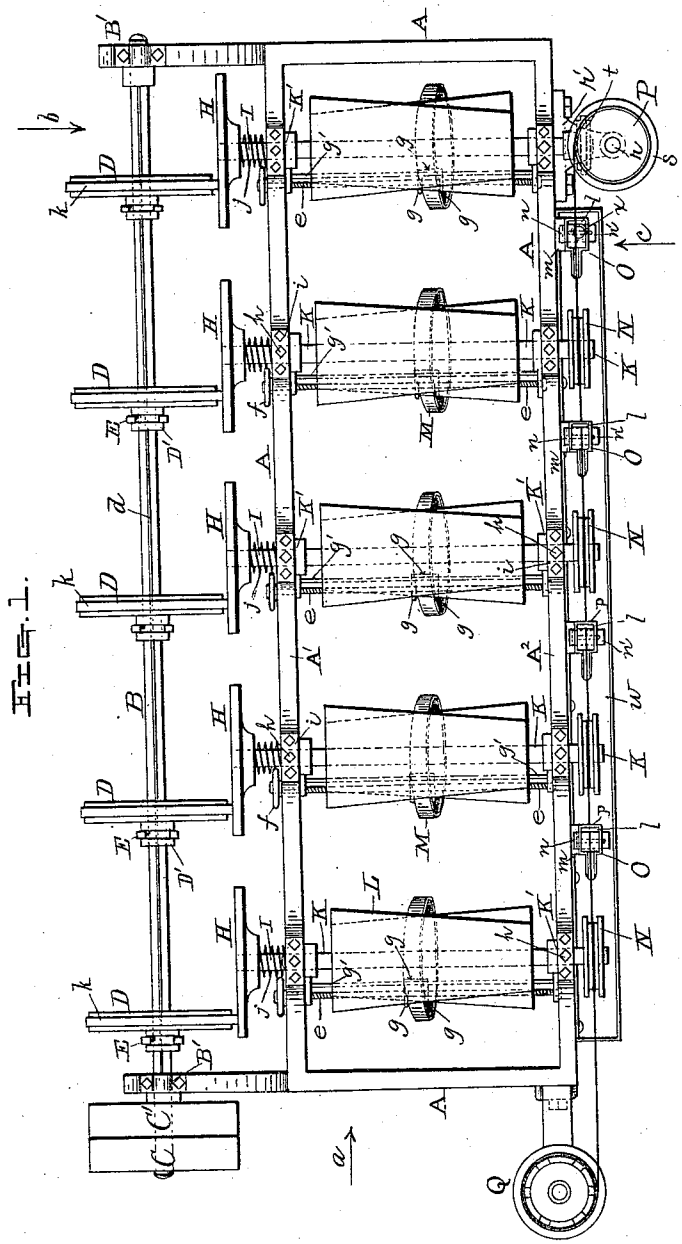
(No Model.) 2 Sheets—Sheet 1.

H. SMITH.

WIRE DRAWING MACHINE.

No. 396,437. Patented Jan. 22, 1889.

Fig. 1.



Witnesses;

Walter B. Nourse.

Forrest C. Wasson.

Inventor;

Herbert Smith.

By A. A. Barker. Atty.

N. PETERS. Photo-Lithographer. Washington, D. C.

(No Model.) 2 Sheets—Sheet 2.

H. SMITH.

WIRE DRAWING MACHINE.

No. 396,437. Patented Jan. 22, 1889.

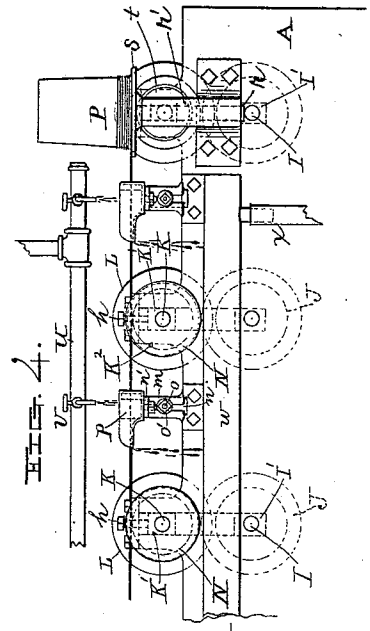


Fig. 4.

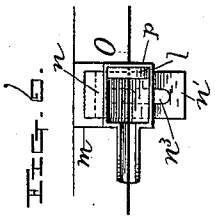


Fig. 6.

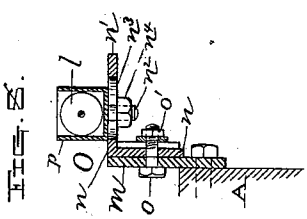


Fig. 8.

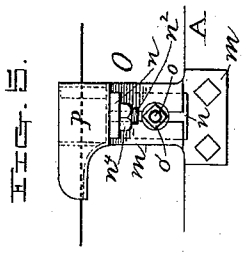


Fig. 5.

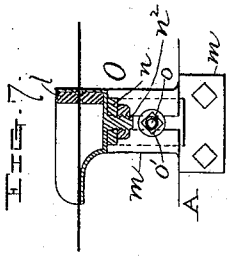


Fig. 7.

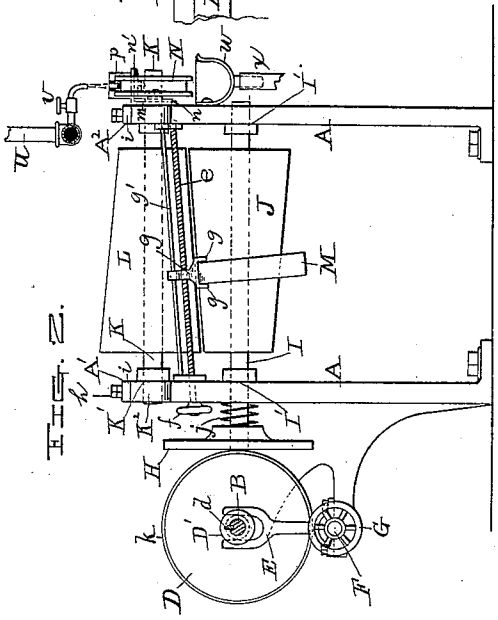


Fig. 2.

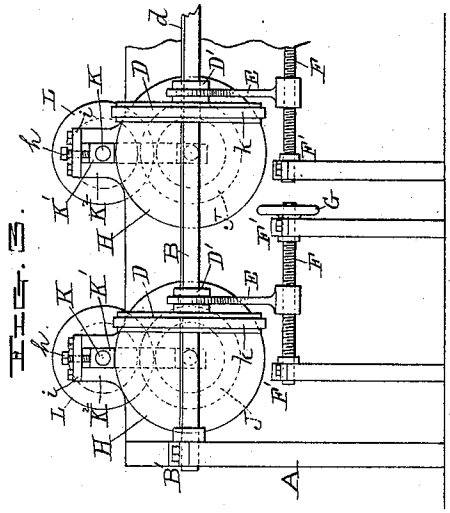


Fig. 3.

Witnesses;

Walter B. Nourse

Forrest C. Wesson.

Inventor;

Herbert Smith.

By A. A. Barker. Att'y.

N. PETERS. Photo-Lithographer. Washington. D. C.

UNITED STATES PATENT OFFICE.

HERBERT SMITH, OF WORCESTER, MASSACHUSETTS.

WIRE-DRAWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 396,437, dated January 22, 1889.

Application filed November 7, 1888. Serial No. 290,185. (No model.)

To all whom it may concern:

Be it known that I, HERBERT SMITH, of the city and county of Worcester, and State of Massachusetts, have invented certain new and useful Improvements in Wire-Drawing Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 represents a plan view of a wire-drawing machine embodying my improvements. Fig. 2 is an end view thereof with the driving-pulleys, as well as wire reel and block, left off, looking in the direction of arrow *a* in Fig. 1. Fig. 3 is a side view of one end of the back of the machine looking in the direction of arrow *b* in Fig. 1. Fig. 4 is a side view of one end of the front of the machine looking in the direction of arrow *c* in Fig. 1; and Figs. 5, 6, 7, and 8 are a front view, plan, central longitudinal section, and central transverse section, respectively, of the die holder or support.

My invention relates to improvements in wire-drawing machines having a series of dies, through which the wire is drawn and reduced several sizes by a continuous operation; and it consists in the construction, arrangement, and combination of parts hereinafter specified, whereby the above result is effected, the essential feature being to produce a machine which shall run smoothly with the least possible vibratory motions, as and for the purpose hereinafter more fully set forth.

Following is a detailed description of my said invention with reference to the accompanying drawings, enabling others to fully understand the nature and purpose thereof.

The various parts marked A represent the main frame-work of the machine, made in practice of the proper shape to support the various operating parts.

B is the main driving-shaft, fitted to turn in suitable bearings, B′ B′, in frame A, and having at one end the fast and loose pulleys C C′, which may in practice be connected, as usual, with any suitable driving mechanism. Upon said main shaft B are mounted a series of friction-disks, D—five in this instance—whose hubs D′ engage with the upper ends of clutch-levers E, arranged in this instance under each hub. The lower ends of said clutch-levers are fitted over horizontal longitudinal threaded shafts F, one for each clutch-lever, and fitted to turn in suitable stationary bearings, F′ F′. Said threaded shafts are held against longitudinal movement in their bearings, and are turned by means of a hand-wheel, G, on the end of each shaft.

The disks D are fitted to slide longitudinally on the shaft B, but are held against rotary motion thereon by means of the feather-key *d*, which is preferably extended the whole length of the shaft between its bearings. Said disks D engage with a series of disks, H, arranged at right angles to and upon a line horizontally therewith. The latter disks, H, are mounted on the outer ends of a series of horizontal shafts, I, arranged at right angles to the shaft B and fitted to turn in suitable stationary bearings, I′ I′, in frame A. Upon said shafts I, between the side frames, A′ A², of frame A, are mounted the friction-cones J, and above said friction-cones are mounted, on shafts K, similar friction-cones, L, the cones being arranged in a series of pairs in line horizontally lengthwise of the machine, with the cones of each pair beveled in opposite directions, as is illustrated in Figs. 1 and 2, and at sufficient distance apart to admit a friction-belt, M, between them, the purpose of thus interposing the belts M between the cones being to admit of imparting a varying speed from the bottom to the upper cone of each pair by moving the belts longitudinally from one point to another on the peripheries of said cones. Said operation may be performed by means of any suitable and convenient shipping device. In this instance said result is effected in the following manner: Between the cones of each pair, at one side and parallel to the axes thereof, is arranged a transverse threaded rod, *e*, fitted to turn in suitable bearings at each end in frame A, but held against longitudinal movement therein. Each of said rods is provided with a hand-wheel, *f*, whereby the same may be turned, and a forked belt-carrier, *g*, engaging with the belt, is also fitted to travel over each rod between the bearings thereof, the same being provided with a transverse-threaded opening to receive the threaded rod and with a smooth opening to receive a smooth holding and

guide rod, g', secured at the ends in frame A, at one side of and parallel to the threaded rod, the purpose of said rod g' being to hold the belt-carrier against rotary motion on the threaded rod, so that when the latter is turned said carrier will be moved along the same in one direction or the other, according to which way its hand-wheel f is turned. The belt M is thereby moved with it, and in consequence changes the speed of the upper cone, it being increased by moving the belt toward the smaller end of said upper cone and decreased by reversing said movement. The top cones are fitted to turn in adjustable bearings K′, fitted to slide vertically in suitable housings, K^2. Said top cones rest upon the bottom cones, with the belts M between them, and additional downward pressure may be applied when required by means of vertical holding-screws h, which may be turned down against the tops of the adjustable bearings K′. Said screws are fitted to turn in cap-plates i, fastened to the tops of housings K^2. A constant pressure is imparted to keep the faces of the disks H against the peripheries of the disks D by means of suitable springs, j—in this instance fitted over the shafts I between the side frame A′ and the hubs of disks H. If desired, any other suitable spring device may be used to effect the same result.

The frictional power of the disks D against the disks H may be augmented by providing said disks D with leather bearing-faces k, as is best shown in Fig. 1. Upon the outer ends of the shafts K, opposite to the disks H on shafts I, are mounted the flanged drawing-through pulleys N, around which the wire is wound one or more turns in its passage through the machine, as is usual in other machines of this class. Between said drawing-through pulleys and in a horizontal line therewith are arranged the reducing-dies l, which are held in position in the adjustable holders O, fastened to frame A. Said die-holders are constructed in the following manner:

A plate, m, having a vertical holding-slot in its front side, is secured to frame A, and in said slot is fitted an angle-plate, n, having a horizontal arm, n', extending out laterally from the machine, as is best shown in Fig. 8. Said plate n may be adjusted vertically in the holding-slot of plate m and fastened, after adjustment, by means of a set-screw, o, and nut o', the screw being passed transversely through the plates. Upon the horizontal arm n' is adjustably fastened the open box or receptacle p, in the front end of which the die l is placed against the vertical end thereof, as is shown in Fig. 7. The opposite or rear end of said die-receptacle is made trough-shaped, with the bottom of the trough just below the level of the wire. It is made adjustable on the arm by forming a vertical screw-stud, n^2, on its under side, which passes through a slot, n^3, in the arm n', and is fastened, after adjustment, by the nut n^4, said slot n^3 admitting of its being moved laterally toward and from the machine to bring the die-opening in the required position. By thus constructing the die-holders O it is obvious that the dies l may be readily adjusted either vertically or laterally, so as to bring said dies in any desired position, thus admitting of the size of the drawing-through pulleys being varied to suit different requirements. The wire-drawing block P is preferably arranged vertically, and its shaft r is fitted to turn in a suitable bearing, r', extending out from frame A. The base s of said block rests upon the vertical disk t, secured to one of the shafts K, coming in line therewith, and the block is driven thereby; otherwise the arrangement for driving and regulating said block is the same as that employed for driving and regulating the drawing-through pulleys N, as will be observed by the drawings. The wire is supplied to the machine from a reel, Q, and is drawn forward therefrom through the various dies to gradually reduce it in size by the block P and drawing-through pulleys N in like manner to other similar machines. It may be supplied with a proper lubricating-fluid in passing through said reducing operation by arranging a main supply-pipe, u, having suitable branches and shut-off cocks, v, over the die-holders, adapted to discharge said lubricant over the wire just prior to its passing through the die. Said main pipe u may in practice be connected with any suitable reservoir or other means for supplying the same with the lubricating-fluid. As said fluid flows out of the die-receptacles p it enters a stationary trough, w, arranged under said receptacles, and from thence it is in turn discharged through the waste-pipe x, which may in practice be connected with a suitable receiving tank or receptacle.

The lubricating-fluid may be used over and over, if desired, by combining a suitable force-pump with said receiving tank or receptacle for forcing said fluid back into the supply reservoir or pipes. My invention, however, has no relation thereto, and it is consequently not illustrated.

By constructing a wire-drawing machine as hereinbefore described I am enabled, as will be seen, to adjust the speed of the shafts I K by means of the friction-disks D H, and also the wire-drawing pulleys N and block P, by the friction-cones J L and belt M, so as to vary their speed to a nicety, the shafts being adjusted independently of the wire-drawing pulleys, and each shaft and pulley independent of the other. Being thus enabled to exactly adjust the various parts, and all the parts being driven by frictional power rather than gearing, the wire is drawn through the machine in a very smooth and even manner, without any jerks or vibratory movements, and in consequence a superior quality of wire is produced, especially in treating the finer grades, for which this machine is more especially designed.

I am aware that it is not broadly new to

obtain a varying speed or adjustment by means of a pair of friction-disks, as D H. Neither is it new to effect the same result by means of friction-cones and a belt placed between them, as J, L, and M, and I therefore limit my invention to the combination thereof with the other parts of my improved machine, as set forth in the claims.

Having now fully described said machine, what I claim therein as new, and desire to secure by Letters Patent, is—

1. In a wire-drawing machine, the combination of a series of adjustable rotary friction driving-disks and a series of rotary friction-driven disks driven at varying speeds from the first-named disks, with a series of friction-cones on the same shafts as the friction-driven disks, a series of friction-cones driven at varying speeds from the first-named cones through the medium of a series of adjustable belts arranged one between each pair of cones of the series, a series of drawing-through pulleys, and the wire-drawing block, said pulleys being on the same shafts as the driven cones and the block on an independent shaft driven in turn from the shaft of one of said driven cones, all having suitable supports, as well as constructed and arranged for operation substantially as and for the purpose set forth.

2. In a wire-drawing machine, the combination of a series of adjustable rotary disks and a series of rotary disks driven at varying speeds from the first-named disks, with a series of friction-cones on the same shafts as the driven disks, a series of friction-cones driven at varying speeds from the first-named cones through the medium of a series of adjustable belts arranged one between each pair of cones of the series, a series of drawing-through pulleys, and the wire-drawing block, said pulleys being on the same shafts as the driven cones and the block on an independent shaft driven in turn from the shaft of one of said driven cones, a series of adjustable die-holders, and the dies, all having suitable supports, as well as constructed and arranged for operation substantially as and for the purpose set forth.

3. In a wire-drawing machine, the combination of the adjustable rotary friction driving-disks D, mounted on and keyed to driving-shaft B so as to slide but not turn thereon, and having means for moving each independently on said driving-shaft, with the rotary friction-driven disks H, mounted on shafts arranged at right angles to shaft B and having means for forcing said disks H against disks D, friction-cones J L, the cones J on the same shafts with disks H and cones L on shafts parallel to said first-named shafts, adjustable friction-belts M, interposed between the peripheries of each pair of cones J L and having means for moving the same laterally between the ends of the cones, the drawing-through pulleys N, and block P, said pulleys mounted on the same shafts as the friction-driven cones L, and the block on an independent shaft driven from one of the shafts of said driven cones, the stationary adjustable die-holders O, arranged between the drawing-through pulleys, in line therewith, the dies *l*, held in position in said die-holders, suitable means for supplying the lubricating-fluid to said dies and for discharging or carrying off the waste, a suitable reel for holding the wire as it is drawn forward into the machine, and suitable means for supporting the various parts, substantially as and for the purpose set forth.

4. In a wire-drawing machine, the combination of the adjustable rotary friction driving-disks D, mounted on and keyed to driving-shaft B so as to slide but not turn thereon, and having means for moving each independently on said driving-shaft, with the rotary friction-driven disks H, mounted on shafts arranged at right angles to shaft B and having means for forcing said disks H against disks D, friction-cones J L, the cones J on the same shafts with disks H and cones L on shafts parallel to the first-named shafts, adjustable friction-belts M, interposed between the peripheries of each pair of cones J L and having means for moving the same laterally between the ends of the cones, and the drawing-through pulleys mounted on the same shafts as the driven cones L, substantially as and for the purpose set forth.

5. In a wire-drawing machine, a die-holder comprising, in combination, the vertical plate *m*, having a vertical holding-slot in its front side and secured to a stationary support, the angle-plate *n*, adjustably fastened in the slot in said plate *m* and having the horizontal arm *n'*, provided with the vertical slot n^3, and the die-receptacle *p*, adjustably fastened to said arm *n'*, substantially as set forth.

6. In a wire-drawing machine, the combination of the die *l* with a die-holder, O, consisting of a stationary holding-plate, *m*, an angle-plate, *n*, adjustably fastened to said plate *m*, and a receptacle, *p*, in turn adjustably fastened to plate *n*, substantially as set forth.

HERBERT SMITH.

Witnesses:
A. A. BARKER,
W. B. NOURSE.