

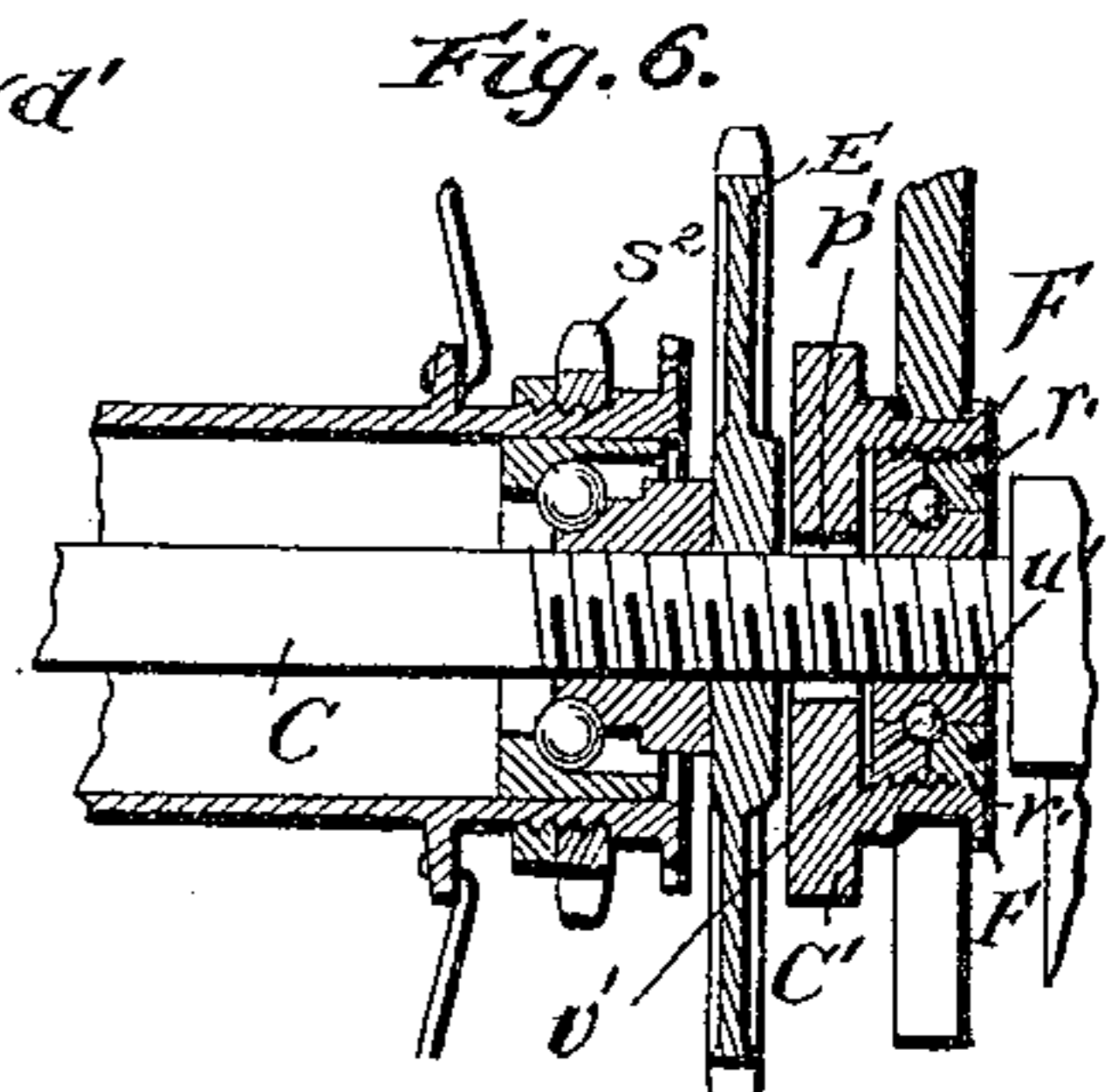
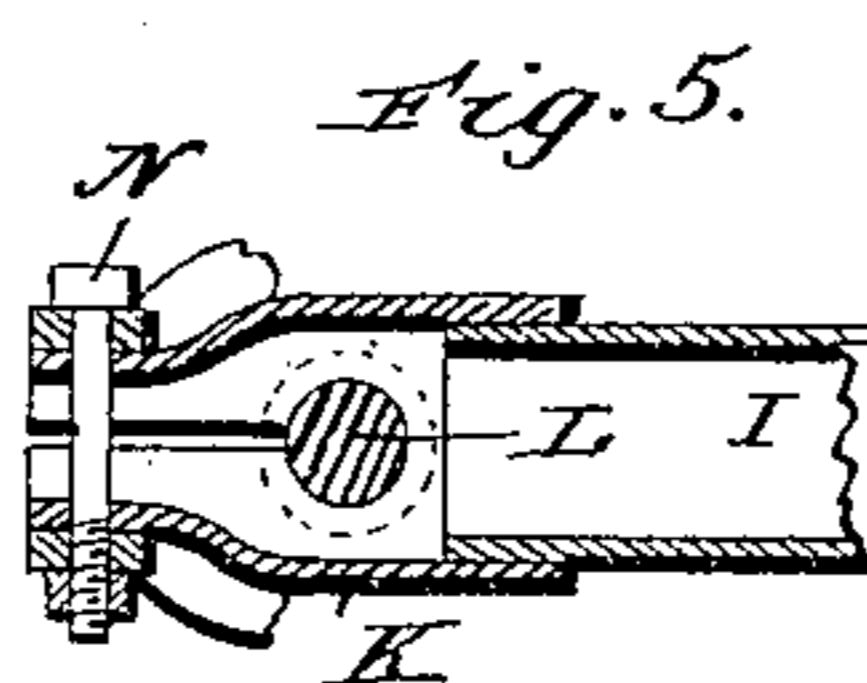
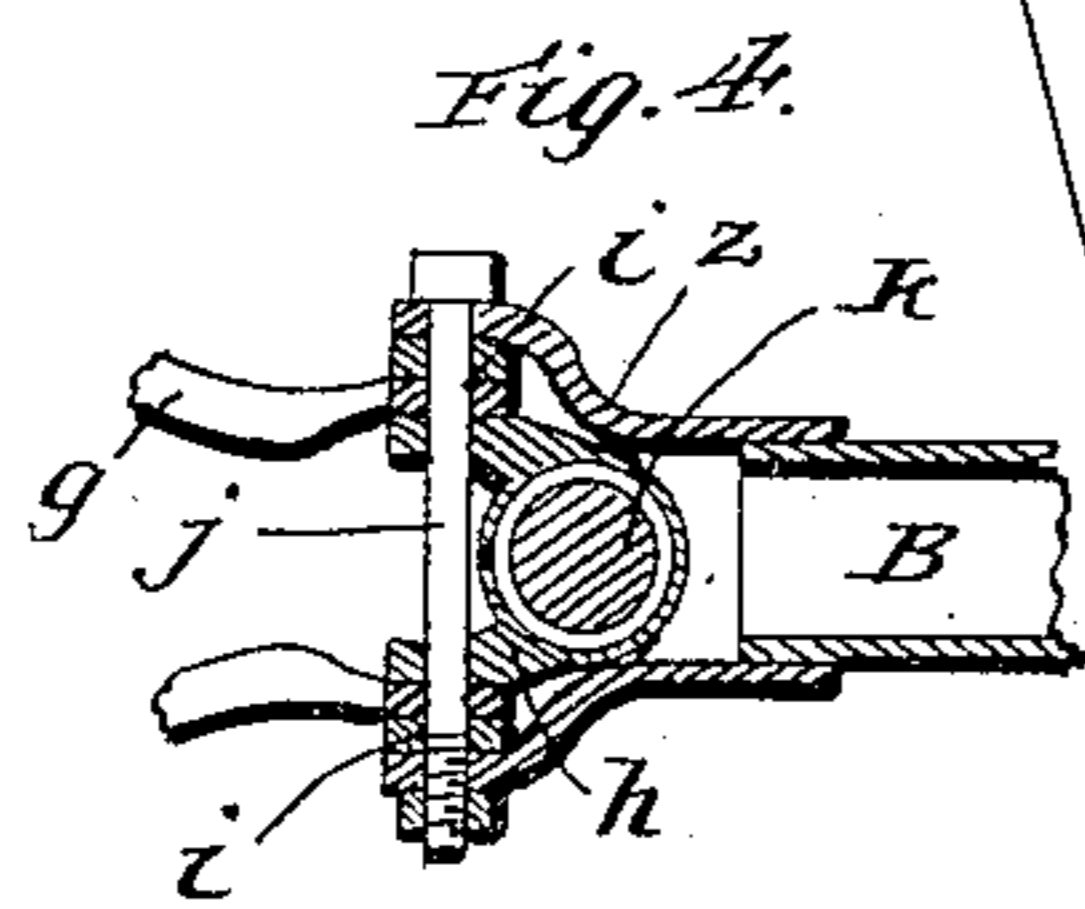
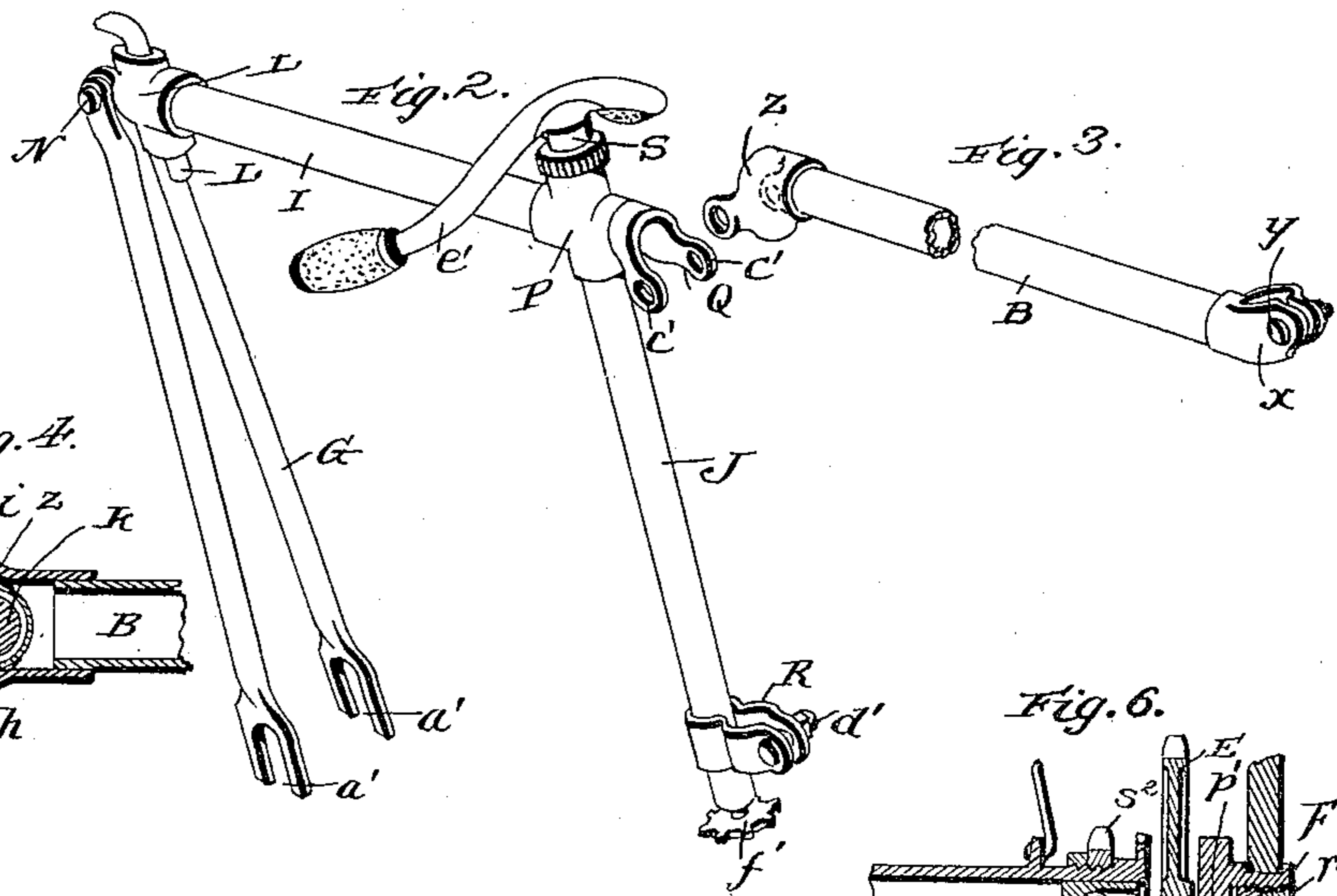
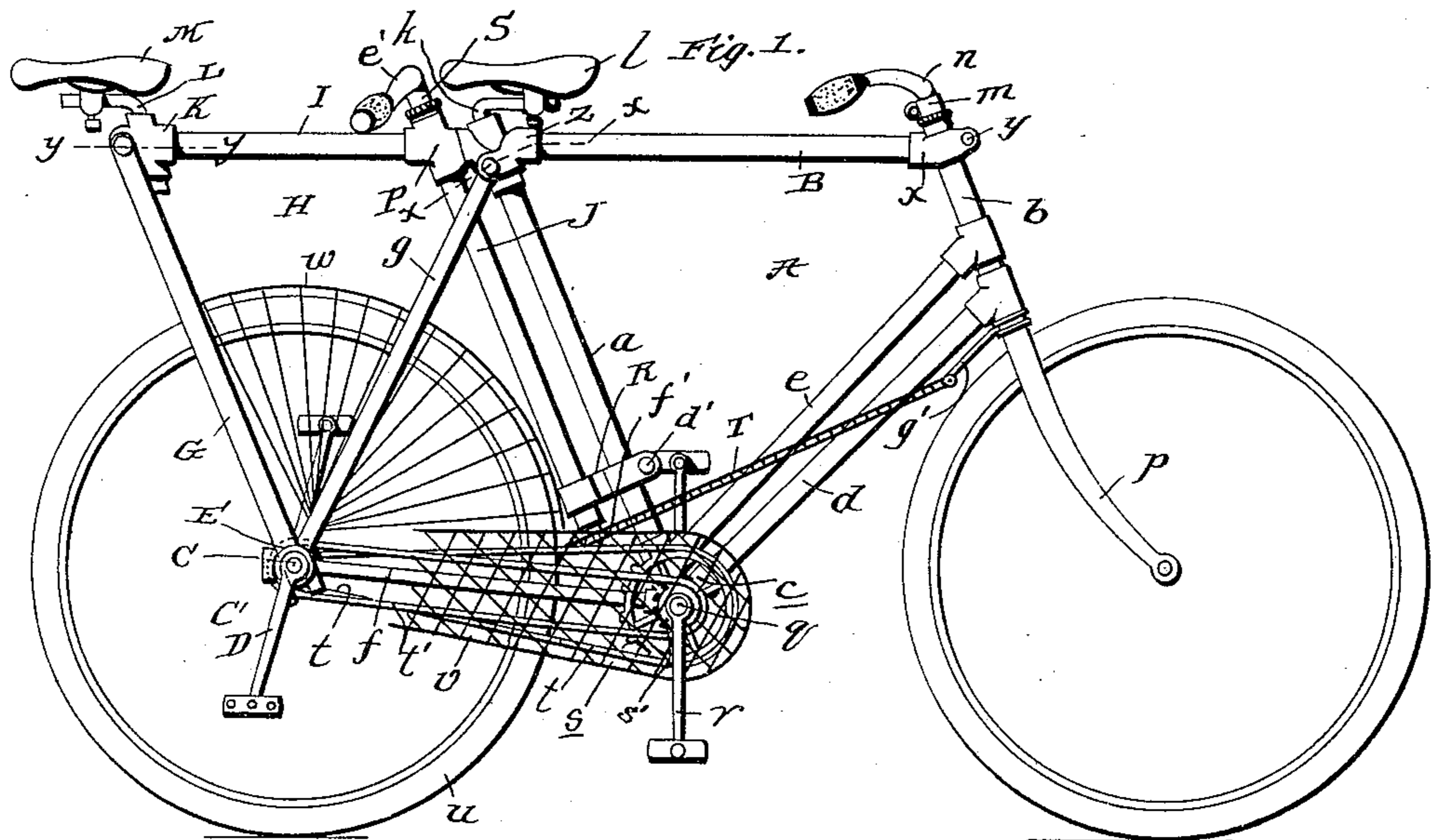
No. 611,780.

Patented Oct. 4, 1898.

O. FETZER.
BICYCLE.

(Application filed Dec. 29, 1897.)

(No Model.)



Witnesses:
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UNITED STATES PATENT OFFICE.

OTTO FETZER, OF CLEVELAND, OHIO.

BICYCLE.

SPECIFICATION forming part of Letters Patent No. 611,780, dated October 4, 1898.

Application filed December 29, 1897. Serial No. 664,236. (No model.)

To all whom it may concern:

Be it known that I, OTTO FETZER, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Bicycles; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to bicycles, and contemplates the provision of a bicycle adapted to be readily converted from a single into a tandem and one which is provided with a main frame of such construction that it may be quickly and easily changed from a diamond frame into a drop-frame, and vice versa, to adapt it for the use of men or women.

With the foregoing in view the invention will be fully understood from the following description and claims when taken in conjunction with the annexed drawings, in which—

Figure 1 is a side elevation of my improved convertible bicycle. Fig. 2 is a perspective view of the auxiliary frame. Fig. 3 is a broken perspective view of the removable top line-bar of the main frame. Fig. 4 is an enlarged transverse section taken in the plane indicated by the dotted line $x x$ of Fig. 1. Fig. 5 is a similar view taken in the plane indicated by the line $y y$ of Fig. 1, and Fig. 6 is a transverse section taken through the center of the drive-wheel.

In the said drawings similar letters designate corresponding parts in all of the several views, referring to which—

A designates the main frame of my improved bicycle, which comprises a king-post a , a head-post b , a crank-hanger c , two bottom line-bars $d e$, bottom runs f , and rear stays g . The king-post a , head-post b , crank-hanger c , and bottom line-bars $d e$ may be constructed and connected together in the ordinary manner, while the rear stays g have their upper ends arranged at opposite sides of a clip h on the king-post, said stays and clip being provided with coincident apertures i to receive a connecting-bolt j , which has for an additional purpose to clamp the post k of a seat l in the king-post in the ordinary manner. The head-post b receives a steering-head m , which has the usual handle-bar n at its upper end and wheel-carrying fork p at

its lower end, while the hanger receives the usual crank-shaft q , which has the pedal-cranks r and the sprocket-wheels $s s'$, the former being connected by the usual chain t with the sprocket-wheel s^2 of the rear or drive wheel u .

B designates the removable top line-bar of the main frame. This bar B has a clip x at its forward end designed to straddle the head-post b and be removably fixed thereon by a bolt y , and it also has a clip z at its rear end designed to straddle the upper ends of the rear stays g and the clip h and be connected therewith by the bolt j . From this it will be appreciated that the top line-bar B may be readily secured upon the frame A, so as to convert said frame into a diamond frame suitable for men's use and that it may be removed with equal facility when a drop-frame or one suitable for use of women is desired.

The rear or drive wheel u is loosely mounted upon and designed to rotate independent of a shaft C, which serves the twofold function of an axle and crank-shaft and is provided with the detachably-connected pedal-cranks D and the sprocket-wheel E, as shown, the said wheel E being connected by a chain t' with the sprocket-wheel s' on the shaft q , so as to transmit motion to said shaft q and enable the rear rider to assist in the propulsion of the machine. This arrangement of both chains $t t'$ at one side of the bicycle is advantageous for the reason that it permits of both chains being inclosed by a single guard v , as shown in Fig. 1. A mud-guard w is also preferably employed over the rear wheel u ; but as said mud-guard forms no part of my invention it is obvious that it may be omitted when desired.

The end connections C' of the rear stays g and bottom runs f have apertures p' , loosely receiving the combined axle and crank-shaft, and also have annular lateral projections F on their outer sides surrounding the said apertures, as shown. These annular projections F (see Fig. 6) have interior threads for the engagement of the sectional bushings r' , which are designed and adapted to serve in conjunction with collars u' , fixed on the combined shaft and axle C, to form raceways for antifriction-balls v' , and thus reduce the friction incident to the rotation of the combined crank-shaft and axle C in the frame. The

said projections F are also designed to afford rests for the supporting-bars G of the auxiliary frame H, which are bifurcated at their lower ends, as indicated by a' , and are therefore adapted to straddle the projections. To prevent lateral displacement of said supporting-bars, the lateral projections F are grooved after the manner shown in Fig. 6 to form seats for the bifurcated lower ends of said bars.

In addition to the said supporting-bars G the auxiliary frame H comprises the top line-bar I and the post J. The top line-bar I is provided at its rear end with a clip K to receive the post L of a seat M, and the said clip is provided with a bolt N, (see Fig. 5,) which in addition to binding the clip on the seat-post serves to connect the clip and supporting-bars G, as shown. At its forward end the top line-bar I is connected to the post J by a joint P, which has a clip Q. (Better shown in Fig. 1.) This clip Q has apertured arms c' , which are designed and adapted to be interposed between the arms of the clip z and rear stays g of the main frame and be detachably connected thereto by the bolt j . The upper end of the auxiliary-frame post J is securely connected to the main frame by the clip Q, as stated, while the lower end of said post J is connected to the king-post a of the main frame by a clip R, the said clip being brazed or otherwise secured upon the post J and being provided with a bolt d' , as shown, for binding it upon the king-post a .

S designates a steering-head which is journaled in the post J and has a handle-bar e' at its upper end and a sprocket f' at its lower end, and T designates a sprocket-chain which takes around the sprocket f' and is detachably connected at its ends to arms g' , extending laterally from the crown of the fork p , as shown. This construction, as will be readily appreciated, enables the rear rider to participate in the steering of the bicycle, as is desirable.

From the construction described it will be appreciated that the auxiliary frame H is adapted to be readily disconnected and removed from the main frame A and that the pedal-cranks D are adapted to be readily removed from the shaft C, while the chain T of the auxiliary steering apparatus is adapted to be readily disconnected from the arms g' of the fork p . From this it follows that the tandem shown in Fig. 1 may be readily converted into a single and that the single may be converted with equal facility into a tandem. It will also be appreciated that the connections and disconnections necessary to converting the tandem into a single or the single into a tandem are such that they may be effected with no other tool than a nut-wrench and without the employment of skilled labor, which is a desideratum.

Having thus described my invention, what I claim is—

1. In a convertible bicycle, the combination of the main frame having a crank-hanger and

also having the lateral projections on the end connections between its bottom runs and rear stays, a shaft q journaled in the crank-hanger and provided with pedal-cranks, a rear or drive wheel, a combined axle and shaft C extending through the hub of said wheel and journaled in the lateral projections on the end connections, gearing intermediate of the shaft C and the shaft q , gearing intermediate of said shaft q and the rear or drive wheel, and a suitable auxiliary frame detachably connected with the main frame and having supporting-bars bearing on the lateral projections of the end connections thereof, substantially as specified.

2. In a convertible bicycle, the combination of the main frame having a crank-hanger and also having the lateral projections on the end connections between its bottom runs and rear stays, a shaft q journaled in the crank-hanger and provided with pedal-cranks and also with sprocket-wheels s s' disposed at one side of the crank-hanger, a rear or drive wheel provided with a sprocket s^2 arranged in alinement with and connected by a chain with the sprocket-wheel s on shaft q , a combined axle and shaft C extending through the hub of said wheel and journaled in the lateral projections on the end connections, a sprocket-wheel E fixed on said shaft C and arranged in alinement and connected by a chain with the sprocket-wheels s' on shaft q , and a suitable auxiliary frame detachably connected with the main frame and having supporting-bars bearing on the lateral projections of the end connections thereof, substantially as specified.

3. In a convertible bicycle, the combination of the main frame having the clip at the upper end of its king-post, lateral projections F on the end connections between its bottom runs and rear stays, and a detachable top line-bar B; said bar B having a clip at its forward end clamped on the head-post and a clip z at its rear end straddling the clip on the king-post and the upper ends of the rear stays, the auxiliary frame comprising the post J having the clip detachably fixed on the king-post of the main frame, the top line-bar having the clip at its rear end, the supporting-bars connected to said clip and having bifurcated lower ends bearing on the projections F of the main frame, and the clip Q at the juncture of the post J and top line-bar having its arms interposed between the arms of the clip z and the upper ends of the rear stays of the main frame, and a bolt extending through and detachably connecting the arms of the clips Q and z , the clip on the upper end of the king-post, and the upper ends of the rear stays, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

OTTO FETZER.

Witnesses:

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MAX. M. KOCH.