J. S. Drake,

Artificial Leg.

No. 9,232. Patented Aug. 31, 1852.

Fig 1

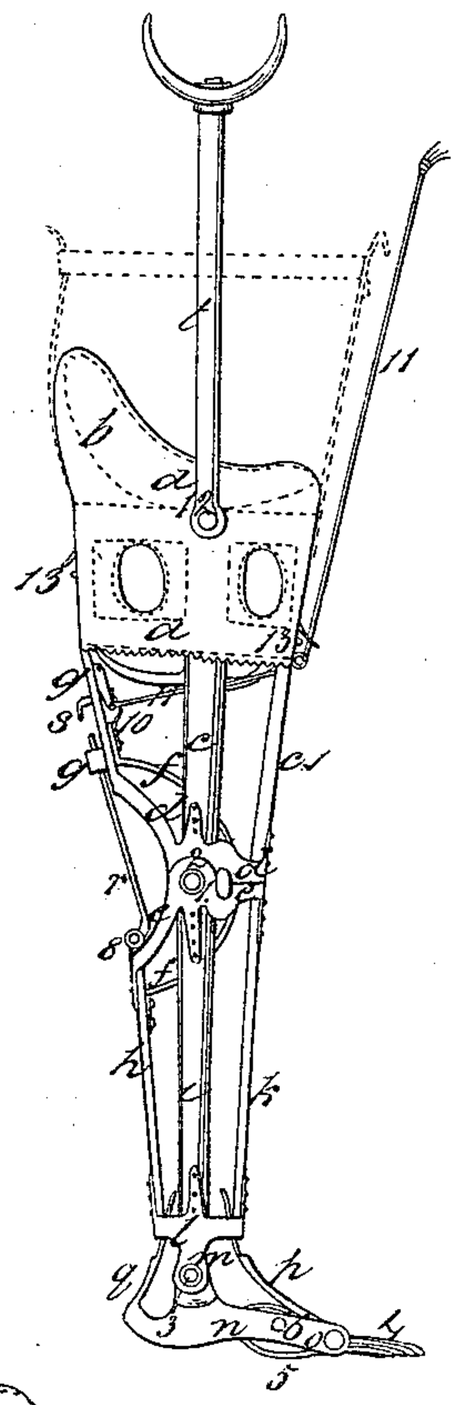


Fig. 2

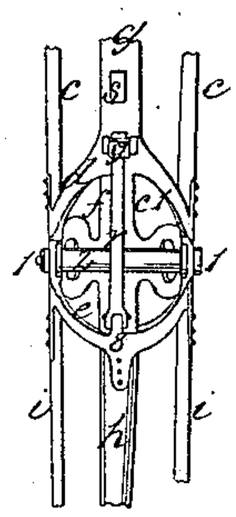


Fig. 3

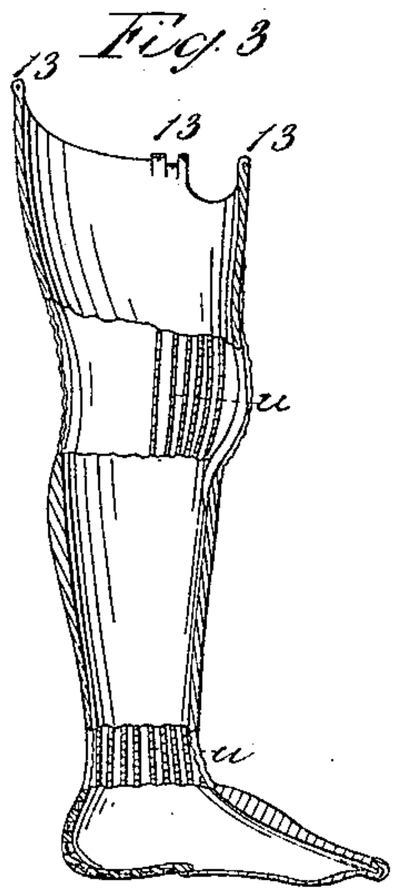


Fig. 4

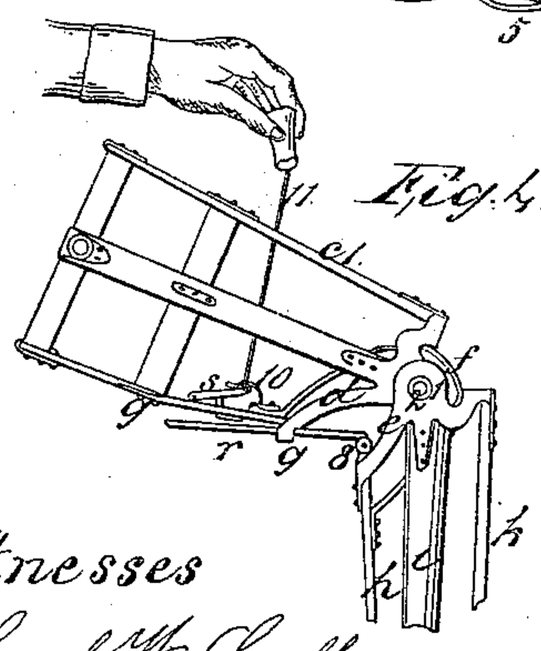


Fig. 5

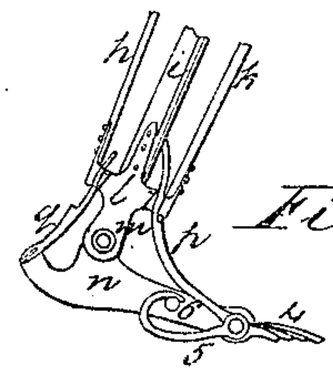
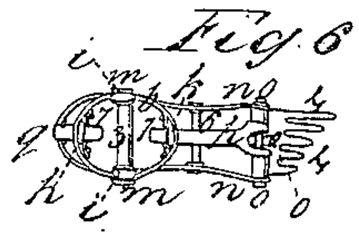


Fig. 6



Witnesses

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UNITED STATES PATENT OFFICE.

JOHN S. DRAKE, OF NEW YORK, N. Y.

ARTIFICIAL LEG.

Specification of Letters Patent No. 9,232, dated August 31, 1852.

To all whom it may concern:

Be it known that I, JOHN S. DRAKE, of the city, county, and State of New York, have invented, made, and applied to use certain new and useful Improvements in Artificial Legs, the object of which is to render the leg more secure and easy, having a more natural movement than those heretofore used; and I hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing, making part of this specification, wherein—

Figure 1, is a side elevation of the leg as with the exterior covering removed. Fig. 2, represents the back of the knee joint. Fig. 3, is a section of the external covering. Fig. 4, shows the knee as bent, when the wearer is in a sitting posture. Fig. 5, shows the foot as the leg is about to spring forward, and Fig. 6, is a plan of the skeleton foot.

The like marks of reference designate the same parts in all the figures.

The socket *a*, that incloses the stump, is made as a leather or similar covering over a frame work formed by side pieces *c*, *c*, and front piece c^1, of whalebone connected at their upper ends by two or more rings or straps within the covering of the socket. This covering is extended up on the back and outer side as shown at *b*, to take a bearing on the hip and lower part of the body and thereby relieve the stump from a portion of the weight of the wearer, and the covering of the socket *a*, is perforated to admit air to keep the stump cool. The side pieces *c*, *c*, and front piece c^1, connect on their lower ends with the upper half piece *d*, of the knee frame, which is connected to a similar lower half piece *e*, by two knuckle joints 1, on a pin 2, one joint on each side of the knee, and so formed as shown, that the circular edges of the joint bear on each other and thereby relieve the pin 2, from strain and wear in walking.

g, is a metal plate attached to the back part of the knee *d*, where it is curved up to allow of the bending of the knee see Fig. 4, and this plate *g* is attached to a piece of whalebone in the back part of the socket *a*.

f, is a bow spring one end of which is riveted on to the plate *g*, the other end being secured to the back rib *h*, of the lower part of the leg. This lower joint of the leg is formed by the piece *h*, two side pieces *i*, *i*, and a front piece *k*, of whalebone attached to the lower half *e*, of the knee joint, the lower ends being connected by a collar or ring *l*.

It will be understood by this description of the construction of the knee joint that the operation is that as the party wearing the leg, throws forward the stump the spring *f*, yields giving a movement similar to the natural knee, and the further operation of the spring brings the lower part of the leg forward in a natural manner, and on the foot taking the ground the bearing is given by the knuckle joints 2, 2, and the front parts of the knee joint *e*, and *d*, and through them onto the skeleton pieces of the leg.

The ankle joint is formed by two knuckle joints *m*, depending from the ring *l*, and moving on a pin 3. *n*, is the frame of the foot attached to the moving half of the knuckle joints *m;* this frame *n*, has a bolt or rod *o*, connecting its forward ends and forming the hinge for the toes 4, which have a spring 5 extending backward under the foot, the end being turned upward and forward. 6, is a cross rod between the parts *n*, of the foot which taking the point of the spring 5, retains the toes as shown in Fig. 5. *p* is a spring bar curved as shown one end of which is attached to the center pin *o*, the upper part passing through staple or mortise on the inside of the ring *l*, and has a stop piece to take on the under side of ring *l*, when the leg is thrown forward as shown in Fig. 5, and the shape of this spring is such that it has a constant tendency to throw the point of the foot down, it being compressed as the leg is thrown forward. *q*, is the back spring bar similar to the bar *p*, and is attached to the heel part of the frame *n*, and a stop piece on the heel allows the frame *n* to turn only a given amount on the ankle joint.

The operation of the foot in walking is that on the weight coming onto the heel the foot comes down flat on the ground, the spring 5, resting on the ground or shoe if worn holds the toes 4, down also and on the body being thrown forward and the heel raised the pin *o*, forms a center on which the foot raises until the hooked end of the spring 5, takes on the bar or rod 6, retains the toes, and the farther raising motion is at the point of the toes, with an elasticity due to the spring 5, and on the foot being raised from the ground the spring *p*, having

been compressed by the forward motion of sliding in the mortise 7, throws the point of the foot down into a natural position to take another step.

Having thus described the construction and operation of this artificial leg in walking, the next point of my improvement is in the means for bending the knee when in a sitting posture. The strength of the spring *f*, is to be such as will throw the leg forward each step, but not so much as will prevent the weight and leverage of the leg when the stump is nearly horizontal from overcoming the spring so that the lower leg hangs nearly vertical, but if no other means were employed in case of a slip the knee joint would bend back precipitating the wearer. To prevent this I place a locking bar *r*, attached by a joint 8, to the back and lower part of the knee joint passing through and guided by a staple 9, on the back part of the upper knee joint *d*. *s*, is a hook coming through a mortise in the plate *g*, from a plate set on a center pin on the back plate *g*. 10 is a spring to press the hooks *s*, outward and 11, is a cord by which the plate and hook *s* is drawn inward, this cord passes to any convenient part of the body at which the wearer can pull the same. The hook *s*, taking the end of the locking piece *r*, prevents the further bending of the knee but when this hook is drawn inward by the cord 11, the piece *r*, slides by it and the knee is bent as shown in Fig. 4.

12, is a center pin and knuckle joint on the outside of the side piece *c*, about on the line of the hip joint of the leg, to this knuckle joint is a crutch piece *t*, see Fig. 1, of a length to set up under the arm, the upper end being formed as a swivel to allow of the working of the body. This it will be seen throws part of the weight off the stump onto the arm and enables a person to feel that the leg is firmly placed before throwing his weight on it. This crutch is to be covered with suitable elastic padding and a strap around the waist together with straps from the front and rear of the leg as shown by dotted lines in Fig. 1, secure the leg to the body.

The covering which I use for this leg is shown in section in Fig. 3, and is to be made of leather or any fit substance into as near the shape of the natural leg as may be, and covered with kid or similar substance. In order to allow of the working of the knee and ankle I introduce corrugated india rubber fabric to which the kid or other covering is attached by which the form of the limb is preserved but the parts are allowed to move by the elasticity of the india rubber. This elastic india rubber fabric may also be introduced into the foot, and in Fig. 3, is shown at the parts marked *u*.

The exterior covering is made to lace up at the foot, and the skeleton leg being introduced without the foot from the top, the covering is secured at the points 13, to the skeleton. The foot is then put on and secured by the ankle pin and the covering laced up which completes the construction and attachments of the leg.

I am aware that a skeleton frame has been used of metal, but the whalebone is lighter and less liable to be affected by frost or to affect the stump by conducting power rendering the stump cold and liable to be frozen.

I do not claim the use of a spring to throw the lower part of the leg forward, but I am not aware of any straight or curved spring having been used with a skeleton knee as herein shown.

I do not claim the open skeleton to receive the stump as the ordinary wooden legs have been secured by straps and bands acting in the same manner and for the same purpose.

What I desire to secure by Letters Patent is—

1. I claim the skeleton knee pieces *d*, and *e*, in combination with the spring *f*, attached at its ends to the upper and lower parts of the leg as described and shown.

2. I claim the arrangement of the spring toes 4, on their center *o*, kept down by the spring 5, as described and shown.

3. I claim the locking piece *r*, and hook *s*, to allow of the bending of the leg as described and shown.

In witness whereof I have hereunto set my signature this nineteenth day of July one thousand eight hundred and fifty-two.

JOHN S. DRAKE.

Witnesses:

LEMUEL W. SERRELL,

CHARLES TENCELLENT.