

No. 767,201.

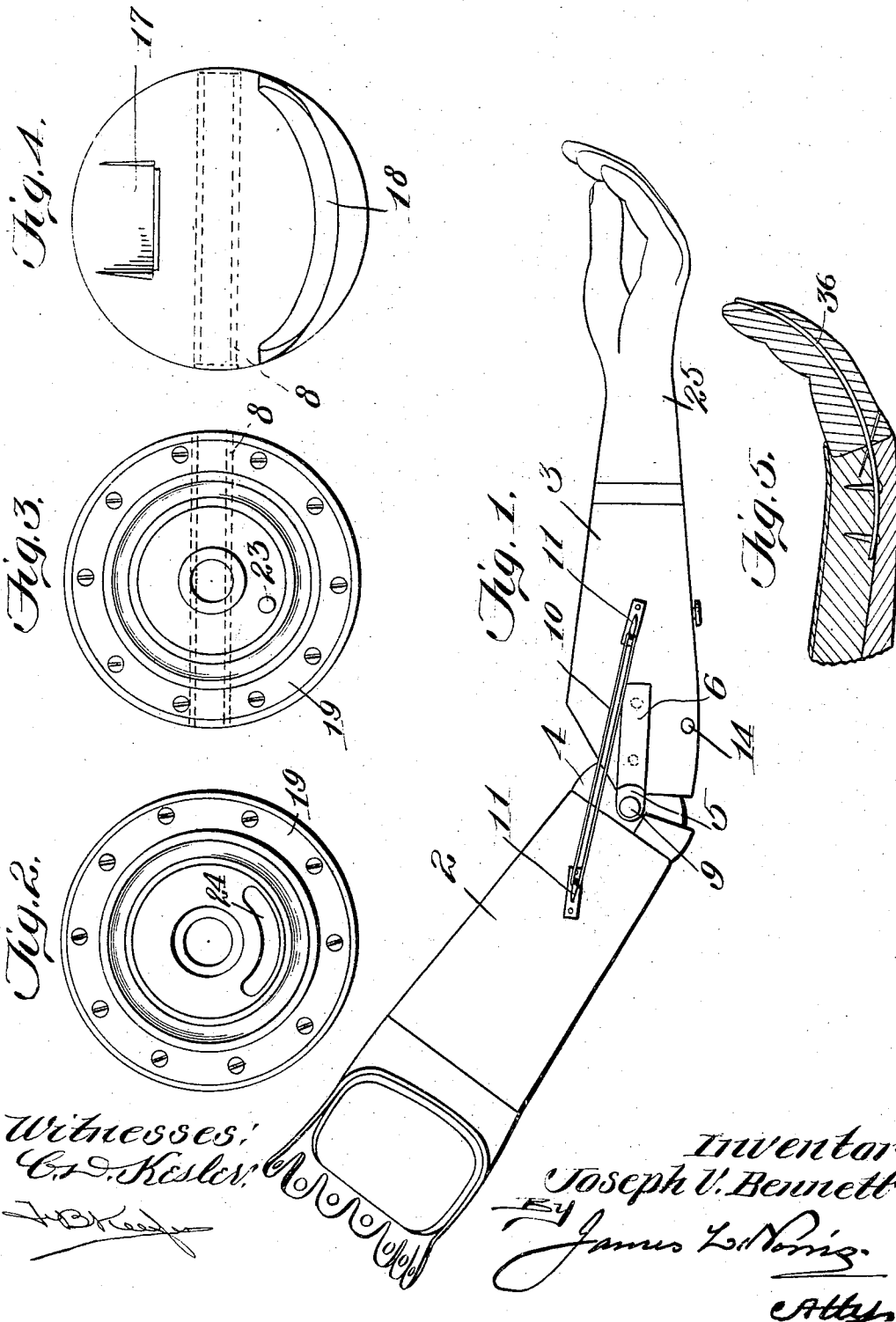
PATENTED AUG. 9, 1904.

J. V. BENNETT.
ARTIFICIAL ARM.

APPLICATION FILED JAN. 5, 1904.

NO MODEL.

2 SHEETS—SHEET 1.



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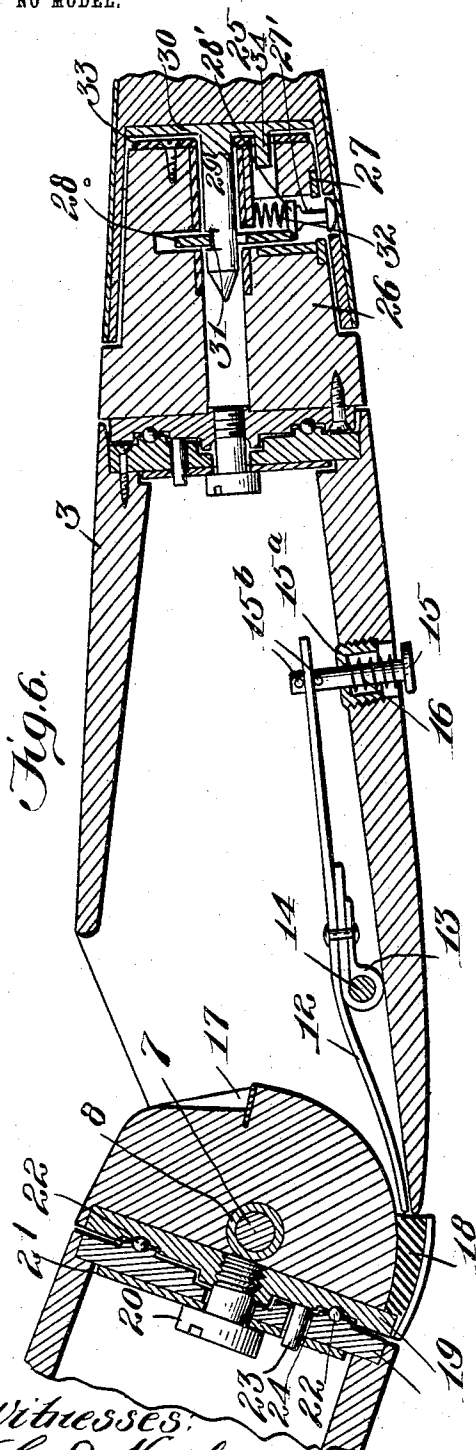


Fig. 6.

Fig. 10.

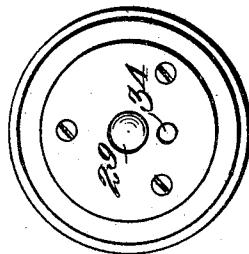


Fig. 9.

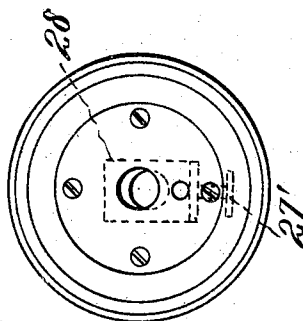


Fig. 8.

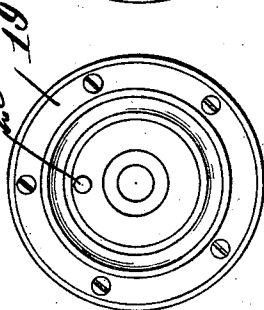
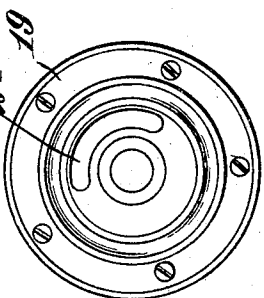


Fig. 7.



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UNITED STATES PATENT OFFICE.

JOSEPH V. BENNETT, OF HUNTSVILLE, MISSOURI.

ARTIFICIAL ARM.

SPECIFICATION forming part of Letters Patent No. 767,201, dated August 9, 1904.

Application filed January 5, 1904. Serial No. 187,832. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH V. BENNETT, a citizen of the United States, residing at Huntsville, in the county of Randolph and State of Missouri, have invented new and useful Improvements in Artificial Arms, of which the following is a specification.

This invention relates to artificial arms; and the object of the invention is to provide a simple, effective, and light article of this character, which can be inexpensively made and worn without discomfort to the user.

The invention includes other objects and advantages, which, with the foregoing, will be set forth at length in the following description.

In the drawings accompanying and forming a part of this specification I illustrate one desirable embodiment of the invention, which will be hereinafter fully described; but I do not limit myself to the exact disclosure thus made, for certain variations may be adopted within the scope of my claims following said description.

In said drawings, Figure 1 is an elevation of an arm including my invention. Figs. 2 and 3 are face views of the two pieces or parts of the upper section. Fig. 4 is a face view of the ball end of the upper-arm section. Fig. 5 is a sectional detail of a portion of the hand. Fig. 6 is an enlarged sectional elevation of the intermediate portion of the arm. Figs. 7 and 8 are views corresponding to Figs. 2 and 3, respectively, of the lower-arm pieces. Figs. 9 and 10 are face views of the lower end of the forearm-section and the inner end of the wrist.

Like characters refer to like parts throughout the different views.

The artificial arm constituting the present invention consists of upper and fore arm sections or members, as 2 and 3, respectively, which to secure lightness are preferably made hollow, and with the same object in view are made of wood, leather, or aluminium, although of course I do not limit myself to such construction nor to the use of any particular material. The two sections 2 and 3 are hingedly connected, and each in turn consists of two pivoted pieces, as will hereinafter appear, by

virtue of which latter construction the artificial arm will have the same motions as the natural arm. The upper section terminates at its forward or lower end in a ball or spherical portion 4, said ball portion, as will hereinafter appear, being upon the lower or fore piece or part of the upper-arm section or member 2. The ball or spherical portion 4 fits a socket in the top of the forearm-section 3, which socket of course may be the bore or chamber of said hollow section 3. The sections are flexibly connected, whereby the forearm-section 3 can be angularly adjusted with respect to the upper-arm section 2, and the flexible connection may be of any desirable character. The one illustrated will be now set forth.

In the opposite sides of the upper portion of the forearm-section 3 are formed channels in which the metallic or equivalent strips 5 are set and suitably secured. The metallic strips 5 are covered by the facing-pieces 6, of wood or of the material of which the forearm-section is composed. These facing-pieces 6 set, of course, in the channels that receive the respective strips, and their outer faces are flush with the corresponding face of the forearm-section 3. The strips 5 project from the upper end of the forearm-section, and such projecting ends are perforated to receive the headed pivot-pin 7, which pin passes through and turns in the bore of a bearing-sleeve 8, suitably held in a transverse perforation in the ball portion or end 4. The pivot-pin 7 is, as stated, headed at one end, the opposite end of the pin being internally threaded to receive the external threads of a holding-screw 9, whereby the several hinged parts are held in their assembled relation. By removing the holding-screw the pivot-pin 7 can be driven from place, so as to secure the separation of the upper and fore arm sections 2 and 3, respectively.

Means of a suitable nature are provided for automatically flexing the forearm section or member 3 in an upward direction, and the means illustrated consist of two elastic bands, each denoted by 10, the opposite ends of the bands being engaged over hooks, as 11, suitably fastened to the opposite sides of the two

arm-sections 2 and 3. The tendency of the elastic bands, which may be of any desirable form or construction, is therefore to swing the forearm-section 3 in an upward direction. I contemplate, however, holding by suitable means, as will hereinafter appear, the forearm-section in a desired angular or adjusted position.

A frictional detent is illustrated at 12, located within the interior of the forearm-section 3, said detent consisting of an elongated strip of sheet metal, the upper end of which normally engages the face of the ball or spherical portion 4, so as to hold the lower-arm section in the desired angular position and in opposition to the elastic bands 10. To the under or rear side of the frictional detent 12 is riveted or otherwise suitably fastened the shank of the sleeve 13, arranged for turning motion upon the transverse pivot 14, supported within the forearm-section 3. From this it will be evident that the detent 12 has a rocking motion, with the pivot 14 as the center. The under side of the forearm-section is perforated to receive the sleeve 15^a of the detent - actuating pin 15, which pin passes through a coincident perforation at or near the forward end of the detent 12, said pin being provided with projections or offsets 15^b at opposite sides of the forward end of the detent 12, whereby upon the longitudinal movement of the pin 15 the detent 12 will be rocked. The pin 15 is surrounded by a coiled spring 16, bearing at its inner end against the sleeve 15^a and at its outer end against the head of the pin 15, whereby said spring 16, acting through the intermediate pin 15 and inner projection 15^b, will maintain the working end of the detent 12 in firm frictional contact with the surface of the ball portion 4, so as to hold the forearm in the desired angular position. By pressing the pin 15 inward the projection 15^b by acting against the detent 12 will rock the working end of the latter away from the surface of said ball portion, whereby the forearm-section will be released to be swung downward by hand or upward by the elastic bands 10.

The ball portion has a seat 17, illustrated as a notch, to receive the working end of the detent 12 when the forearm-section is at right angles, or approximately so, with the upper-arm section, whereby such position will be maintained until said working end of the detent is moved out of the seat 17 by the manipulation of the actuating-pin 15.

Upon the forward or lower piece or part of the upper-arm section or member 2 and at the rear thereof is a cushion 18, illustrated as a rubber pad, against which the forearm-section 3 is adapted to abut when moved into line or approximately into line with the upper-arm section, the cushion being faced with leather or other suitable material to protect it and being suitably secured in place. The

cushion and its protecting or facing piece are approximately of segmental form, the lower portion of the cushion being engaged by the upper edge of the forearm-section when the latter is alined with its mate, as just set forth.

It will be remembered that the upper and fore arm sections 2 and 3 have been set forth as each consisting of two parts connected together by a joint permitting turning movement of one part or piece with respect to the other, and as the joints between the parts of the respective sections are practically the same in each case I will describe in detail but one of them—say that of the upper-arm section 2. It will be seen that said upper-arm section is composed of two pieces, the upper one being considerably longer than the lower one and the latter being provided with the ball or spherical portion 4, hereinbefore described. These two sections have suitably fastened thereto bearing-plates, as 19, which may be made of aluminium, brass, steel, or the like, said plates being suitably fastened—as, for example, by means of screws—to the two pieces. The upper plate is centrally perforated to receive a pivot 20, shown as a screw tapped into a central perforation in the lower plate, the shank of the screw turning freely in said upper perforation, while the head of said screw bears against a washer-plate, as 21, fitted against the upper face of the upper bearing-plate 19.

From the foregoing it will be obvious that the lower piece of the upper-arm section 2 is arranged to turn with respect to the complementary piece. To reduce friction, I introduce between the two plates antifriction-balls 22, fitted in annular raceways in the respective plates. In the present instance the lower piece of the upper-arm section does not rotate through a full arc, means being provided to limit the rotative motion, one simple form of which will now be set forth.

From the lower plate 19 extends an eccentric-pin 23, adapted to play in a segmental slot 24 in the upper plate 19, said slot being concentric with the axis of motion of the lower plate. The pin 23 by abutting against the ends of the segmental slot limits the turning motion of the lower piece of the upper-arm section. The two plates 19 can be secured in rabbets formed in the respective plates which carry them.

The hand is denoted in a general way by 25, its wrist portion, which is preferably, though not necessarily, of wood, being hollow or chambered to receive the reduced forward portion 26 of the forearm-section 3. By reducing the forward end of said forearm-section a shoulder is provided, against which what might be considered the wrist portion of the hand abuts when the hand is in place, said hand in the present instance being removably connected to the forearm-section, whereby it can be taken from place to substi-

tute another one therefor or for any other desired purpose.

I set into the reduced portion 26 a perforated plate 27 of approximately arcuate form, through the perforation of which the screw 27' extends, said screw being tapped into a flange 28' at the lower end of a plate 28, said plate being centrally perforated to receive the spindle 29, extending rearward from the center of the disk or plate 30, fastened within the wrist portion of the hand 25. The plate 28 constitutes a spring-actuated latch for removably holding the hand in place by engaging the spindle 29, the latter having a peripheral notch or recess 31 to be engaged by what might be considered the upper portion of the wall of the slot in said plate or latch. The latch or plate 28 is shown in its effective position in Fig. 6, the plate being seated in the notch or recess 31, which relation is maintained by the coiled spring 32, bearing at one end against the flange 28' and at the other end against a suitable fixture.

Upon the flat forward end of the reduced portion 26' of the forearm-section 3 is suitably fastened a plate 33, centrally perforated to receive the spindle 29' and having an eccentric perforation to receive the correspondingly eccentric pin 34 upon the complementary plate 30 when the hand is applied to the forearm, so that said end is prevented from turning with respect to the front piece of the forearm-section 3.

To apply the hand, the reduced portion 26 of the forearm-section 3 is introduced into the socket of the wrist portion of said hand until the spindle 29 is entered in the central perforation of the plate 33, the hand then being moved rearward or the forearm-section being moved forward, so as to apply the hand. When the beveled or pointed inner portion of the spindle enters the perforation of the plate or latch 28, the latter is thrust upward for a short distance or until the notch 31 in said spindle comes opposite the upper portion of the wall of the perforation of said plate, at which point the spring 32 will force the plate or latch 28 into its effective position. During the latter part of the motion the eccentric-pin 34 will ride into the perforation in the plate 33, which is intended to receive it, so that when the parts are assembled the hand cannot turn with respect to the part with which it is immediately connected.

The wrist portion of the hand is perforated, as at 34, to receive the head of the actuating-screw 27' when the hand is in its assembled condition. To remove the hand, the head of the actuating-screw 27' will be pressed inward, thereby disengaging the latch or locking-plate 28 from the spindle 29, after which the hand can be easily slipped from place.

The hand 25 is composed mainly of wood or some equivalent material, the fingers thereof being flexible and incasing springs, which

are of properly-bowed form, whereby a certain amount of resiliency is secured in said fingers to enable them to firmly retain certain articles, such as a pencil or any tool or implement. The fingers are composed entirely of felt or similar material and each receives a flat steel spring, as 36, suitably fastened to the wooden portion of the hand. The thumb receives a spring like the springs incased in the fingers. That portion of the hand corresponding to the carpal and metacarpal bones is composed, preferably, interiorly of wood and exteriorly of cork in order to secure lightness. The ball of the thumb is composed entirely of cork and its proximal and distal phalanges of felt. The use of these particular materials, however, is not essential, for other materials can be employed in lieu thereof.

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

1. An artificial arm, including upper and fore flexibly-connected sections, means for automatically flexing one of said sections, and a detent device under the control of the user for positively holding the arm-sections in a desired angular position in opposition to said flexing means.

2. An artificial arm including upper and fore flexibly-connected sections, the upper section having a ball end and the lower section being adapted to receive said ball end, and a detent under the control of the user for frictionally engaging the surface of said ball end on the movement of said lower section and serving to maintain said lower section in angularly-adjusted positions desired with respect to the upper one.

3. An artificial arm including a forearm-section, an upper-arm section flexibly connected with the forearm-section and having a ball end to fit the former, and a frictional detent under the control of the user, adapted to traverse the face of said ball end to frictionally hold the lower-arm section in different angular positions, said ball end having a seat to receive the working end of the detent.

4. An artificial arm having a forearm-section and an upper-arm section, the latter having a ball end and the former being arranged to receive said ball end, means for flexibly connecting the two sections, means for automatically flexing the lower-arm section, a friction-detent arranged for rocking motion within the lower-arm section, the working end of the detent being arranged to traverse said ball end, and a spring-actuated pin carried by the forearm-section for operating the detent to move the working end of the latter into ineffective position.

5. An artificial arm having a section consisting of two parts pivotally connected together for movement of one of them about a longitudinal axis, and means for limiting the motion of one part with respect to the other.

6. An artificial arm including a section consisting of two parts, pivotally-connected plates fastened to the respective parts, and antifric-
tion-balls between and in contact with the re-
spective plates.

7. An artificial arm including a section comprising two parts, and pivoted plates fastened to the respective parts, one plate having a pin and the other plate having a segmental slot
to receive said pin.

8. An artificial arm including a section comprising two parts, pivoted plates fastened to the respective parts, one plate having a pin and the other plate having a segmental slot
to receive said pin, each plate having an annular raceway, and antifric-tion-balls fitted in the respective raceways.

9. An artificial arm, the fore section of which carries a spring-actuated latch, and a
hand removably connected with said forearm-section and held in its normal position by said spring-actuated latch and provided with manually-operable means for actuating said spring-actuated latch in a direction to release
the hand.

10. An artificial arm having a forearm-section

and a hand, the wrist portion of which is hollow and perforated, a spring-actuated latch carried by said fore section, the hand being provided with a spindle to be engaged
by said spring-actuated latch, and an operating-pin for the spring-actuated latch, said pin being adapted to fit within the perforation of the hand when the latter is applied to said fore section.

11. An artificial arm including a fore section and a hand, provided with a central spindle and an eccentric-pin, the fore section being perforated to receive the spindle and pin, a spring-actuated latch adapted to engage a
peripheral notch in the said spindle, and an actuating-pin for the latch, the wrist portion of the hand being perforated to receive the head of the actuating-pin.

In testimony whereof I have hereunto set
my hand in presence of two subscribing witnesses.

JOSEPH V. BENNETT.

Witnesses:

W. A. MATLOCK,
J. N. WAYLAND.