

No. 687,257.

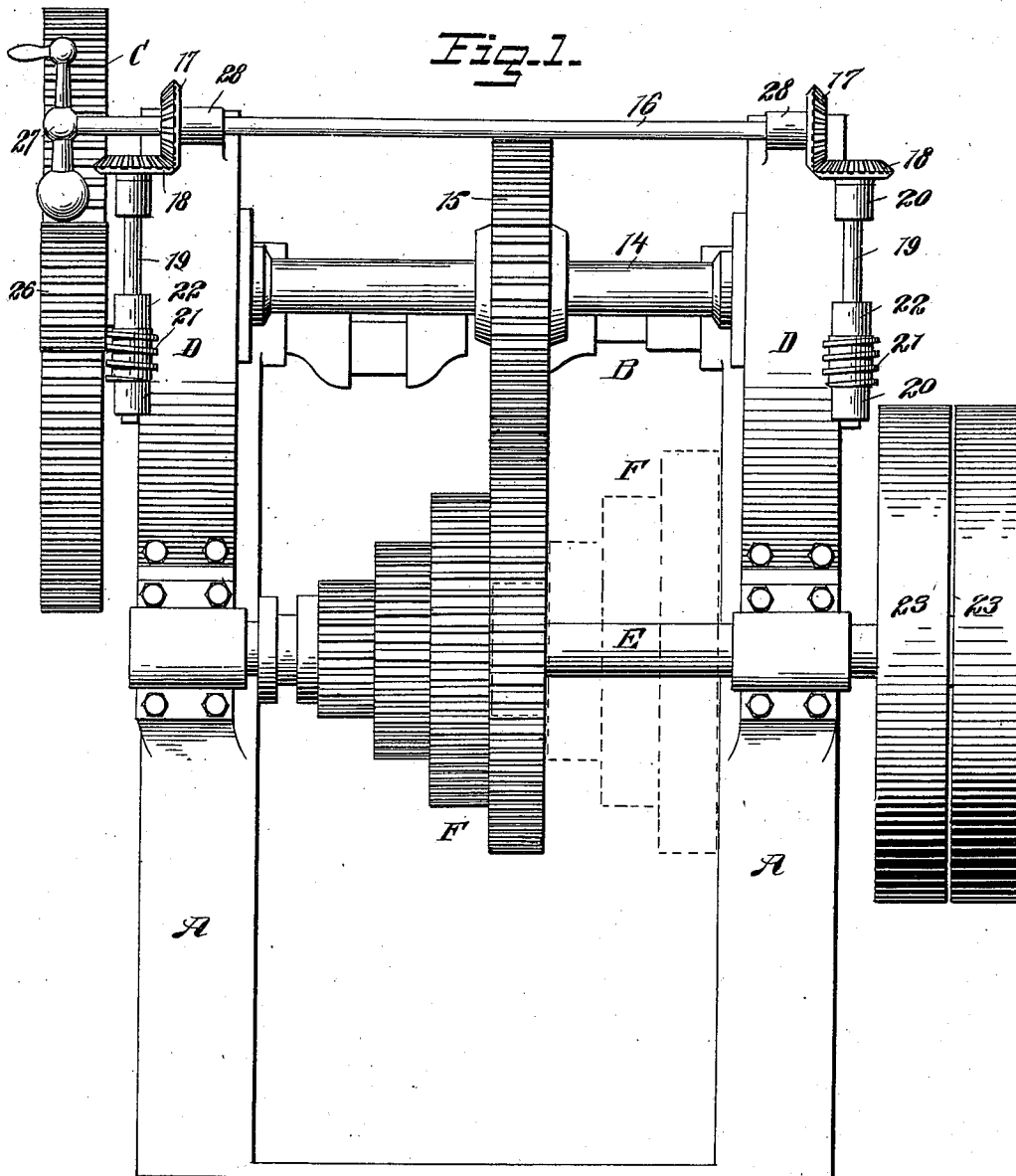
Patented Nov. 26, 1901.

C. O'CONNOR & G. C. AHRENS.
DEVICE FOR REGULATING SPEED.

(Application filed Mar. 18, 1901.)

(No Model.)

5 Sheets—Sheet 1.



WITNESSES:

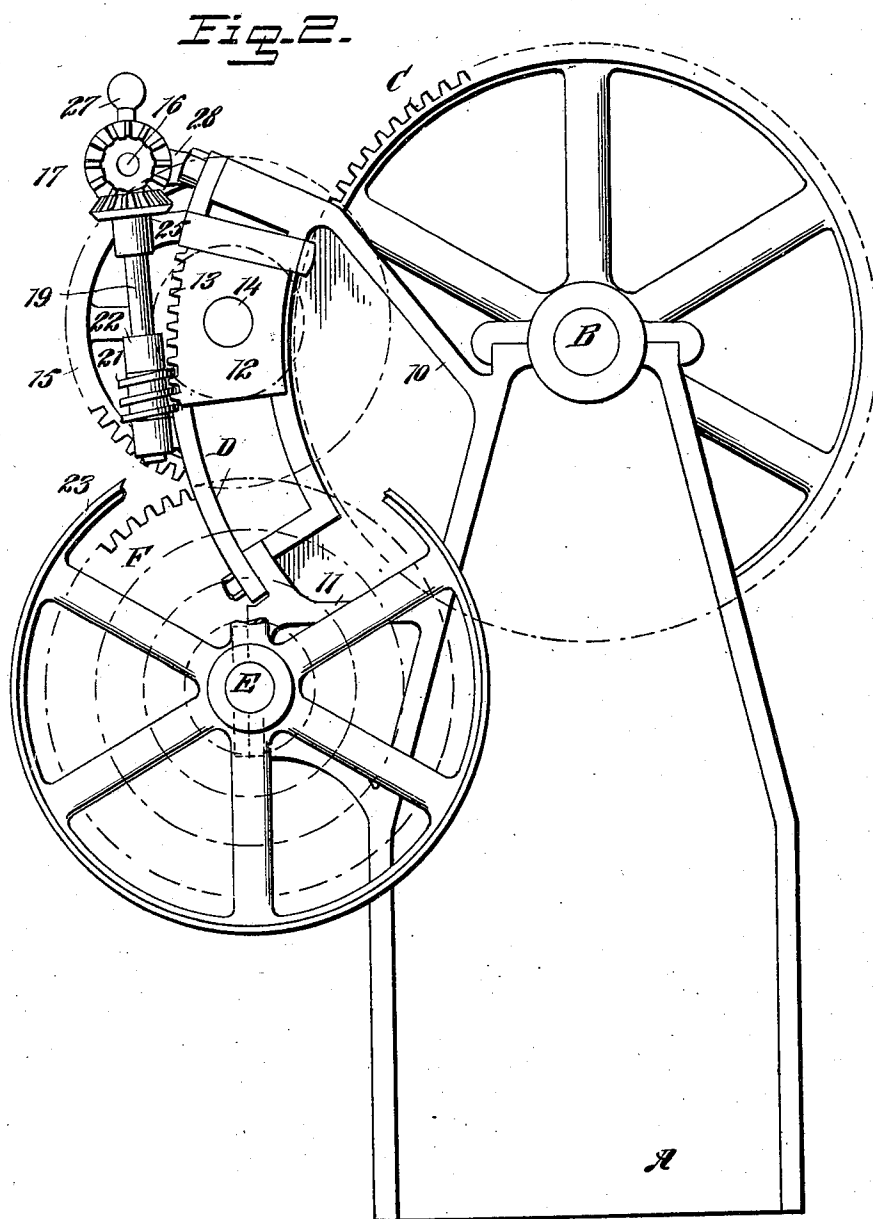
James F. Duhamel
John A. Stokes

INVENTORS
Charles O'Connor
George C. Ahrens
BY *Mumford*
ATTORNEYS

Patented Nov. 26, 1901.

(Application filed Mar.. 18, 1901.)

5 Sheets—Sheet 2.



James F. Duhamel
J. F. Duhamel

INVENTORS
Charles O'Connor
George C. Ahrens
BY 
ATTORNEYS

No. 687,257.

Patented Nov. 26, 1901.

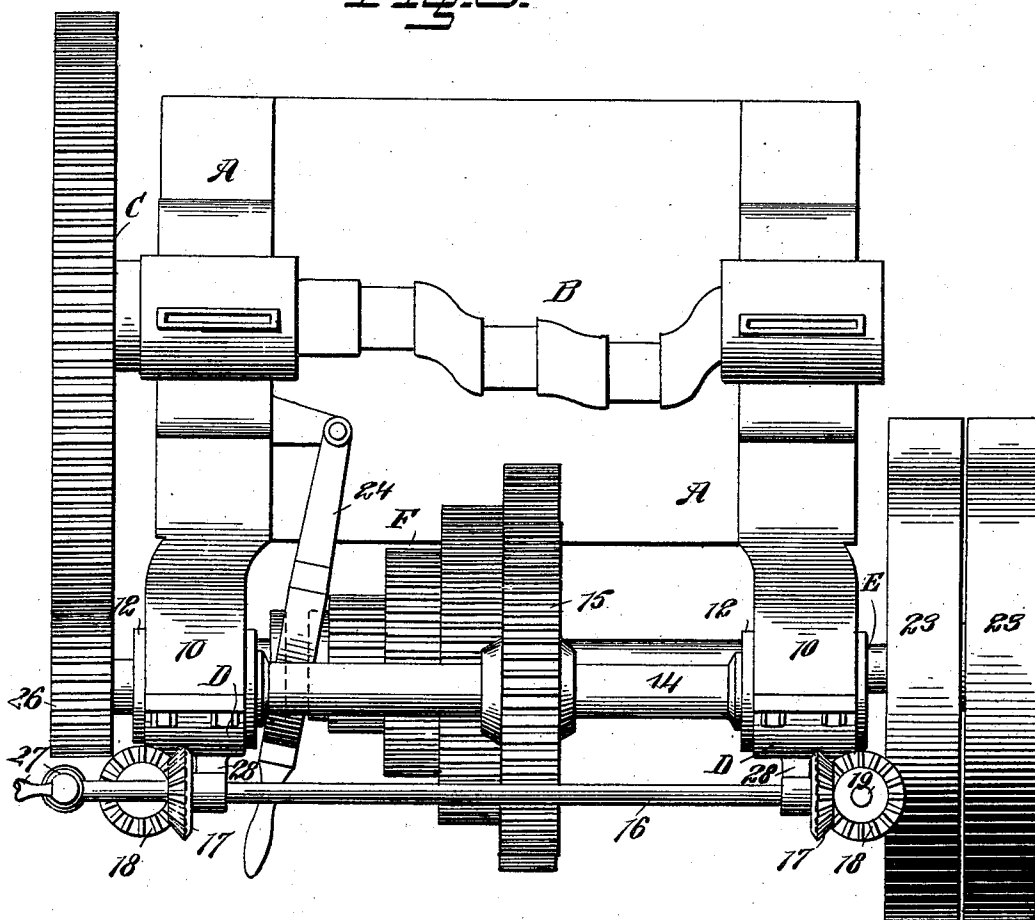
C. O'CONNOR & G. C. AHRENS.
DEVICE FOR REGULATING SPEED.

(Application filed Mar. 18, 1901.)

(No Model.)

5 Sheets—Sheet 3.

Fig. 3.



WITNESSES:

James F. Duhamel
John A. Ocker

INVENTORS

Charles O'Connor
George C. Ahrens

BY

Mumford
ATTORNEYS

No. 687,257.

Patented Nov. 26, 1901.

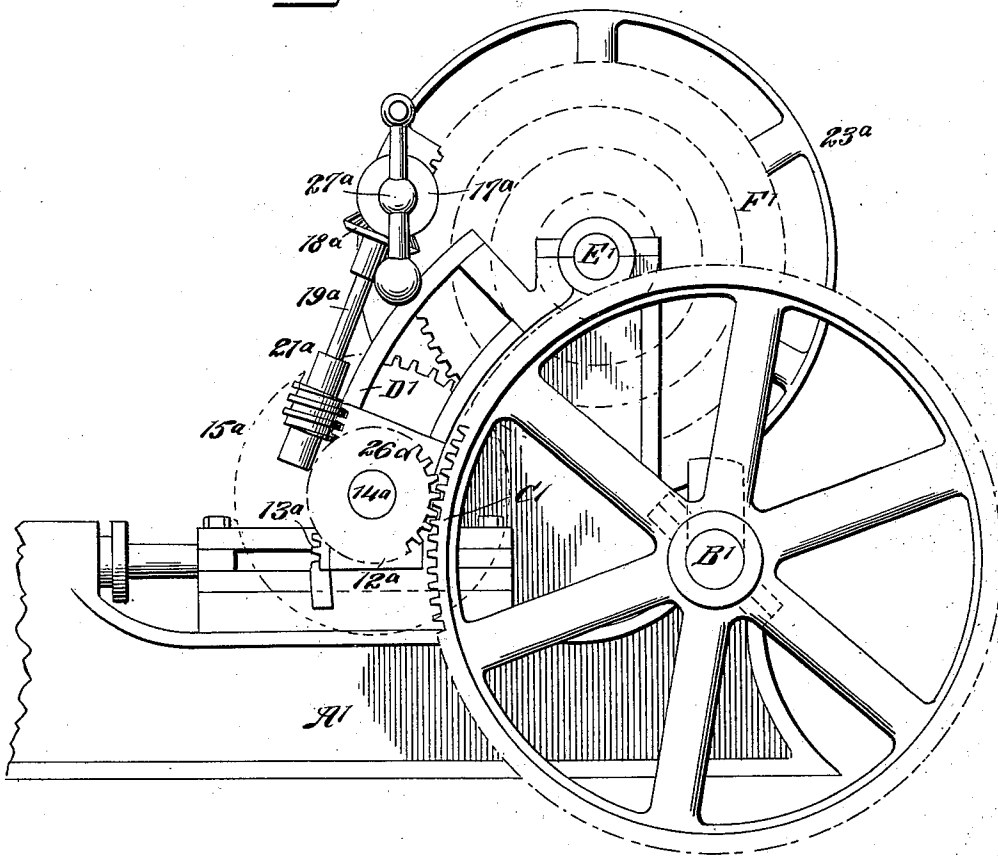
C. O'CONNOR & G. C. AHRENS.
DEVICE FOR REGULATING SPEED.

(Application filed Mar. 18, 1901.)

(No Model.)

5 Sheets—Sheet 4.

Fig. 4.



WITNESSES:

James F. Duhamel
George C. Ahrens

INVENTORS
Charles O'Connor
George C. Ahrens
BY *Munn*
ATTORNEYS

No. 687,257.

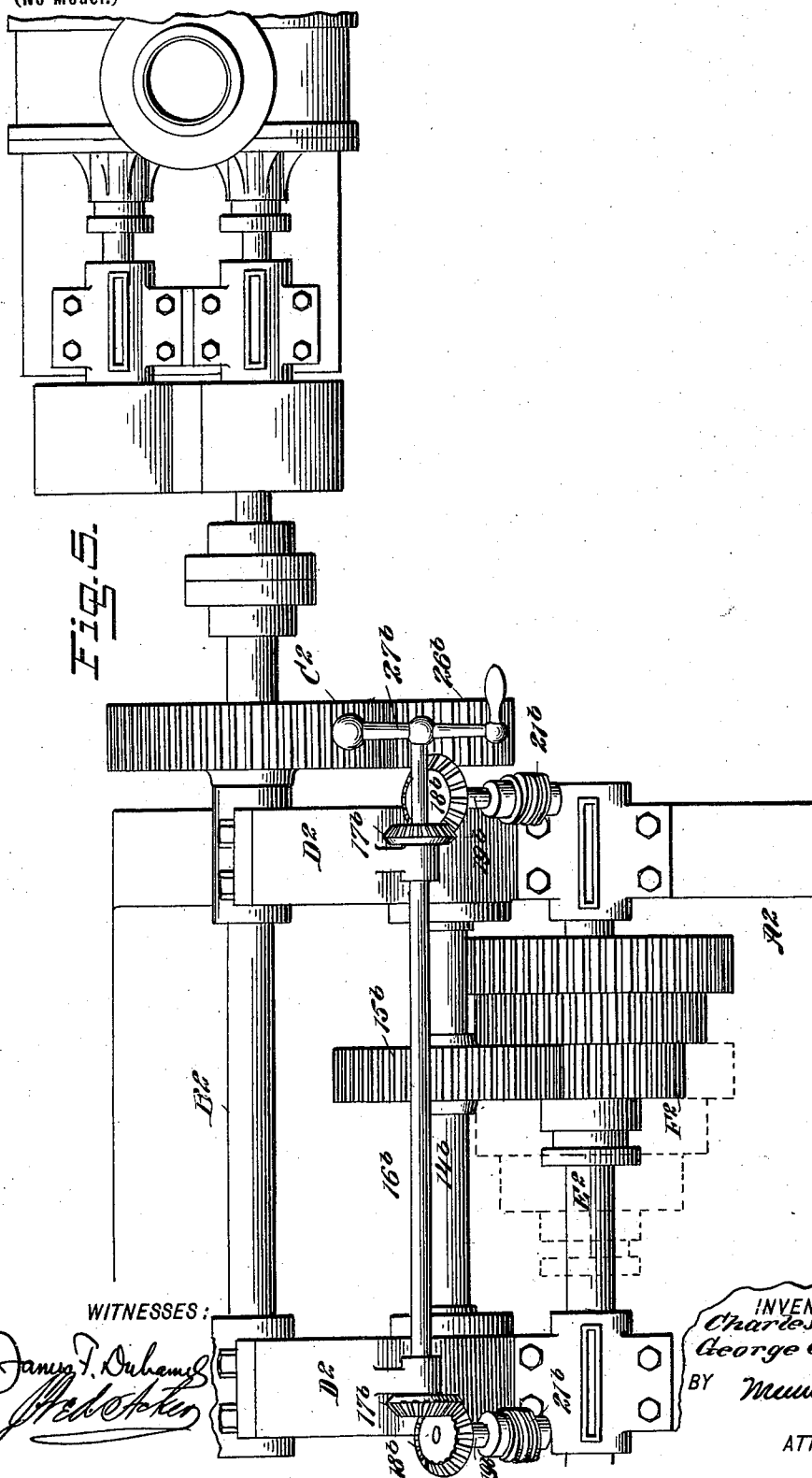
Patented Nov. 26, 1901.

C. O'CONNOR & G. C. AHRENS.
DEVICE FOR REGULATING SPEED.

(Application filed Mar. 18, 1901.)

5 Sheets—Sheet 5.

(No Model.)



WITNESSES:

James F. O'Connell
George C. Ahrens

INVENTORS
Charles O' Connor
George C. Ahrens
BY *Mumford*
ATTORNEYS

UNITED STATES PATENT OFFICE.

CHARLES O'CONNOR AND GEORGE C. AHRENS, OF NEW YORK, N. Y.

DEVICE FOR REGULATING SPEED.

SPECIFICATION forming part of Letters Patent No. 687,257, dated November 26, 1901.

Application filed March 18, 1901. Serial No. 51,684. (No model.)

To all whom it may concern:

Be it known that we, CHARLES O'CONNOR, a resident of New York, (Greenpoint, borough of Brooklyn,) in the county of Kings, and
5 GEORGE C. AHRENS, a resident of New York, (Blissville, borough of Queens,) in the county of Queens and State of New York, citizens of the United States, have invented a new and Improved Device for Regulating Speed, of
10 which the following is a full, clear, and exact description.

Our invention relates to devices for regulating the speed of machinery, being especially adaptable to power-pump machinery.

15 The purpose of the invention is to provide a simple mechanism for changing or regulating the speed of power machinery without changing the diameter of the driving-pulley or interfering with said pulley or the driving-
20 belt in any manner.

A further purpose of the invention is to provide a device for regulating speed capable of ready adaptation to all manner of pumps.

25 The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification,
30 in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a front elevation of the device shown applied to the frame of a vertical form of power-pump. Fig. 2 is a side elevation of
35 the device applied to a vertical type of power-pump, and Fig. 3 is a plan view of the device applied to the same form of power-pump. Fig. 4 is a side elevation of the device applied to the frame of a horizontal type of power-
40 pump, and Fig. 5 is a plan view of the device applied to a rotary form of power-pump.

A represents a portion of the frame of an upright power-pump, B represents the pump-shaft, and C a large gear-wheel which is se-
45 cured to one end portion of the said pump-shaft. Preferably at the front of each side of the said frame A, at or near the top, arms 10 and 11 are carried outward, one arm upward and the other more or less downward, as
50 shown in Fig. 2, and each pair of arms 10 and 11 serves to support a hollow segmental casing D, the arc upon which the casing is con-

structed being taken from the center of the pump-shaft B. In each casing D a journal-box 12 is mounted to travel, and these boxes 55 extend beyond the outer faces of the casing D and have their forward or convex edges at their extended portions provided with series of teeth 13, as is best shown in Fig. 2. These boxes 12 serve to journal a driven
60 shaft 14, which when the device is applied to the vertical form of pump is located in front of the pump-shaft B. The driven shaft 14 is provided within the frame with an attached gear 15, as is best shown in Fig. 1, and at one
65 outer end of the said driven shaft 14 a pinion 26 is secured, which pinion meshes with the teeth of the large gear C on the pump-shaft B, as is also best shown in Fig. 1.

The driven shaft 14 is raised and lowered 70 on the arc of a circle usually by means of the following mechanism: A shaft 16 is journaled in suitable bearings 28, attached to the casings D, and this shaft 16 is provided with a handle 27 at one end and with beveled gears 75 17 near its ends. These bevel-gears 17 mesh with bevel-gears 18, and the bevel-gears 18 are carried by suitable shafts 19, journaled in suitable bearings attached to the front of the casings D. Each shaft 19 is provided with 80 a worm-thread 21, which worm-threads mesh with the teeth 13 on the journal-boxes 12. Thus by turning the shaft 16 the journal-boxes 12 are raised and lowered, yet the pinion 26 always remains in mesh with the large gear 85 C on the pump-shaft. Each vertical shaft 19 is preferably provided with a collar 22 above its worm-thread, as shown in Fig. 2; but we desire it to be understood that the construction just described may be varied in many 90 particulars.

The main drive-shaft E is journaled in suitable bearings attached to the front of the frame A, and this drive-shaft E is provided at one of its ends with fast and loose pulleys 95 23, as shown in Figs. 1, 2, and 3. A cone of gears F is mounted to slide on the drive-shaft E within the casing A, yet turn with the said shaft, and this cone of gears F is shifted on the drive-shaft through the medium of a suit- 100 able lever 24. (Illustrated in Fig. 3.) The gear 15 on the driven shaft 14 is adapted to mesh with any one of the series of gears constituting the cone of gears F. Thus it will

be observed that when the driven shaft 14 is raised through the medium of the adjusting mechanism described the cone of gears F can be shifted on the drive-shaft, so as to bring
 5 any one of the gears constituting such cone in alinement with the gear 15 on the driven shaft, and that when the driven shaft 14 is adjusted downward its gear 15 will mesh with the desired gear on the drive-shaft, and the
 10 speed communicated from the drive-shaft to the pump-shaft will be increased or decreased without removing the driving-belt from the driving-pulley and that the driving-pulley will at all times be of the same diameter, thus
 15 utilizing the full power of the driving-belt.

In Fig. 4 we have illustrated the application of the device to a horizontal form of pump in which the frame is designated as A'. In this construction of pump the drive-shaft E' is journaled in suitable bearings above the pump-shaft B', which latter shaft is provided with a large gear C' at one end, meshing with a pinion 26^a on the end of a driven shaft 14^a, which driven shaft in this instance is below
 25 the drive-shaft E'. This driven shaft 14^a is mounted in boxes 12^a, provided with teeth 13^a, and the boxes are held to slide in segmental casings D'. The same adjusting mechanism for the driven shaft 14^a is shown
 30 applied to the horizontal form of the pump, comprising a shaft having a handle 27^a attached at one end, the said shaft being provided with bevel-gears 17^a near its ends, which mesh with bevel-gears 18^a, which are secured
 35 to worm-shafts 19^a, the worms 21^a of which shafts mesh with the teeth of the boxes 12^a. The driven shaft 14^a is likewise provided between its ends with a large gear 15^a, and as the driven shaft 14^a is adjusted this large
 40 gear 15^a is adapted to mesh with any one of a series of gears forming a conical set of gears F', mounted upon and to turn with the drive-shaft E', the said drive-shaft E' being provided with fast and loose driving-pulleys 23^a.
 45 In regulating the speed the driven shaft 14^a is adjusted to or from the drive-shaft E', as has been stated, so as to bring the gear 15^a into mesh with any one of the gears in the conical set of gears F'.

In Fig. 5 we have illustrated the adaptation of the device to a rotary form of pump in which the pump-shaft is designated as B² and the frame as A². The pump-shaft B² is provided with a large gear C², which meshes
 55 with a pinion 26^b, carried by a driven shaft 14^b, journaled in toothed bearing-boxes mounted to slide in segmental casings D², attached to the pump-frame. These boxes are moved up and down in the segmental casings by a
 60 shaft 16^b, suitably mounted on the frame, provided with a handle 27^b at one end and with bevel-gears 17^b at or near its ends, which bevel-gears 17^b mesh with corresponding gears 18^b, located on worm-shafts 19^b, the worms
 65 21^b of which engage with the teeth of the boxes provided for the driven shaft 14^b. The driven shaft 14^b is movable to or from a drive-

shaft E², on which a series of gears F², arranged in conical form, are mounted to turn and slide, suitable shifting mechanism being
 70 employed, so that any one of the gears F² in the conical set may be brought into mesh with the gear 15^b, secured on the driven shaft at a point between its ends.

The device is exceedingly simple. It is
 75 adaptable to any form of pump and to other machinery, and through its medium the speed may be changed or regulated without touching the driving-belt or changing the diameter of the driving-pulley employed.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. In devices for regulating the speed of machinery, a drive-shaft, a cone of gears
 85 mounted to slide upon and turn with the drive-shaft, a driven shaft, a worm-gear for adjusting one shaft to and from the other, and a gear carried by the driven shaft and adapted to mesh with any gear in the cone of
 90 gears, as set forth.

2. In devices for regulating the speed of machinery, the combination, with a drive-shaft, a cone of gears mounted to slide upon and turn with the said drive-shaft, and a belt-
 95 pulley carried by the drive-shaft, of a driven shaft parallel with the drive-shaft, boxes for the driven shaft mounted to slide in an arc of a circle, adjusting devices for the boxes, and a gear secured upon the driven shaft and
 100 adapted to mesh with any gear in the cone of gears.

3. The combination, with a drive-shaft and the main driving-shaft of a power-machine, a cone of gears mounted to turn with and slide
 105 upon the first-named drive-shaft, and a gear secured upon the said main shaft, of boxes, segmental guides for the boxes, the center of the arc upon which the guides are struck being the center of the said main driving-shaft,
 110 adjusting devices for the boxes, a driven or intermediate shaft mounted in the boxes, a pinion carried by the driven or intermediate shaft, which pinion meshes with the gear on the said main driving-shaft for the power-
 115 machine, and a gear secured upon the driven or intermediate shaft, adapted in the adjustment of the shaft to mesh with any gear in the cone of gears.

4. The combination, with the frame of a
 120 power-machine, the main driving-shaft for the said machine, which main driving-shaft is provided with a gear at one of its ends, segmental guides located on the said frame, the center of the arc upon which the guides are
 125 struck being the center of the said main driving-shaft, and devices for adjusting the said boxes in the guides, of a drive-shaft provided with a belt-pulley, a cone of gears mounted to slide upon and turn with the drive-shaft,
 130 a shifting device for the cone of gears, a driven or intermediate shaft mounted in the said boxes, a pinion at one end of the said intermediate or driven shaft, which pinion meshes with

the gear on the main driving-shaft and is in constant mesh therewith, and a gear secured to the intermediate or driven shaft, which gear in the adjustment of the said shaft is adapted to mesh with any gear in the cone of gears, for the purpose set forth.

In testimony whereof we have signed our

names to this specification in the presence of two subscribing witnesses.

CHARLES O'CONNOR.
GEORGE C. AHRENS.

Witnesses:

C. F. C. HAWKINS,
F. L. R. SWEET.