(No Model.) 2 Sheets—Sheet 1.

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No. 365,250. Patented June 21, 1887.

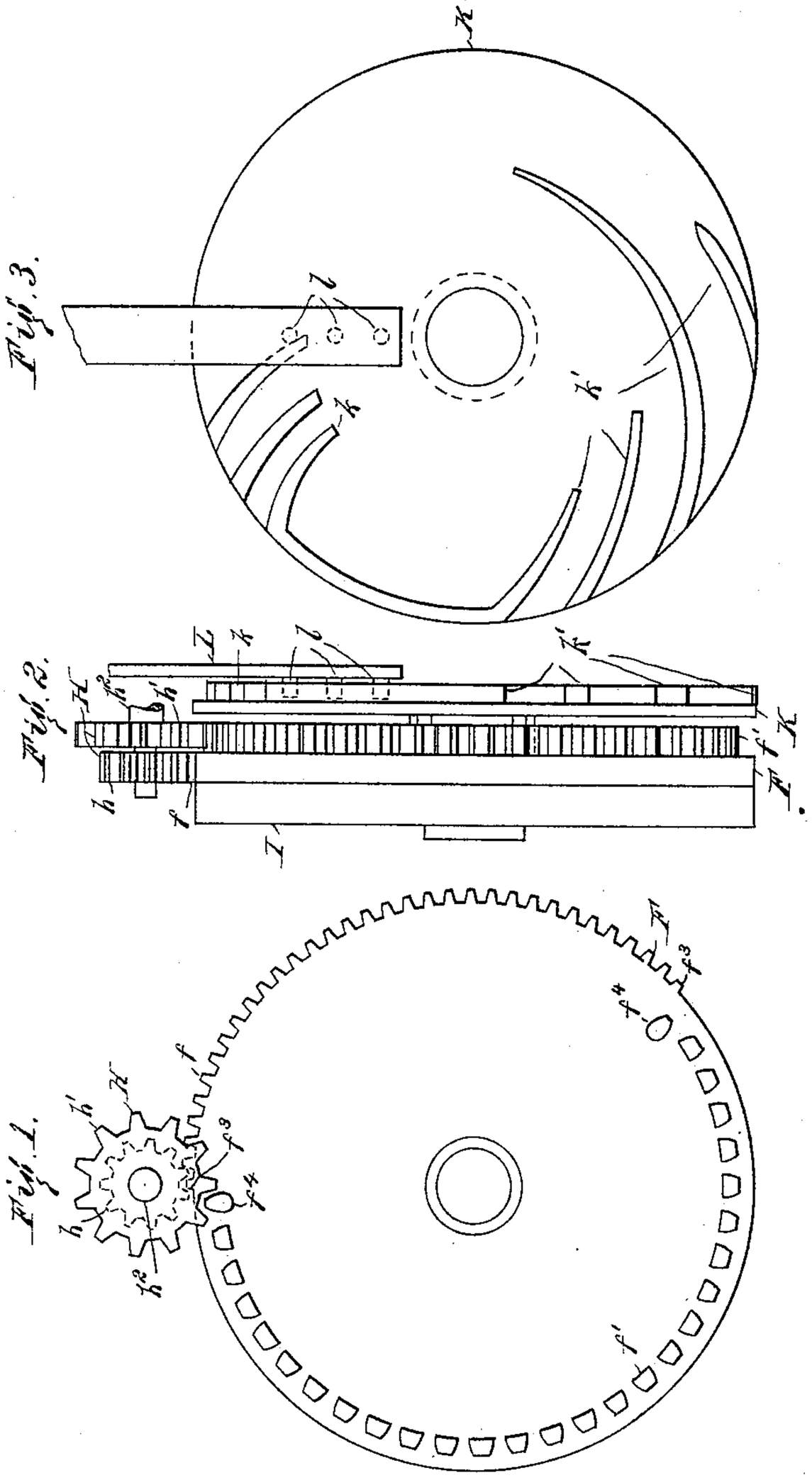

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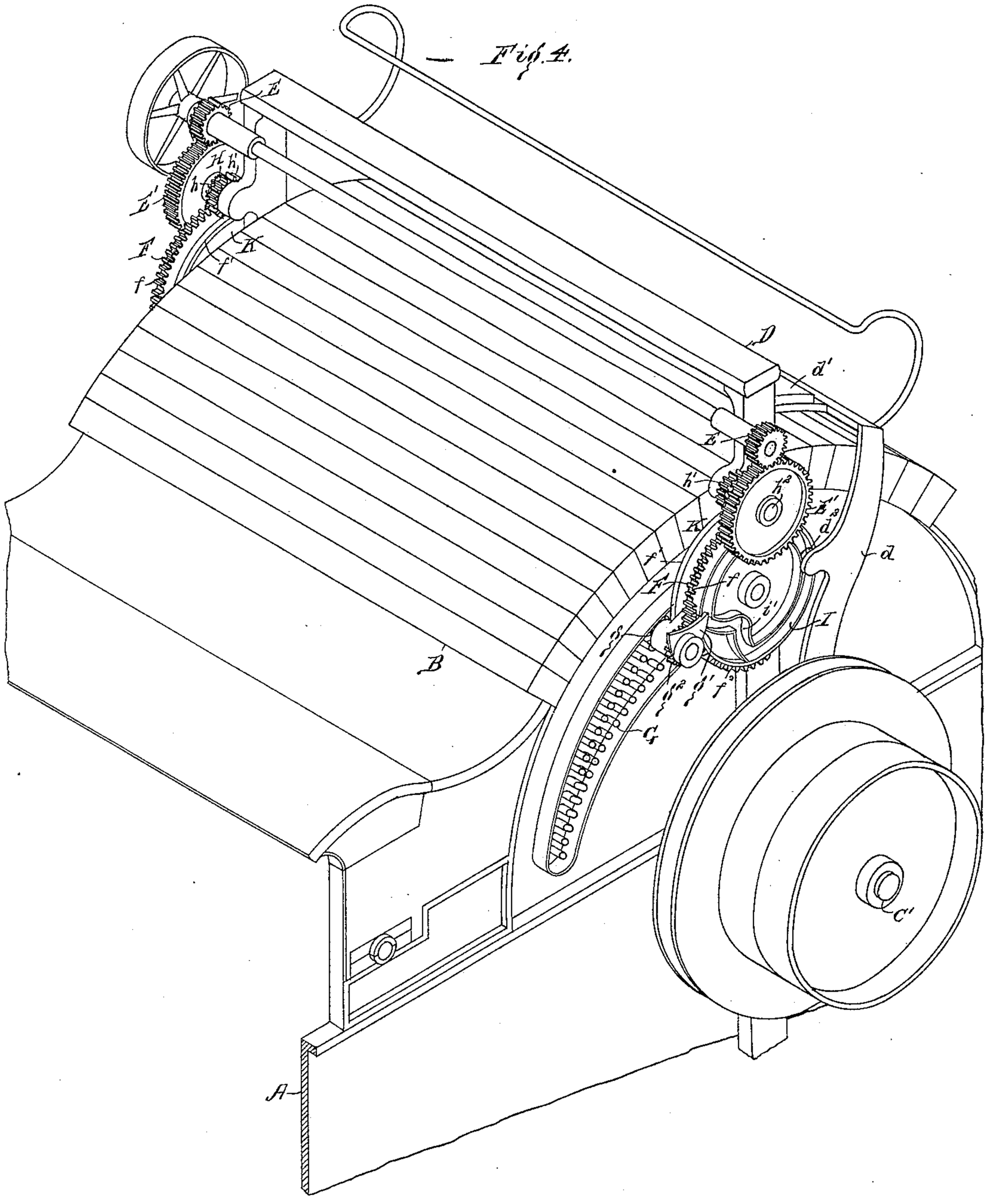
Fig. 4.



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UNITED STATES PATENT OFFICE.

ALONZO FALLS, OF LOWELL, MASSACHUSETTS, ASSIGNOR TO HIMSELF AND ALEXANDER G. CUMNOCK, OF SAME PLACE.

TOP-FLAT STRIPPING MECHANISM FOR CARDING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 365,250, dated June 21, 1887.

Application filed December 18, 1886. Serial No. 221,997. (No model.)

To all whom it may concern:

Be it known that I, ALONZO FALLS, a citizen of the United States, residing at Lowell, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Top-Flat Stripping Mechanism for Carding-Machines, of which the following is a specification.

My invention relates to top-flat stripping mechanism for carding-machines; and it consists in the improved means, hereinafter described and claimed, for imparting to the said mechanism while raising and stripping a top-flat or flat-card a comparatively rapid motion and a slow motion while traversing from flat to flat, said motions alternating with each other in order that the stripping operation (including the lifting and returning of the flat-cards to position) may be performed as rapidly as possible, and that the carding surface of such machines may be diminished by said operation for as short a time as possible.

In the accompanying drawings, Figure 1 is an elevation of the inner side of the stripping-cam gear, or gear provided with the cam-groove which operates the stripping-arm, and the double driving-pinion which impels said gear; Fig. 2, a rear elevation of these parts and of the lifting-cam and of a part of the lifting-rod; Fig. 3, an elevation of the inner side of the lifting-cam and of the lower part of the lifting-rod, the pins of the lifting-rod and a part of the cam being shown by dotted lines; Fig. 4, an isometric view of a portion of the carding-machine, showing the top-flats and the stripping mechanism, including the lifting and traversing devices of the same.

The frame A of the carding-machine, the top-flats B, the main cylinder, the frame D of the stripping mechanism, the stripper-arm *d*, the stripper *d'*, the traverse-pinion *g*, the rack G, with which said pinion *g* engages to traverse the stripping mechanism from flat to flat, the guard *g'*, and pinion g^2, both turning with said pinion *g*, and the pinion E, which operates the stripping mechanism, are all of the usual construction and operation, the frame of the stripping mechanism swinging upon the shaft C' of the main cylinder, substantially as shown in Patent No. 14,481, granted March 18, 1856, to George Wellman.

The pinion E engages with an intermediate gear, E', in the usual manner, and to the gear E' is ordinarily secured a single pinion, which drives the stripping-cam gear F, the latter being usually provided with teeth of uniform pitch entirely around its circumference.

To get the fast and slow speed mentioned above, I use a double gear—that is, a gear which has two pitches and two pitch-lines, each in a different part of the gear. The proportions of the numbers of the two sets of teeth of the stripping-cam gear should, in my judgment, be about as represented, but may be varied to suit circumstances. I have shown said gear F as provided with thirty-three peripheral or spur-teeth, *f*, of such a pitch that eighty-four such teeth would extend around the gear, and I provide said gear with twenty-eight parallel or face teeth, *f'*, which project inward from the face of the disk of the cam-gear, said last-named teeth being arranged in an arc concentric with the periphery of said cam-gear, said sets of teeth being so arranged as to be in effect continuous with each other—that is to say, the two imaginary gear-sectors, which respectively carry said sets of teeth, the spur-teeth, and the face-teeth together form a complete circle.

The double pinion H, which drives the cam-gear, is shown as two pinions, *h h'*, rigidly secured to a common shaft, h^2, which is driven in the usual manner continuously at a uniform speed; but evidently these pinions *h h'* might be cast in one piece. The pinions *h h'* have an equal number of teeth, (eleven being shown on each pinion,) but have different diameters, different pitches, and different pitch-lines, the smaller pinion, *h*, engaging the spur-teeth, *f*, of the cam-gear and the larger pinion, *h'*, engaging the face-teeth of said cam-gear, the engagement of the pinions alternating, so that their common pinion-shaft, h^2, being continuously rotated, the cam-gear F is continuously rotated; but while the pinion-shaft h^2 is uniformly rotated, the cam-gear has an alternately faster and slower motion—faster while the larger pinion *h'* is in engagement with the

face-teeth, f', and slower while the smaller pinion is in engagement with the spur-teeth f. The cam-groove I, which engages a stud, d^2, projecting from the stripper-arm d in the usual manner, is of the usual shape, being concentric with the cam-gear throughout the greater portion of the length of said cam-groove, and in this part producing no effect to move the stripping-arm, the effective portion i' of the cam-groove I being in engagement with the stripping-arm only when the cam-gear has its faster motion.

The cam-gear F is provided with a third set of spur-teeth, f^2, this set of teeth extending only partly around the cam-gear and engaging with the pinions g^2 in the usual manner, the traverse-pinion g engaging with the pins of an arc-shaped rack, G, secured to the side of the frame of the carding-machine concentrically with the shaft of the main cylinder in the usual manner, the purpose of the traverse-pinion and traverse-rack being, as is well understood, to cause the stripping mechanism to move from one to another of the top-flats, in order that the same may be stripped.

A guard, g', is secured to the pinion g and turns with it, and when said last-named pinion is at rest is in contact with a peripheral flange on a cam-gear, the portion of the guard next the flange being concave to fit the same to prevent the traverse-pinion g from turning, and by the engagement of the traverse-pinion with the rack G to hold the stripping mechanism in the usual manner exactly in its proper position for raising and stripping the flat being operated upon. The set of teeth f^2 are of course not in the same vertical plane with the spur-teeth f, above mentioned, but are so arranged that the slower motion of the cam-gear and the traversing of the stripping mechanism are simultaneous with each other.

The lifting cam K, provided with the cam portions $k\,k'$ for raising and lowering the lifting-rod L by engaging the horizontal pins l, projecting from said lifting-rod, is so secured to the cam-gear as to operate said lifting-rod while the cam-gear is rotating at its faster speed.

The respective numbers of teeth in the sets of spur-teeth f and face-teeth f' first above described are not of course limited to the exact numbers given above; but the angular space occupied by the face-teeth should be sufficient to allow the operations of lifting, stripping, and lowering the top-flats to their positions to be begun after the cam-gear F has acquired its greater speed and to be completed before said cam-gear resumes its slow motion.

In order that the teeth may not require so great accuracy of construction, the teeth at each end of each set of teeth $f\,f'$ may be different from the other teeth of the same set, the spur-teeth f^3 f^3 at each end of the set of teeth f being of about half the length of the other teeth of the same set, and the end teeth, f^4 f^4, of the set f' of face-teeth being narrower at the outer side to enable the smaller pinion, h, and the larger pinion, h', more readily to be engaged with and disengaged from said spur-teeth and face-teeth, respectively; but the end teeth of each of these sets may, if the teeth are carefully constructed and properly located, be like the other teeth of the same set.

By the use of the pinions $h\,h'$, spur-teeth f, and face-teeth f' I am enabled to secure the fast and slow motion without reducing the speed to such an extent as is required where segmental gears, adapted to engage each other once in every revolution of their supporting gears, are secured to the intermediate gear and cam-gear, and without any labor of adjustment of the parts, because the pinions $h\,h'$ may evidently be cast in one piece and cannot both be in engagement at the same time, so that the teeth of said pinions, being arranged alternately with each other, it is only necessary to engage the compound pinion $h\,h'$ with any part of the double gear and they will work properly together without any jar or shock when the pinions $h\,h'$ pass into and out of engagement, because the pinions are complete and not segmental.

I claim as my invention—

1. The combination of the main shaft, the supporting-frame swinging on said shaft, the cam-gear provided with a stripping-cam groove and with two sets of gear-teeth continuous with each other, said sets having different pitches and pitch-lines, and two pinions rigidly secured together concentrically with each other, one of said pinions having a pitch and a pitch-line to correspond with one set of said gear-teeth and the other of said pinions having a pitch and a pitch-line which corresponds with the other set of said gear-teeth, the stripper-arm provided with a stripper and with a projection which engages with said stripping-cam groove, the lifting-cam turning with said cam-gear, the lifting-rod provided with pins to engage said lifting-cam, and means, substantially as described, of giving to said pinions a continuous and uniform rotary motion, the traverse-rack, the traverse-pinion engaging said rack, and another pinion secured to said traverse-pinion and engaging a third set of teeth, with which said cam-gear is provided on a portion of its periphery, said sets of teeth on said cam-gear being arranged, as described, so that said cam-gear and said lifting-cam are rotated at a greater speed while said lifting-rod is being raised and while the stripper is being operated, and at a less speed when the stripping mechanism is moving from flat to flat, as and for the purpose specified.

2. The combination of two concentric pinions having different diameters, different pitches, and different pitch-lines, and rigidly secured to each other, and the gear provided with a set or row of spur-teeth, and provided also with a set or row of face-teeth, the smaller of said pinions engaging with said spur-teeth and the larger pinion engaging with said face-teeth alternately with each other, the end teeth of said row of spur-teeth being shorter

than the other teeth of said row and the end teeth of said face-teeth being narrower at the outside to enable said smaller pinion and said larger pinion more readily to engage with and to be disengaged from said spur-teeth and face-teeth, respectively, as and for the purpose specified.

3. The combination of the main shaft, the supporting-frame swinging thereon, two concentric pinions having different diameters, different pitches, and different pitch-lines, and rigidly secured to each other, and the cam-gear provided with a cam-groove and with a set or row of spur-teeth, and provided also with a row of face-teeth, the smaller of said pinions engaging with said spur-teeth and the larger of said pinions engaging with said face-teeth alternately with each other, the end teeth of said row of spur-teeth being shorter than the other teeth of said row and the end teeth of said face-teeth being narrower at the outside than the other face-teeth to enable said smaller pinion and said larger pinion more readily to engage with and to be disengaged from said spur-teeth and face-teeth, respectively, the stripper-arm provided with a stripper and with a projection which enters said cam-groove, the lifting cam turning with said cam-gear, the lifting-rod provided with pins to engage said lifting-cam, means, substantially as described, of giving to said pinions a continuous and uniform rotary motion, the traverse-rack, the traverse-pinion engaging said rack, and another pinion secured to said traverse-pinion and engaging a third set of teeth, with which said cam-gear is provided, said sets of teeth on said cam-gear being arranged respectively to each other, substantially as described, to rotate said cam-gear and said lifting-cam at a greater speed while said lifting-rod is being raised and while the stripper is being operated, and at a less speed when the stripping mechanism is being moved by the rotation of said traverse-pinion, as and for the purpose specified.

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