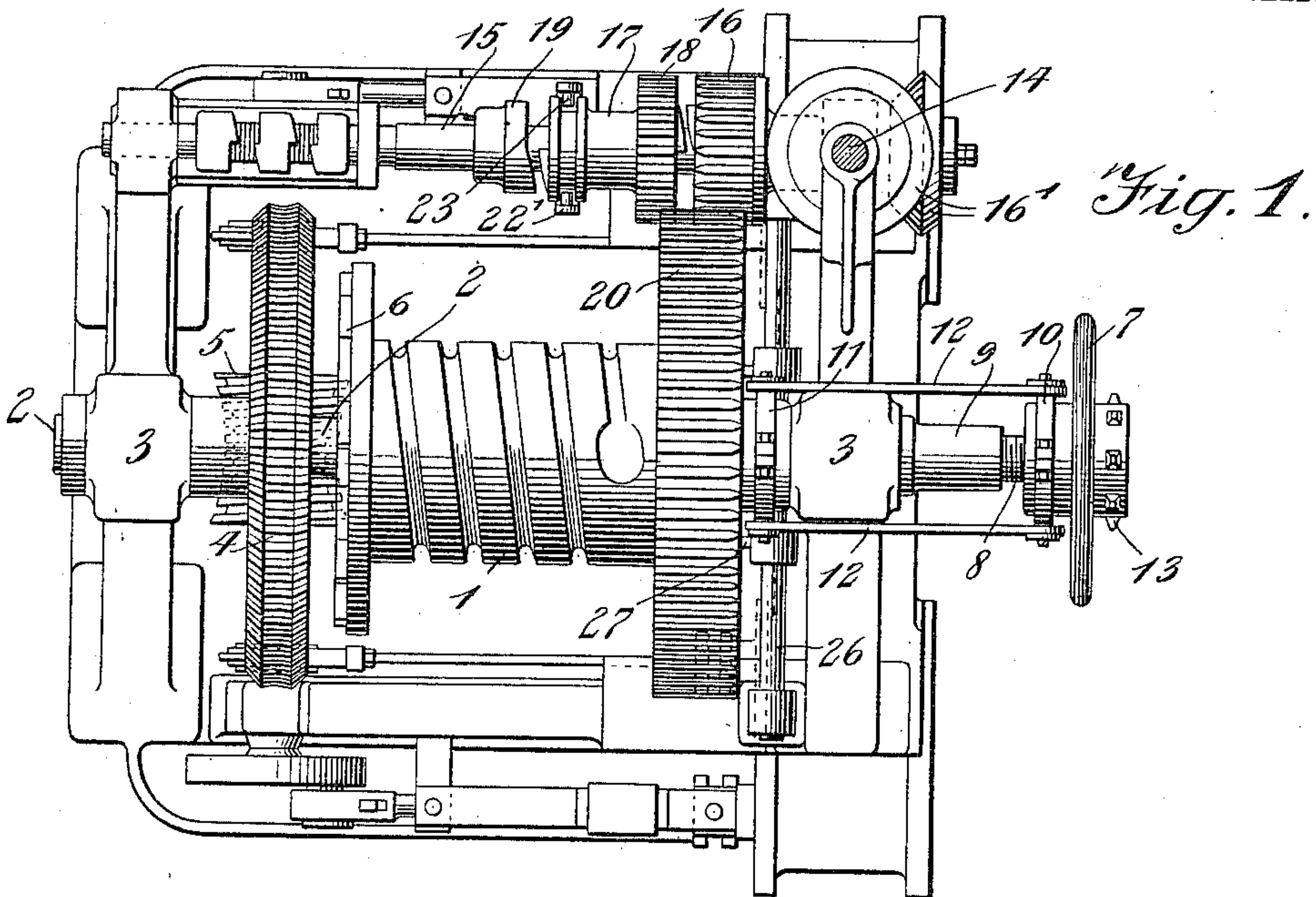


F. C. SCHOEN.  
COMBINED STEAM AND HAND STEERING ENGINE.  
APPLICATION FILED MAY 19, 1909.

994,876.

Patented June 13, 1911.

3 SHEETS-SHEET 1.



WITNESSES:  
*E. E. Hardenbergh, Jr.*

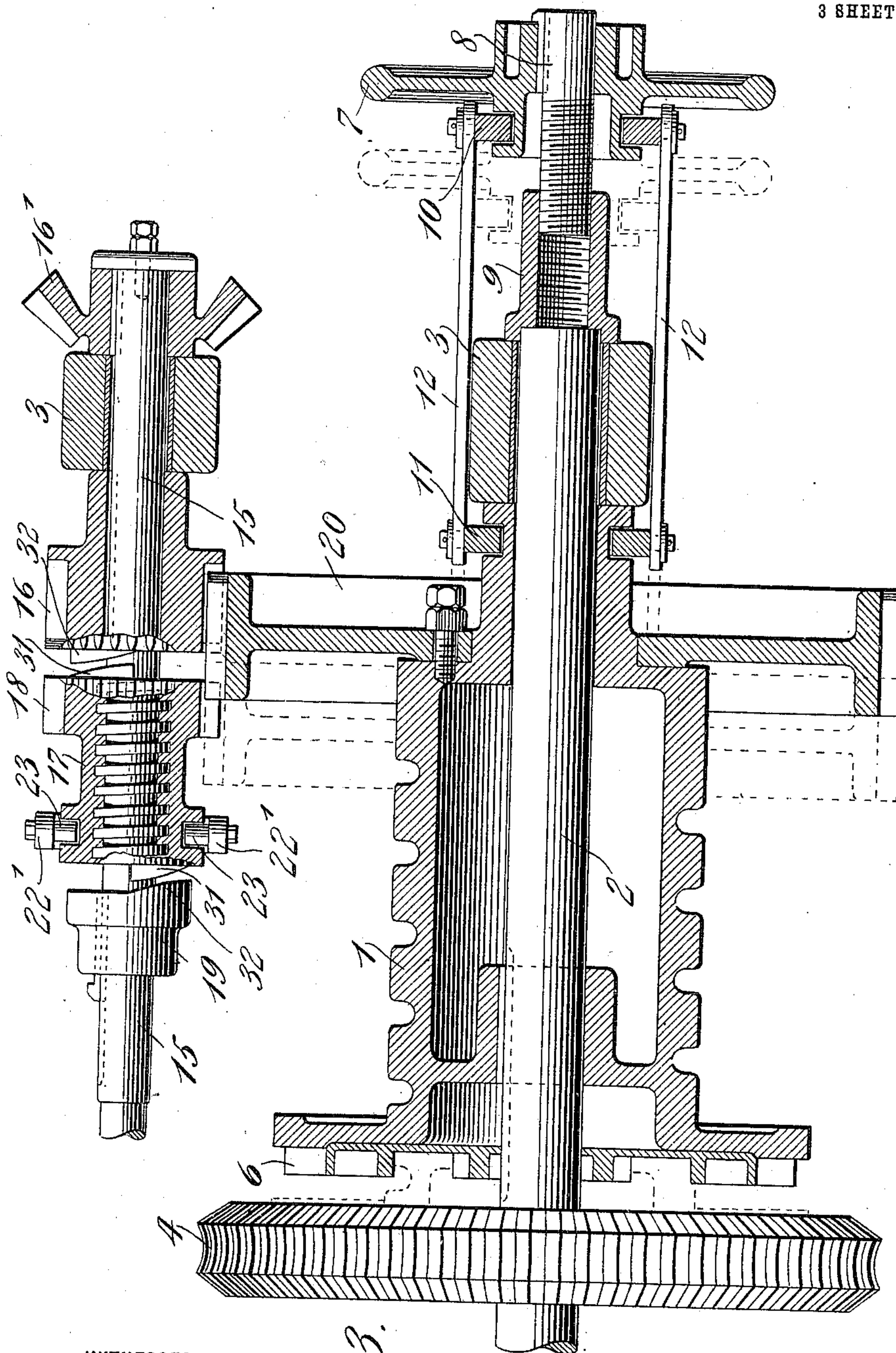
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ATTORNEYS

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3 SHEETS—SHEET 2.



WITNESSES:

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*Fig. 3.*

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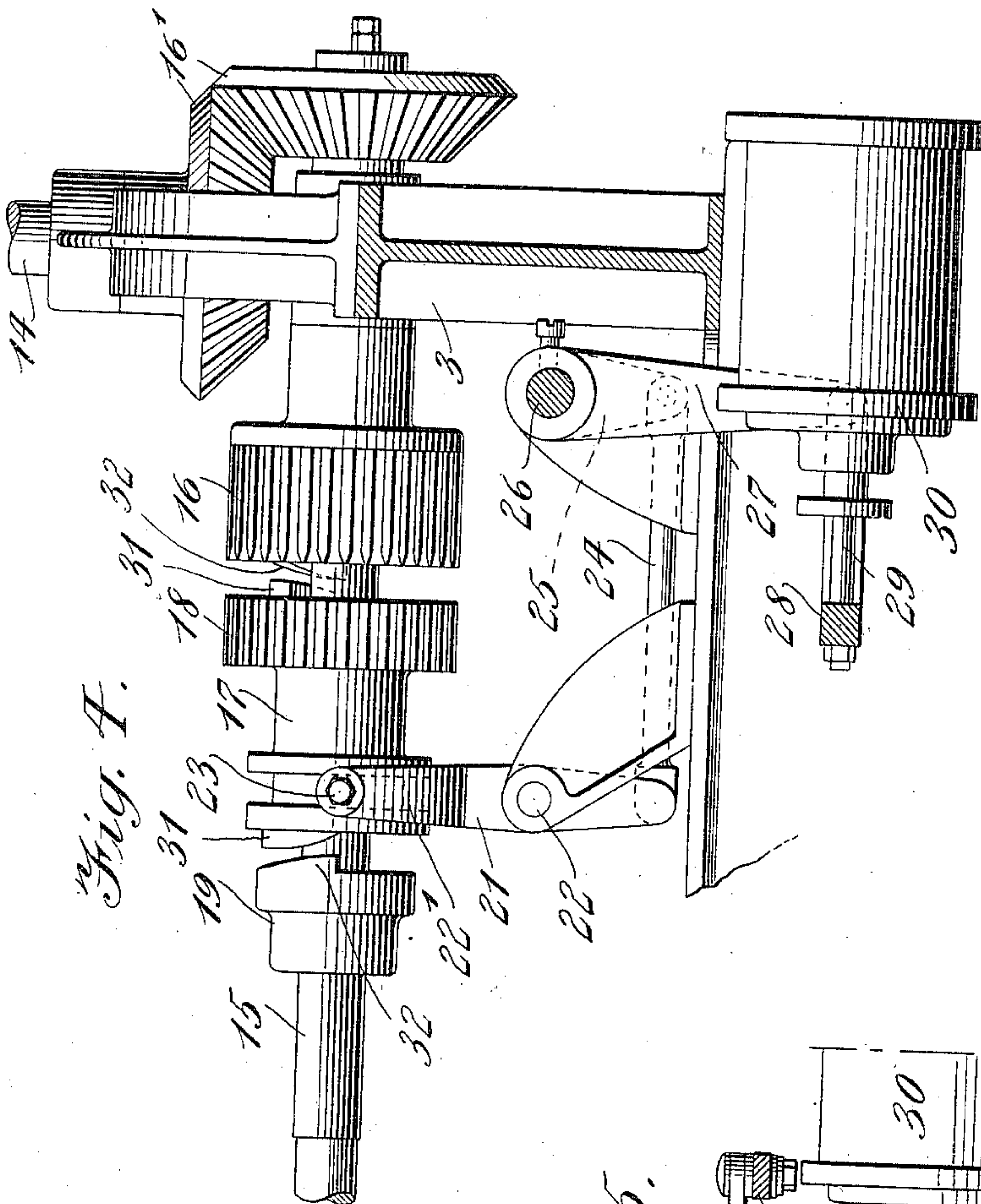
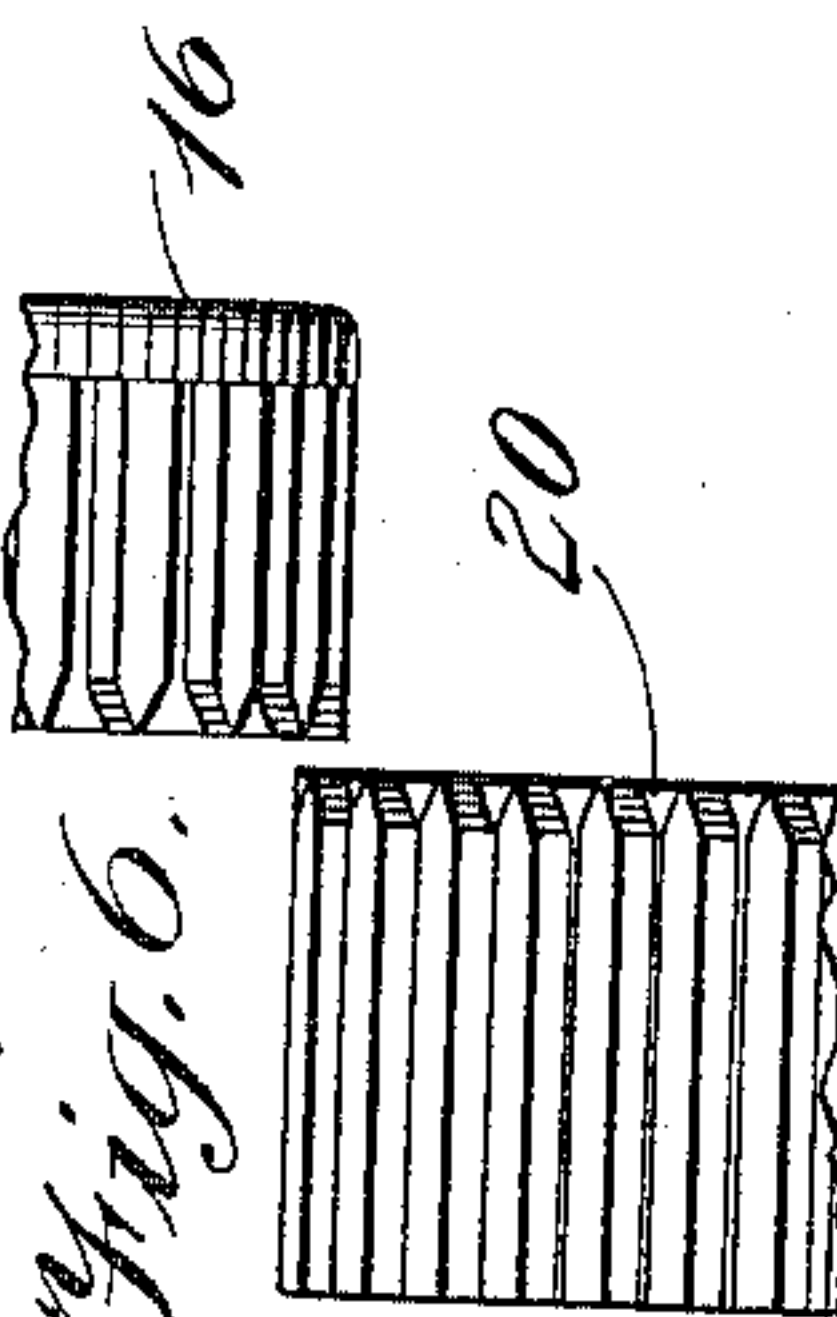
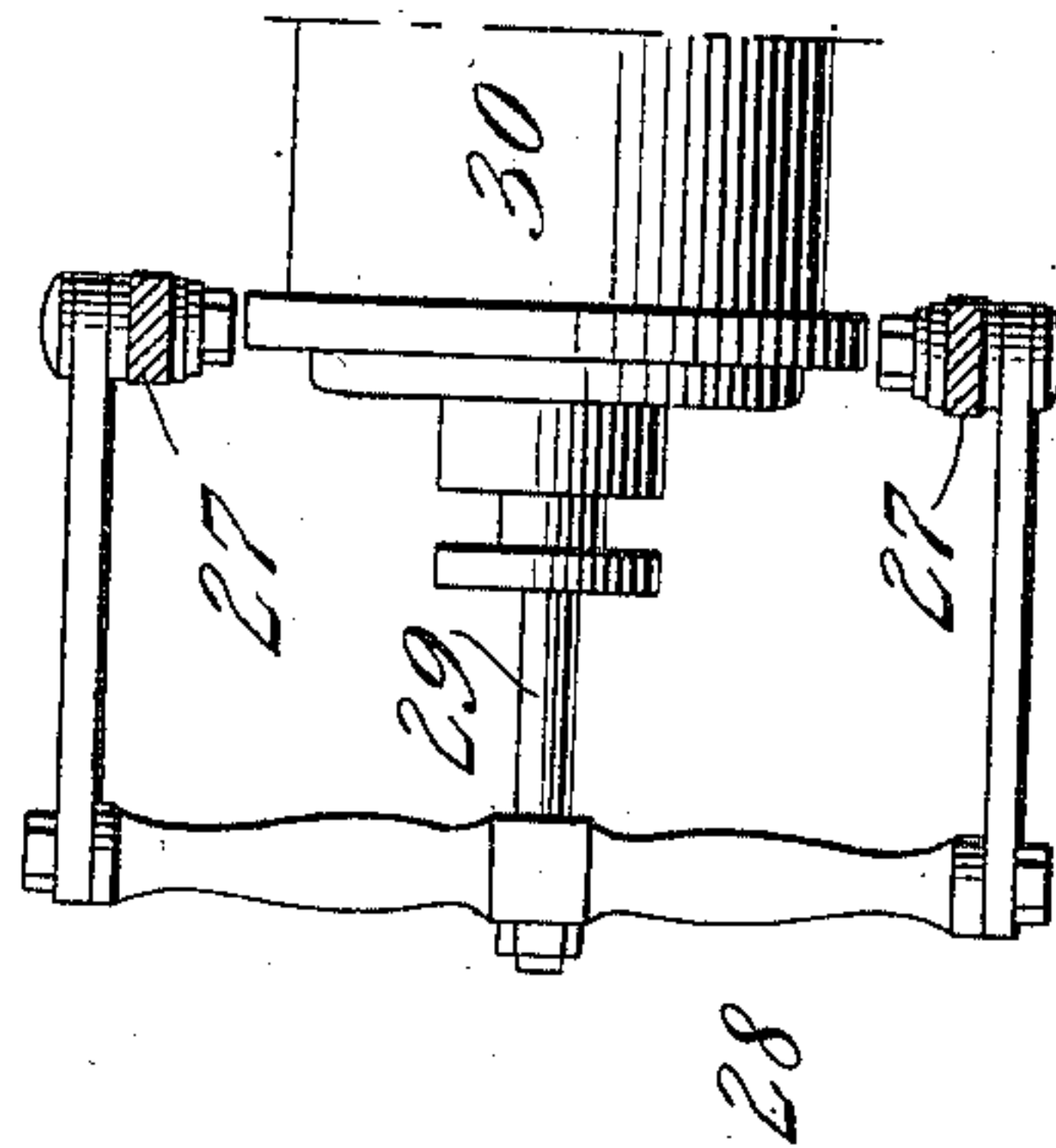


Fig. 5.



WITNESSES:  
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Fig. 6.

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# UNITED STATES PATENT OFFICE.

FREDERICK C. SCHOEN, OF NEW YORK, N. Y., ASSIGNOR TO LIDGERWOOD MANUFACTURING COMPANY, A CORPORATION OF NEW YORK.

COMBINED STEAM AND HAND STEERING ENGINE.

994,876.

Specification of Letters Patent. Patented June 13, 1911.

Application filed May 19, 1909. Serial No. 496,958.

*To all whom it may concern:*

Be it known that I, FREDERICK C. SCHOEN, a citizen of the United States, and a resident of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Combined Steam and Hand Steering Engines, of which the following is a specification.

My invention relates to the class of steering engines wherein the ropes or chains leading from the rudder of a ship, or the like, are wound upon a drum, rotary movement of the drum in either direction resulting in a corresponding movement of the rudder to steer the ship and the movement of the drum being effected either through its connection with a steam steering engine or through hand power, the apparatus being adjustable to provide for either method of drum operation as desired or required.

Heretofore in an apparatus as above described the change from steam to hand operation of the drum, or vice versa has commonly been effected through various systems of levers and the like, adapted through clutches to operatively connect the drum with the steam or with the hand power shaft and to bring the drum out of operative connection with the other of said shafts.

It is the purpose of my invention to provide mechanism whereby the change from steam to hand power, or the reverse, may be made without the operation of levers, clutches and the like, there resulting an apparatus of great simplicity of design and operation, having a minimum number of parts and therefore capable of long continued use without faulty operation, breakage or disarrangement of parts, or the like.

For the purpose of illustration, I have shown in the drawings herewith and will hereafter describe, my invention as embodied in a combined steam and hand steering engine of well known form, my invention being capable of use in connection with any form of engine of this class, as desired, and consisting in the design, arrangement, combination and operation of parts as set forth in and falling within the scope of the claims hereto appended.

In the drawings herewith like characters of reference denote like parts in all the figures thereof.

Figure 1 represents a plan view of a combined steam and hand steering engine embodying my invention; Fig. 2 represents a view in end elevation of the engine shown in Fig. 1; Fig. 3 represents a detail plan view in section of the engine drum and hand power shaft taken centrally through the same; Fig. 4 represents a detail view in side elevation of a portion of the hand-power shaft and connections between the same and the engine valve; Fig. 5 represents a detail plan view of an end portion of the engine valve; Fig. 6 represents a detail view of a portion of meshing gears showing the teeth of the gears as pointed or beveled at one side to permit of sliding engagement of the gears.

As shown in Figs. 1 and 2, the engine embodying my invention comprises a rope or chain drum 1 mounted on its shaft 2 which latter is supported in bearings in frame 3. Secured adjacent one end of shaft 2 is a gear wheel 4 in mesh with and driven from a worm 5 on the steam engine crank shaft, the gear 4 being provided with an inner clutch face. The end of drum 1 adjacent the gear 4 is provided with a clutch plate 6 adapted to engage with the clutch face of gear 4 when the drum is moved lengthwise of its shaft toward the gear; in this manner the drum is driven from the steam engine when the clutches of gear 4 and plate 6 are in engagement. The drum 1 is moved lengthwise of its shaft as shown in detail in Fig. 3 by means of a hand wheel 7 mounted on a shaft 8, the inner threaded end of which turns in the threaded bore of an extension 9 of the drum shaft bearing; a circular plate 10 is loosely mounted in an annular groove in the hub of the hand wheel 7, a second plate 11 in like manner resting in a groove in the hub of the drum 1, and connections 12 extending between said plates. It will thus be seen that the turning of the hand wheel moves the same inward or outward in accordance with the direction in which it is turned, the drum 1 being in like manner moved lengthwise of its shaft through the



connections 12 between the hand wheel and drum. The hand wheel 7 is also preferably provided with a chain sprocket 13 from which an endless chain, not shown, extends 5 to the pilot house of the ship in order that the shifting of the drum may be accomplished by the turning of a wheel in the pilot house.

Turning to a detail consideration of the 10 hand steering mechanism, as shown in Figs. 1, 2 and 3, a vertical shaft 14 extends downward from the pilot house of the ship and is turned by means of a wheel (not shown) in the pilot house. Shaft 14 is connected 15 with the horizontal hand power shaft 15 through bevel gears 16', the shaft 15 being mounted in bearings in the frame 3 and extending parallel to and in a horizontal plane with the drum shaft 2. Adjacent 20 one end of shaft 15 a gear pinion 16 is keyed fast to and turns with the shaft; adjacent pinion 16 the surface of the shaft is threaded and a member 17 provided at one end with a gear pinion 18, is mounted on 25 and has a threaded bore engaging with the threaded surface of the shaft. Adjacent member 17 a collar 19 is keyed fast to and turns with the shaft. The end of the drum 1 opposite the clutch plate thereon is provided with a gear wheel 20 which is adapted 30 at all times to mesh with the pinion 18, as is shown in Fig. 3, wherein the drum gear is shown in broken lines in its position when the drum is moved inward to be in engagement with the steam driven gear and in 35 full lines when the drum is moved out of driving engagement with the steam gear to its hand-operated position; this engagement of drum gear 20 and pinion 18 serves to 40 control the operation of the steam engine valve and also to limit the turning of the drum as will hereafter be more fully described.

As is shown in Fig. 3, when the drum 1 45 is moved inward and engages with the steam driven gear the drum gear 20 is out of engagement with the gear pinion 16 on the hand power shaft 15, but when the drum is moved outward from its engagement 50 with the steam gear, the drum gear 20 is adapted to mesh with the gear pinion 16, any turning of the hand power shaft 15 thereupon resulting in a corresponding turning of the drum. The adjacent sides of 55 the gear teeth on drum gear 20 and gear pinion 16 are preferably beveled in order that should said gears be slid into mesh when the teeth thereon do not register exactly, the engagement between the gears 60 may take place without danger of injury to the teeth. It is thus readily apparent that a shifting of the drum 1 lengthwise of its shaft will result in its engagement with the steam driven gear 4 and its disengagement

from hand-operated pinion 16 or vice versa, 65 as may be desired.

The operation of the steam engine valve as shown in Figs. 1 and 2 and in detail in Figs. 4 and 5, is as follows: A lever 21 pivoted at 22 below shaft 15 is provided with 70 curved arms 22' extending upward and having projecting studs 23 resting on an annular groove in member 17. The lower end of the lever 21 is pivotally connected with a rod 24, the latter being in like manner 75 connected at its opposite end with a lever 25 on a shaft 26 extending across one end of the engine between the drum 1 and supporting frame 3. The shaft 26 is connected by lever arms 27 to a cross piece 28 80 mounted on the outer end of the valve stem 29 which extends into the engine valve cylinder 30. Upon movement of the lever 21 on its pivot the movement of the lower end of the lever will result, through rod 24, 85 lever 25, shaft 26, lever 27, and cross piece 28, in a corresponding movement of the valve piston rod 29. Movement of lever 21 is secured through its connection with member 17 which is screw-threaded on the 90 hand-power shaft 15 and having its gear 18 continually in mesh with the drum gear 20, cannot revolve with the shaft 15, but moves lengthwise of the shaft when the latter is turned. Thus any turning of the shaft 15 95 resulting from operation of the wheel in the pilot house causes a movement of the member 17 lengthwise of the shaft 15 and an opening of the engine valve to permit of operation of the engine in accordance with 100 the degree and direction of operation desired.

The operation of the combined steam and hand steering engine as above described, will be readily understood and is in brief as 105 follows: When steering by steam the drum is moved into engagement with the steam driven gear, any movement of the hand-wheel in the pilot house results in a turning of the hand-power shaft 15 and a length- 110 wise movement of pinion 17 on the shaft to open the engine valve; the pinion is moved and the valve opened to a degree and in a direction corresponding with the degree and direction in which the pilot house wheel is 115 turned. Opening of the valve results in an operation of the engine to turn the drum and move the rudder to the extent necessary to effect the desired steering operation; the rotation or turning of the drum effects a turning 120 of gear 18 which meshes with the drum gear 20 and, the hand-power shaft 15 then being stationary, there results a movement of member 17 lengthwise of the shaft 15 back to its normal position thereon to effect the closing 125 of the engine valve. This constitutes one complete steering operation when steam power is used.



In steering by hand the power to turn the drum and effect the steering operation is transmitted directly to the drum from the wheel in the pilot house through shafts 14 and 15, pinion 16 and drum gear 20; the drum being out of engagement with the steam driven gear and the steam-power being entirely shut off if desired.

Since the degree to which member 17 will be moved lengthwise of the shaft 15, and the valve will be operated is determined by the turning of the shaft, in order to prevent too great an operation of the valve and the striking of the cylinder heads by the valve and injury to the heads, it is desired to limit the extent to which the hand-power shaft 15 may be turned in either direction when steering by steam, and the resulting lengthwise movement of member 17 to operate the valve. For this purpose I have provided an outwardly extending lug 31 at each end of member 17 and a lug 32 on pinion 16 and collar 19 extending toward the member 17; when the hand-power shaft 15 is turned to move the member 17 toward the pinion 16 and the member 17 reaches a position adjacent pinion 16, the turning of said pinion with the shaft 15 will result in contact between lug 32 thereon and lug 31 on member 17, the shaft 15 thereupon being locked against further movement in that direction since member 17 cannot be turned unless by movement of the drum. In like manner turning of the shaft and movement of member 17 in the opposite direction is limited by contact between lug 31 on the opposite end of member 17 and lug 32 on collar 19. In this manner through a desired positioning of the lugs, and proportioning of the valve operating levers the maximum operation of the valve is fixed, beyond which further turning of the hand-power shaft and operation of the valves is impossible until the engine has operated the drum to move member 17 from its extreme position toward its normal or central position.

From the above description it will be seen that the apparatus may be used either for steering by hand-power or by steam, as may be desired, or as may be rendered necessary through accident or the like, and that the change from one power to the other may be made rapidly and efficiently, the mechanism embodying my invention being simple and durable and capable of long continued operation without loss of efficiency or danger of injury.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a device of the class described, in combination a drum, a gear on the drum, a hand-power shaft, a gear pinion threaded on said shaft and meshing with the drum

gear, a second pinion on said shaft, and means for placing said drum gear and said second gear in engagement. 65

2. In a device of the class described, in combination a drum, a gear on the drum, a hand-power shaft, a gear pinion threaded on said shaft and meshing with the drum gear, a second pinion on said shaft, and means for placing said drum gear in mesh with said first and second gears simultaneously. 70 75

3. In a device of the class described in combination, a drum shaft, a clutch member on the shaft, a drum mounted on the shaft adapted to be connected with said clutch member, a gear on the drum, a hand-power shaft, a pinion threaded on the hand-power shaft and meshing with said drum gear, a second pinion secured on the hand power shaft and means for connecting and disconnecting said drum and said clutch member and for bringing said drum gear and said second pinion into engagement. 80 85

4. In a device of the class described in combination, a drum shaft, a clutch member on the shaft, a drum mounted on the shaft and adapted to be connected with said clutch member, a gear on the drum, a hand-power shaft, a pinion threaded on the hand-power shaft and meshing with said drum gear, a second pinion secured on the hand-power shaft and means for connecting and disconnecting said drum and said clutch member and for bringing said drum gear into mesh with said first and second pinions simultaneously. 90 95 100

5. In a device of the class described in combination, a power shaft, a drum shaft, a clutch member on the drum shaft adapted to be driven from the power shaft, a drum mounted on the drum shaft and adapted to be connected with said clutch member, a gear on the drum, a hand-power shaft, a member threaded on the hand-power shaft, a gear on said threaded member meshing with the drum gear, a pinion secured on the hand-power shaft, means for bringing said drum gear and said pinion into engagement, a controller adapted to control the operation of said first mentioned power shaft and connections between the controller and said member threaded on the hand-power shaft. 105 110 115

6. In a device of the class described in combination, a power shaft, a drum shaft, a clutch member on the drum shaft adapted to be driven from the power shaft, a drum mounted on the drum shaft and adapted to be connected with said clutch member, a gear on the drum, a hand-power shaft, a member threaded on the hand-power shaft, a gear on said threaded member meshing with the drum gear, a pinion secured on the hand-power shaft, means for bringing said drum gear into mesh with said pinion and 120 125



threaded element simultaneously, a controller adapted to control the operation of said first mentioned power shaft and connections between the controller and said member threaded on the hand-power shaft.

7. In a device of the class described in combination, a power shaft, a drum shaft, a clutch member on the drum shaft adapted to be driven from the power shaft, a drum mounted on the drum shaft and adapted to be connected with said clutch member, a gear on the drum, a hand-power shaft, a member threaded on the hand-power shaft, a gear on said threaded member meshing with the drum gear, a pinion secured on the hand-power shaft, means for disengaging the drum and said clutch member and for bringing said drum gear and said pinion into engagement, a valve adapted to control the operation of said first mentioned power shaft and connections between the valve and said member threaded on the hand-power shaft.

8. In a device of the class described in combination, a power shaft, a drum shaft, a clutch member on the drum shaft adapted to be driven from the power shaft, a drum mounted on the drum shaft and adapted to be connected with said clutch member, a gear on the drum, a hand-power shaft, a member threaded on the hand-power shaft, a gear on said threaded member meshing with the drum gear, a pinion secured on the hand-power shaft, means for disengaging the drum and said clutch member and for bringing said drum gear and said pinion into engagement, said drum gear remaining in mesh with the gear on said threaded member, a valve adapted to control the operation of said first mentioned power shaft and connections between the valve and said member threaded on the hand-power shaft.

9. In a device of the class described in combination, a drum, a gear on said drum, a hand-power shaft, a pinion and a collar secured on the shaft, a member threaded on the shaft between the pinion and the collar, a gear on said member meshing with the drum gear, a lug on said pinion and on said collar extending toward the threaded member, a lug on each end of the threaded member, and means for bringing said drum gear and said pinion into engagement.

10. In a device of the class described in combination, a drum, a gear on said drum, a hand-power shaft, a pinion and a collar secured on the shaft, a member threaded on the shaft between the pinion and the collar, a gear on said member meshing with the drum gear, a lug on said pinion and on said collar extending toward the threaded member, a lug on each end of the threaded member, and means for bringing said drum gear and said pinion into engagement, said

drum gear remaining in mesh with the gear on said threaded member.

11. In a steering apparatus, a drum, a motor to drive the drum, controlling means for the motor, a gear on the drum, a hand shaft, a gear pinion threaded on said shaft for movement longitudinally of the latter and arranged in mesh with the drum gear, said pinion being connected to the controlling means for the motor, a second pinion on the shaft adapted to be rotated thereby, and means for disconnecting the drum from the motor and placing the drum gear in mesh with said second gear on the hand shaft.

12. In a steering apparatus, a drum, a motor to drive the drum, controlling means for the motor, a gear on the drum, a hand shaft, a gear pinion threaded on said shaft for movement longitudinally of the latter and arranged in mesh with the drum gear, said pinion being connected to the controlling means for the motor, a second pinion on the shaft adapted to be rotated thereby, and means for disconnecting the drum from the motor and placing the drum gear in mesh with the gears on the hand shaft simultaneously.

13. In a steering apparatus, a drum, a motor to drive the drum, controlling means for the motor, a gear on the drum, a hand power shaft, a gear pinion threaded on said shaft in mesh with the drum gear, said pinion being connected to the controlling means for the motor, a second pinion on the shaft adapted to be rotated thereby, and means for connecting and disconnecting said drum and motor, and for placing the drum gear in mesh with the first pinion when the drum and motor are connected and for placing the drum gear in mesh with both pinions simultaneously when the drum and motor are disconnected.

14. In a steering apparatus, a drum, a motor to drive the drum, controlling means for the motor, a gear on the drum, a hand shaft, a gear pinion threaded on said shaft for movement longitudinally of the latter and arranged in mesh with the drum gear, said pinion being connected to the controlling means for the motor, means for limiting the movement of said pinion on the shaft, a second pinion on the shaft adapted to be rotated thereby, and means for connecting the drum to the motor and placing the drum gear in mesh with said second gear on the hand shaft.

15. In a steering apparatus, a drum, a motor to drive the drum, controlling means for the motor, a gear on the drum, a hand shaft, a gear pinion threaded on said shaft for movement longitudinally of the latter and arranged in mesh with the drum gear, said pinion being connected to the control-

ling means for the motor, a second pinion on  
the shaft adapted to be rotated thereby,  
means on the shaft and said second gear  
for limiting the movement of the threaded  
5 pinion longitudinally of the shaft, and  
means for connecting the drum to the motor  
and placing the drum gear in mesh with  
said second gear on the hand shaft.

In testimony whereof I have signed my  
name to this specification in the presence 10  
of two subscribing witnesses.

FREDERICK C. SCHOEN.

Witnesses:

FRANK E. RAFFMAN,  
T. E. HARDENBERGH, Jr.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,  
Washington, D. C."

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